

Understanding the Relationship between Climate Change and Conflict: A Case Study of Pakistan



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2019

Understanding the Relationship between Climate Change and Conflict: A Case Study of Pakistan

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A thesis submitted in partial fulfillment of the requirements for the degree of

MS Peace and Conflict studies

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DECLARATION

I certify that this research work titled Understanding the Relationship between Climate Change and Conflict: A Case Study of Pakistan is my own work. The work has not been presented elsewhere for assessment. The material that has been used from other sources it has been properly acknowledged / referred.

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Abstract

This research aims to apprehend the phenomenon of climate change as a threat multiplier in Pakistan and conceptualizes the issue through the lenses of vulnerability, risk, and adaptive capacity. Furthermore, it considers Homer Dixon theory (1994) to analyze the relationship between environmental scarcity and threat climate induced conflict in Pakistan. In particular, the concept of vulnerability helped to recognize social and physical vulnerabilities and generate understanding of possible climatic risks, which Pakistan is already facing. Since last decade, repeated incidence of natural disasters especially floods, expose the country highly vulnerable to the negative impacts of climate change. In addition to country's geographical location and socioeconomic conditions making it vulnerable to climate induced natural disasters. In comparison to above-mentioned inkling of environmental insecurity, four key links of climate change have been identified as a threat multiplier: political instability, economic weakness, resource scarcity, and mass migration. This research argues that, climate change may increase the risk of conflict only under certain conditions and as an interactive outcome with certain socio-political factors.

Acknowledgement

First, and most of all, I would like to thank Dr. Muhammad Makki, for his expertise, assistance, guidance and patience throughout the process of writing thesis. Without the help of my thesis advisor this research would not have been possible. I would like to thank my GEC members Dr Bakare Najimdeen and Dr Imdadullah for their suggestions and encouragement. Thankyou Dr. Bakare for many generous and helpful suggestions.

Table of Contents

1. Introduction	1
1.1. Evolution of Global climate change agenda	2
1.2. The Climate Change and Security Nexus: The Global Discourse	3
1.3. Statement of problem	5
1.4. Methodology	5
1.5. Research questions	5
2. Literature Review	6
2.1. Socio-economic factors contributing to climate change risks.....	12
2.1.1. Population demands	12
2.1.2. Global stability.....	12
2.1.3. Distribution of wealth	12
2.1.4. Local versus national government decision-making.....	12
2.2. The relationship between climates related change and security risks	13
2.2.1. Climate change and risk of conflict- vulnerabilities and risk	16
2.2.2. Asia	18
2.2.3. Climate conflicts in Asia.....	18
3. Conceptual framework.....	23
3.1. Vulnerability.....	23
3.1.1. Internal vulnerability and external vulnerability.....	25
3.1.2. Socioeconomic and biophysical.....	25
3.2. Risk hazard.....	25
3.3. Adaptive Capacity	27
3.4. Table Possible Interaction between Climate and Security	30
4. Climate change as a threat multiplier: case study of Pakistan	31
4.1. Figure	34
4.2. Climate Change and Agriculture Sector of Pakistan.....	35
4.3. Agriculture implications.....	37
4.4. Table.....	40
4.5. Implication for water sector of Pakistan	41
4.6. Table.....	42
4.7. Climate Change Impacts on Indus River Basin	42

4.8.	Recent Trends of Climate Change and water in Pakistan	44
4.9.	Hydrology of the Indus Basin	45
4.10.	Table: History of natural disasters in Pakistan	47
4.11.	Table: Assessment of Costs Faced by Pakistan after 2010 Flood	47
5.	The Impacts of Climate Change on Pakistan: Possible Implications for Human and National Security	48
5.1.	Pakistan’s socio-economic, governance deficits, and fault lines include:	49
5.2.	The Climate Change-Security Nexus: The Need for Recognition and Operationalization	49
5.4.	Exacerbating Ethnic, Regional, and Class Tensions	51
5.5.	Magnifying Demographic Trends: Urbanization and Migration	53
5.6.	Conclusion.....	54
6.	Analysis and Discussion	55
6.1.	Socio-economic Impacts	55
6.2.	Risk and Vulnerability	56
6.3.	Resource Scarcity and Conflict	58
6.4.	Physical Impacts.....	60
6.5.	Risk and Vulnerability	60
6.6.	Resource Scarcity and conflict	62
6.7.	Adaptive Capacity – physical and socio-economic impacts	64
6.8.	Discussion and Conclusion	65
	References.....	68

1. Introduction

This study looks at the input of environmental change in Pakistan as a risk multiplier. It claims that a lack of funds could never be the primary cause of the cultural dispute in Pakistan. However, evidence indicates that the economic shift in Pakistan interacts with Pakistan's composition and function, triggering techniques that increase racial, tribal and class rivalries. These combinations of powers promote helpful resources, marginalization and progressive strengthening of the government and the underprivileged and increasing economic issue. These procedures in turn culminate in high disputes (interethnic as an example) and poverty, particularly in metropolitan areas of the state. The concept of vulnerability applied to interpret Pakistan's societal and natural vulnerability and to examine Pakistan's adaptive capacities towards impact of climate change. First step was to understand climatic vulnerability and risks elements, furthermore, to generate the concept of vulnerability and risk in context of Pakistan's climate change, which lead us to two important vulnerable sectors of Pakistan to climate change i.e. Water and Agriculture. As an agricultural economy, Pakistan's economy depends upon agri-business. Changes in precipitation, crop production and unawareness are already affecting agriculture sector of Pakistan, which is discoursed in chapter 4. However, water sector is equally vulnerable, excessive use of water, lack of technology, melting glaciers, floods, trans boundary agreement and interprovincial competition has lead water issues more significant. Importance of melting glaciers have been identified by many researches which clearly indicates that fast melting of glaciers will eventually increase scarcity of water. Recent flooding in Pakistan indicates our weakness for adaptive capacity. In addition, if we keep lacking and kept wasting our water this might lead towards resource scarcity in country, which will eventually generate interprovincial chaos. To comprehend the relation between environmental scarcity and contention homer Dixon theoretical framework applied towards further construct an understanding of worst situation Pakistan could face because of environmental scarcity and societal vulnerability. In brief, this research identifies Pakistan's climatic risk and vulnerabilities. Moreover, to understand the relationship between climate change and possibility of conflict in Pakistan.

The aim of this study was to know how climate change and war are linked to Pakistan and, as such, two main preliminary issues were addressed: how Pakistan is susceptible to climate change. Why is climate change regarded in Pakistan as a risk multiplier? Seven different types of

vulnerabilities have been discovered, Food and Water Shortages, Frequent and more Intense natural disasters, unaware, The population is increasing poor financial assets and floods and glacier are shrinking. This study attempts to comprehend the difference between climate change and immediate conflicts because no proof is found of climate change and consequently immediate conflicts are recognized in order to create a climate change link with safety conditions.

Wired N. D. defines climate change as:

"A broad range of global phenomena created predominantly by burning fossil fuels, which add heat-trapping gases to Earth's atmosphere. These phenomena include the increased temperature trends described by global warming, but also encompass changes such as sea level rise; ice mass loss in Greenland, Antarctica, the Arctic and mountain glaciers worldwide; shifts in flower/plant blooming; and extreme weather events."

1.1. Evolution of Global climate change agenda

In 1988, the World Meteorological Organization (WMO) and the UN Environment Programmed (UNEP) together settled the Inter-Governmental Panel on Climate Change (IPCC) including many researchers from everywhere throughout the world to evaluate the logical, specialized and financial data applicable for the comprehension of the danger of human prompted environmental change, its potential effects and alternatives for moderation and adjustment. Researchers expected that higher high temperature would initiate a fast melting of mounts ice sheets and Artic ocean ice prompting progressively visit extraordinary climate occasions, for example, floods, cyclonic tempests, heat waves and dry seasons compromising low lying beach front areas and island nations and environments all over the place. Established researchers required a powerful worldwide reaction to the approaching atmosphere emergency. The primary report of the IPCC, liquidated in 1990, validated the agreement in established researchers on the causes and effects of environmental change. The report educated the between administrative dealings propelled by the UN General Assembly that year to consider a conceivable worldwide reaction to environmental change. The exchanges prompted the selection of the UN Framework Convention. (Bhandari, 2018)

At Rio in June 1992 at the UN meeting on Environment and Development (UNCED). On "Climate Change conference (UNFCCC)". The Convention became effective in March 1994. The UN climate change conference characterized environmental change as "a difference in atmosphere

which is ascribed straightforwardly or in a roundabout way to human movement that adjusts the arrangement of the worldwide temperature...." "A definitive goal" of the Convention is "the adjustment of the ozone depleting substance (GHG) focuses in the climate at a level that would avoid hazardous anthropogenic impedance with the worldwide framework." The UN climate change conference affirmed that environmental change caused generally by GHG outflows; particularly CO₂ for the most part in the then industrialized nations and approached them to lead the pack in decreasing the discharges to balance out the atmosphere. Tied down in the standards of "value" and "regular however separated duties and particular abilities of nations at various degrees of improvement. (CBDR), the Convention expressed the commitment of created nations to give money related, innovation, and limit building help to the creating nations to adjust to the unfriendly effects of environmental change and seek after the objective of financial advancement and destitution annihilation (Spencer, 2008).

The third COP held in the Japanese city of Kyoto intended to actualize the 1992 Framework Convention. Another round of conferences in 1995 prompted the appropriation of an understanding the Kyoto Protocol-in 1997 during the third COP. Under the Protocol, the created nations (37 on the whole) consented to diminish their GHG emanations by a normal of 5 % beneath the 1990 level up to 2012. The US Government confronting restriction in the Congress neglected to amend the Kyoto Protocol, later supporting its position by pointing out that it did not require emanations decreases by China and other industrializing creating nations. Thusly, Japan likewise revoked its commitments under the Protocol. (Jhonston 2017)

More than 43,000 delegates of states and different partners, including 150 heads of state and government, went to the "Paris Climate Conference" (COP 21). The French Government attempted colossal endeavors towards the accomplishment of the exchanges. The Paris Agreement perceives that environmental change "speaks to an earnest and conceivably irreversible danger to human social orders and the planet." This also depicts environmental change as "a typical worry of mankind" and broadcasts an understanding "to maintain and advance local and global collaboration so as to activate more grounded and increasingly yearning atmosphere activity by all gatherings and non-party partners, including the common society. (Guardian, 2015)

1.2. The Climate Change and Security Nexus: The Global Discourse

The announcement on the result of a noteworthy gathering facilitated by Canada in Toronto in June 1988 subtitled *The Changing Atmosphere: Implications for Global Security* cautioned

that adjustments in world atmosphere "speak to a noteworthy danger to worldwide security." Including that, "the conceivably extreme monetary and social separation for present and future ages would decline universal strains and increment danger of contentions among and inside countries."

Notwithstanding, the security ramifications of environmental change did not figure in the underlying worldwide talk on environmental change. Neither the "UNFCCC (1992)" nor the "Kyoto Protocol (1997)" alludes to it. An announcement of "UN Secretary General Kofi Annan" in 2000 suggested "a developing agreement that aggregate security can never again be barely characterized as the nonattendance of contention" and recognized "ecological calamities" as "one of the dangers to human security." The report of the UN "unusual state Panel on Threats, Challenges, and Change" (2004) referred to "ecological corruption and environmental change" as one of the worldwide dangers justifying preventive activities." The report required "the compelling execution of the "Kyoto Protocol" and new exchanges towards a post-2012 long haul methodology for diminishing a dangerous atmospheric devotion." (Guardian, 2012)

The "UN Security Council" examined the security ramifications of environmental change without precedent for 2007 at which many part states, particularly the little island nations, featured the dangers to their security and surely survival presented by environmental change. In 2008, the UN General Assembly held a discussion on "Environmental Change as a Global Challenge" in the wake of the IPCC's fourth evaluation report prompting the selection of a goals approaching all UN organizations "to increase their endeavors in considering and tending to environmental change, including its conceivable security suggestions." The goals mentioned the Secretary General (UNSG) to present a report on "the conceivable security ramifications of environmental change" at the following "(64th) session of the General Assembly". (Ibid)

1.3. Statement of problem

There is no direct relationship between climate change and violent conflict. However, underneath certain circumstances, weather-associated change can influence elements that cause disruption in society which lead towards conflict. Pakistan is vulnerable to climate change. If vulnerability on the resources increases, the scarcity of resources might increase risk of conflict.

1.4. Methodology

To expand links between climate change and conflict, Concepts for vulnerability, Risk, and adaptive capacity applied for the secondary supply of facts and the simulation of different elements associated with the climate change and conflicts' nexus. This study contains both qualitative and quantitative method and interviews conducted under each theme that is risk, vulnerability, resource scarcity, climate change, and conflict respectively.

Secondary facts retrieved from the scholarly articles, newspaper articles, books, and journals for the analyses. The subdivisions of each criterion are essential for information the intensity of those factors. The model is three dimensional and based totally at the definition and approach of United Nations institute of Disaster Risk Reduction (UNISDR) that stipulates three different elements of vulnerability. Hazard and exposure, vulnerability and coping capacity.

1.5. Research questions

1. How did agenda of climate change evolve over the period?
2. What is the relationship between climates change and security risks?
3. Why Climate Change is considered as a threat multiplier in Pakistan? Discuss possible risks and vulnerabilities.
4. What are the possible human and national security implications of climate change in Pakistan?

2. Literature Review

Climate shift has been viewed as influencing the whole of the world. Many nations are particularly concerned about the socio-economic and economic effects of this problem. Moreover, every country on every continent is currently affecting. It frightens domestic markets and influences individuals, networks and nations these days, and tonight, significantly more. Individuals are encountering the huge consequences of environmental alternate, The Ozone harming substance emanations from human activities are exacerbating environmental change and maintain on growing. They are presently at their most accelerated quantities ever. Without pastime, the arena's everyday surface temperature is predicted to ascend over the 21st century and might be going to outperform 3 stages Celsius this century with some zones of the arena expected that could warm plenty extra. The poorest and maximum vulnerable people are being prompted the maximum. In any case, environmental exchange is an international test that does not regard national outskirts. Outflows any location influence people everywhere in the location. Its miles a trouble that calls for arrangements that have to be facilitated at the global measurement and it calls for worldwide collaboration to permit growing nations to develop towards a low-carbon economy (The Arena Counts 2014; United International Locations Framework Convention on Climate Trade, 2013).

At COP21 in Paris on 12 December 2015, to tackle economic changes, countries obtained the Paris Convention. Not precisely a year ago did the agreement come into force. In the contract every state decided to operate to reduce global temperatures to much below 2 degrees Celsius and to move to 1.5 degrees Celsius, considering the serious risks. The Paris Convention is fundamental for achieving the sustainable development objectives and provides a guiding principle for operations in the atmosphere that reduce outflows and make for a flexible environment (Gray, 2016).

The three “key risks” posed by using climate change in Asia highlighted by using the IPCC that have already been experienced with the aid of Pakistan are “extended riverine, coastal, and urban flooding leading to massive damage to infrastructure, livelihoods, and settlements”;

“expanded danger of warmth-related mortality; and “accelerated chance of drought-related water and food scarcity inflicting malnutrition”(IPCC) page number

Each as the 2007 record titled “national security and threat of climate change” defined climate change as “a threat multiplier for instability in a number of the maximum risky regions of the sector”, the 2014 document warned that “the projected impacts of weather alternate might be more than threat multipliers; they’ll function catalysts for instability and conflict. “ US Secretary of defence John Kerry in a 2014 assertion defined weather change as “a global chance of the identical importance as terrorism, epidemics and guns of mass destruction” A US department of protection statement (2014) referred to as climate trade “a threat multiplier.” A announcement issued with the aid of the White residence in may additionally 2015 at the countrywide safety Implications of a converting climate pointed out that the “climate change prompted will increase inside the frequency and or depth of excessive weather occasions ...”might lead to monetary and political instability, that could have dangerous national safety implications.

The accessibility of water for society and agribusiness is ending up progressively questionable, especially in tropical, bone-dry, and semi-bone-dry districts. Diminished precipitation and expanding variety in its conveyance in existence as of now affect the efficiency of horticulture and domesticated animals. Abuse of aquifers and inadequately kept up water dissemination foundation make water worry in urban zones. Agreements directing the utilization of transboundary water between countries accept stable streams and have no space or readiness for overseeing capricious water volume varieties after some time. (Marshall.et al 2018)

There might be circuitous linkages between environmental change and the danger of contention. As such, factors that assume a job in expanding struggle hazard might strengthened by environmental change. There are additionally models demonstrating how nearby conflicts around common assets might be activated or exacerbated by atmosphere related components, especially in economies that are exceptionally reliant on normal assets. It is consequently especially vital to see how and under what conditions these progressions may prompt violent conflict. (Benzie, 2015)

All parts of sustenance security are affected by worldwide environmental change. Creation goes down in territories of dubious water accessibility, where the weight from pathogens is changing or temperatures outperform trim resilience. Value vacillations affect the accessibility of nourishment especially for poor family units where sustenance speaks to an expansive part of their

financial plan, which prompts utilization of less nutritious sustenance. The sustenance emergency in 2008 and the years after exhibited how dry season or surges in significant grain creating nations, presumably identified with environmental change, may hugely affect nearby nourishment costs and accessibility. The emergency had long haul ramifications for the most underestimated, especially women, through antagonistic methods for dealing with stress that individuals were compelled to apply. (Forino et al 2015)

It additionally prompted social agitation in numerous nations; especially where specialists were not able to handle its belongings. The impacts of ocean level ascent are hard to foresee – humankind has not adapted to anything comparable in present day times. Huge numbers of the world's biggest urban areas are situated close to coasts and will end up influenced, similarly as little island states in the Pacific, the Indian Ocean, and the Caribbean. Employments, economy, exchange, political portrayal and numerous different elements affected and will request long haul arranging and readiness. Which should be conceivable given that the progressions will happen moderately gradually. (Ng et al, 2017)

Therefore climatic change and water accessibility are immediately linked between weather and environment (Ludi 2009) as one of the main drivers of agricultural productivity. Contrary to a common misunderstanding, rising sea levels will not only flood highly inhabited coastlines and delta structures, but will also affect arable areas.

This could contribute to salinity in agricultural and beverage areas, triggering food insecurity, water shortages and waterborne diseases, both of which are significantly impacted by aquaculture sector and agricultural groups. Water shortages in northern Pakistan and rising ocean levels along Pakistan and India could contribute to thousands of refugees escaping major national cities that affect both climate and intra-regional security. (Salman 2014; Nelson et al. 2010).

In the context of their resilience to the implications of past and future climate change, the following findings are relevant in Pakistan and India in particular. Mean rainfalls have declined by –10% to –15% since 1960 in Pakistan's desert hills and in the central zone, while average precipitation rose during the same era in North Pakistan. In 2010, the amount of high precipitation occurrences grew, with nine highest precipitations registered in 24 hours. (World Bank, 2015).

The latest natural hazard disaster in Pakistan and India demonstrates the poor processing capacities of both these nations and relatives. In order to affect their safety by severe circumstances, a growing number of refugees in the setting enter metropolitan areas, an effect on their earnings and livelihoods. Both countries were two of the ten most affected by climate change in the last two decades. (Salman, 2012)

According to the study, climate change threatens shoreline populations around the globe (Cities at Risk of Climate Conflict, March 2018) and threatens water and food sources. Taps have been wet for long stretches in some areas of Pakistan's biggest town, and spring ' water is too bitter to consume. Karachi's water supply indicates that either leakage losses and/or robbed the whole 42 percent of the municipal water supply. Water thieves are siphoned back for distribution to starving people.

The socio-political and financial implications of these effects will worsen as worldwide warming remains to develop. Pakistan is the seventh most susceptible nation to serious weather shift under the 2018 Global Climate Risk Index published by a German think group. There have been unexpected floods, extended droughts, and heat waves over the previous 20 years. In relation to the chaos caused to many of the marginally impacted indigenous populations throughout the nation, Pakistan was put on the leading edge of the 2010 super rains, which cost an approximately \$25.3 billion. (Climate instigated threats,2018)

The impacts of climate change have been acknowledged to move individuals, most of which will occur on domestic frontiers. The Intergovernmental Panel on Climate Change has included the most significant effect of environment shift on human movements in its very first 1990 study. It is projected that 150 million individuals could be displaced by 2050, in wilderness, water shortages, earthquakes, hurricanes and other events linked to climate change. (Climate change and internal displacement, Brookings-LSE report, 2014)

As of 2009, every other second individual has been catastrophe affected, with an estimate of 22.5 million individuals affected by occurrences related to environment or weather since 2008. (IDMC 2015). The UNHCR reports that the rains in Pakistan between 2010 and 2012 and the 2015 earthquake in Nepal can find a enormous number of individuals traumatized without accommodation, safe water and fundamental equipment in Somalia and rapid onsets such as droughts in 2012 according to the UNHCR study on disaster and displacements, January 2015.

Most displaced people will stay within their own borders where countries have clearly defined responsibility; the international community can provide aid and humanitarian assistance at the request the international community can.

In 2016, 23.5 million fresh displacements were responsible for disasters with 97 percent fold due to climate and climatic occurrences. Nearly 12.9 million displacements worldwide were caused by hurricanes along with hurricane Matthew, who precipitated more than one million people to be displaced by themselves in Cuba. The hurricane cash paid all the internally displaced people registered in Cuba and large parts of the rent in the United States and Haiti. (Disasters & weather alternate: Internally Displaced humans and Refugees, July 2017)

While few countries in South Asia and Southeast Asia are extremely susceptible to economic changes, little attention has been given to the links between climatic change and ferocious clashes in those two areas. In resource dependent revenue generation, for example, from farming or fisheries an example of reliance that is obvious crosswise over south Asia. This proposes a lessening in business security through lost salary from farming or angling, or lost sustainable characteristic assets, for example, nourishment and water, can build the danger of beginning and the elements of vicious clash. Precipitation stuns, diminishes in precipitation or oceanographic changes can adversely influence pay channels. This would then be able to diminish the open door cost of individuals taking an interest in illicit salary producing exercises or joining equipped gatherings, particularly in regions where there is no legitimate elective wellspring of pay. In some waterfront zones of Indonesia, for instance, diminished salary openings from angling have connected to an expansion in robbery related exercises. In different cases, for example, in certain regions influenced by the Naxalite struggle in India, intensifying employment conditions have identified with the expanded force of continuous common clashes, with expanded help for dissident or government groups. (sipri insights on peace and security no,2018)

The character of the contention in these cases is frequently low power, local and receptive to occasional elements. In addition, the accessible proof proposes that expanded force of continuous clashes or lighting new strains between and inside communal groups is not generally the result of environmental related climatic occasions. A few investigations propose that the versatile limit of gatherings must be calculated into the condition. For example, atmosphere versatile techniques as well as quick beginning calamity reactions in districts subject to

inexhaustible characteristic assets can at times light new pressures between and inside public gatherings over access to these resources while at different occasions they do not. Somewhat, the result appears to rely upon the ability of local government and facilities to adapt the climate. (Roser, M., 'Employment in agriculture', our world in data, 2018.)

In keeping with one of the sectors of the industry most significantly impacted will be the Intergovernmental Panel on Climate Change (IPCC) Asia due to commercial enterprise-as-traditional international warming, nations in temperate and tropical Asia are in all likelihood to have extended publicity to excessive events. Fire hazards, hurricanes and tropical cyclones, tornadoes and slurs and severe vector-born conditions will once again live together with the forested region. Climate trade pressures are probable to disturb hill and lowland biodiversity in Asia. The melt of glacier is expected to boost in the changed environment. An increase in the sea level would cause huge flooding along the huge Asian shoreline and the sandy shoreline recession. Mangrove and coral reefs in Asia have an environmental stabilization that is at risk. (IPCC ,2007)

The South Asian region will also be hit by critical air supply problems, gigantic cuts in crop and corn production, increased diseases, flooding in several areas and drought in other areas and undoubtedly major disruptions of the entire monsoon process. For large areas of North India, a significant reduction in water availability is feasible, the kind of 80 percent of which are encountered by the help of a Himalayan snow-cutting unit more often than not throughout dry summer months. The South-west Mountain is one of the most important global climate operations and offers around 90% of the annual precipitation in the surrounding area. The start, duration, size and total rainfall of the monsoon are key considerations for determining the fitness of the farming industry in India, which still plays a leading role within the US economic system. In keeping with one estimate, 45 percent of the version in India's gross home product over the past 50 years could be defined via the fluctuations in rainfall (FAO 2006). Of finest concern is the opportunity that the monsoon may also shift its sample all of sudden and considerably, because of broader adjustments caused by worldwide warming (Shukla, 2007).

2.1. Socio-economic factors contributing to climate change risks

2.1.1. Population demands

Changes in population volume and appropriation and associated cultural pressures such as housing and education. This is to affect all the hazards to ecosystems, such as land modifications, behavior of animals, air condition and the specific risk of pesticides and illnesses.

2.1.2. Global stability

Situations such as conflict, cataclysm and economic crises may affect international trustworthiness, with less stabilization linked to elevated government weight. It has a smaller impact on biodiversity than a fraction of other economic variables and is mainly seen in the increased danger of pests and diseases via international exchanges, climate mitigation and shifts in species migration programs through neighborhood circumstances in rearing or summer locations or through motion.

2.1.3. Distribution of wealth

Distribution of wealth influences and can be influenced by changes in coastal land use because of ocean level ascents, since seaside land gives various environment administrations, for example, the travel industry, diversion and food production. Atmosphere moderation projects can likewise affect and in delicate regions, there is expanded danger of fierce blaze with builds human leisure use, and an effect on water accessibility as interest goes up.

2.1.4. Local versus national government decision-making

Decision-making between local and domestic government will likely affect all ecosystems chances yet specifically, atmosphere mitigation measures, which are firmly affected by open discernment, for example, building up a vitality methodology and utilization of sustainable power source. Urbanisation vs regional enhancement has a strong impact on many wildlife areas, including animal behavior and habitat modifications by property use modifications, air performance and availability by extending the value of sewage systems versus water for use.

Human prosperity is inseparably connected with the earth and environment, in frequently complex way. Some human populaces are especially powerless against the impacts of regular dangers, changes to the perfect water supply, or disturbance to essential businesses, for example, farming through environmental change. Moreover, the social advantages of the earth, such recreation and prosperity, can likewise be lost through changes to the earth. (UNPRI, 2014; Anneli Sundin 2015)

2.2. The relationship between climate related change and security risks

Numerous threats to worldwide stability and safety recognized, along with the following: (Berlin, 2007, pp. nine-10; Peter Swartz & Doug Randall October 2003, p. 2; Joshua W. Busby)

1. Conflict over resources. Reduction of arable land, shortage of water, diminishing meals and fish shares, multiplied flooding and extended droughts;
2. Coastal cities and critical facilities monetary harm and threat; Lack of territory and border disputes. Loss of territory because of declining coastlines and submergence of large areas, which includes Small Island states, which includes entire international locations, more disputes over different territorial rights land and maritime borders are probable.
3. Eco-fast development (the IPCC expects a broad range of 50 million by the end of the century and a range of 2 hundred million by 2050); Intensified opposition over resource components unsettled access;
4. Climate alternate may additionally notably growth instability in susceptible or failing states by using over-stretching the already restricted capacity of governments to respond effectively to the challenges they face Conditions of fragility and radicalization.
5. The multilateral device is at threat if the international community fails to deal with the threats mentioned above .Pressure on international governance. Climate related change influences would fuel the politics of resentment between those people most suffering from it and most answerable for weather change
6. Threats for global economic improvement;
7. Threats of developing international distributional conflicts between the primary drivers of weather change and people maximum affected.

According to a recent EU paper. The core project is that alternating climates threaten to overburden already fragile and conflict-prone countries and areas. It is crucial to acknowledge that the dangers are not just humanitarian; they also include political and protection hazards that affect EU interests directly. Moreover, it is apparent that many of the problems associated with the effect of alternating climate on global safety are linked to the idea of human security that require comprehensive policy responses. As an example, the attainment of the Millennium improvement dreams would be at sizable threat because weather alternate, if unmitigated, may also well wipe out years of improvement efforts.”

(Weather trade and international protection, p. 2)

The availability of water for society and agriculture is turning into increasingly uncertain, especially in tropical, arid, and semi-arid areas. Reduced rainfall and growing variation in its distribution in time and area already affect the productiveness of agriculture and farm animals. Overuse of aquifers and poorly maintained water distribution infrastructure create water strain in city regions. Agreements regulating the usage of transboundary water between nations anticipate stable flows and have not any space or preparedness for handling unpredictable water volume variations through the years. (Earl et al, 2015)

All elements of food security are motivated by means of international climate trade. Production goes down in regions of uncertain water availability, in which the stress from pathogens is changing or temperatures surpass crop tolerance. Price fluctuations affect the supply of meals particularly for negative families where food represents a large portion in their finances, which ends up in intake of much less nutritious foods. The food disaster in 2008 and the years after confirmed how drought or floods in most important grain generating nations, in all likelihood associated with climate change, may have massive influences on nearby meals expenses and availability⁴ (Schaar, 2013). The crisis had long-time period outcomes for the most marginalized, in particular women, through terrible coping mechanisms that human beings were compelled to use (Scott-Villiers et al 2016). It additionally caused social unrest in many nations, mainly where authorities were unable to dampen its effects.

The effects of sea rise level are hard to be expecting – humanity has not coped with something comparable in modern times. Many of the world’s largest cities are placed close to coasts and becomes affected, simply as small island states inside the Pacific, the Indian Ocean, and the Caribbean. Livelihoods, financial system, exchange, political illustration, and many different elements may be encouraged and could demand lengthy-time period making plans and preparedness, which should be possible given that the changes will occur notably slowly. at the same time situations for orderly decision-making tactics is contextual, wherein edition potential and governance turns into essential. In some uncovered coastal regions, citizens and local government have initiated packages for deliberate relocation to greater elevated and guarded sites. Inuit groups in Alaska are already seriously laid low with sea level rise and hotter winters. Thus far, efforts at planned relocation show principal challenges (Bronen et al 2017). There may be no applicable legislation, it is miles doubtful how relocation need to be financed, who ought to

be compensated, where groups beneath chance need to circulate, and whilst and by way of whom selections ought to be made.

Weather change leads with fact to more intense and in some cases greater common intense weather activities, at the same time as turning into more unpredictable in time and area. This does not best imply storms, floods and droughts, but to longer periods of intense warmth, the latter an increasingly more identified fitness risk when mixed with excessive humidity (Khan, F et al 2014). Severe events disturb public services, economic activities, cause losses in phrases of bodily property, and useless and injured people. Most inclined are bad households who tend to live inside the maximum hazardous environments.

The problem of human beings migrating because of climate alternate has been given a great deal attention – the belief of "weather refugees" shows a direct causal courting and occasions just like the threats towards human security that force humans to flee at some point of armed conflict or due to ethnic, political or spiritual persecution. "Weather refugees" are sometimes defined as a protection risk in opposition to the nations wherein they seek safe haven. Migration research points to a variety of things that impact humans' choice to migrate, wherein aid scarcity may be however no longer necessarily is a main motive (Andrén, U. 2016). In addition, there are numerous sorts of migration – seasonal or more everlasting within a country, or global migration that is once in a while permanent however regularly circular, where the migrant often returns from the country of escape spot to the home A. For longer or shorter periods. Round migration frequently includes men and women who are included in two societies and economies. people laid low with sudden natural screw ups – earthquakes, floods, storms – often migrate however only for a short length after which commonly return domestic. There is little indication that migrants have come to be safety threats in opposition to the international locations to which they flow, on the opposite, the migrants themselves often stay a precarious lifestyles when states try to prevent migration. They will be subjected to human rights violations at some point of their hard and risky journey and after they have arrived in their us of vacation spot. In nations with pastoralists, important authorities frequently save you their conventional actions inside and throughout borders. Mobility and migration are among humanity's oldest and most essential model strategies with many positive development outcomes. Several studies of the importance of migration for the improvement of

individuals and societies conclude that migration have to be embraced, facilitated and made extra cozy. (Adger, 2014)

2.2.1. Climate change and risk of conflict- vulnerabilities and risk

The look at of conflict lets in us to remember that its causes are by no means because of one thing accessible. At the contrary, evidence factors to the complexity of the elements, which power conflicts' emergence. Numerous components of the connection between meals, hunger, peace, and battle have however been nicely explored and documented. We recognize that warfare has a robust unfavorable effect on hunger, meals lack of confidence, and malnutrition. Maximum conflicts mainly have an effect on rural regions and their populations. That is specifically real for civil conflicts, which have tripled in current years, and which are nowadays the most not unusual shape of armed struggle, and an increasing number of extended. Such conflicts damage agriculture, disrupt meals production and meals systems, gasoline the plundering of vegetation and livestock, and purpose lack of property and earning. As a result, they are primary drivers of food insecurity and malnutrition. In reality, one of the lasting outcomes of conflicts is their impact on nutrition, in particular undernutrition in the course of early youth, with lots of the ones affected stricken by lifelong physical and/or mental handicaps.

On the other side, there is proof that unexpected excessive food expenses and shortage of get entry to to food have contributed to instability and civil strife. Although this courting have to be nuanced, and brought along with other types of criticism and discontent – whilst there are also symptoms that food security and stepped forward rural livelihoods may additionally make a contribution to the mitigation and prevention of conflicts and to securing sustainable peace. The speedy progression of climate alternate and its outcomes in terms of ecosystems' disruption, herbal disasters, or resource shortage have severe socioeconomic implications, which can result in improved social tensions and political destabilization. There is developing proof of a causal dating between severe weather activities and the prevalence of civil conflicts. This has proved to be legitimate for droughts and neighborhood violent conflicts in Somalia. A have a look at led through Maystad and Ecker (2014) envisioned that one standard deviation increase of the length and depth of drought increases the probability of conflicts by means of sixty-two percentage. The identical observe also suggests that drought-prompted farm animals fee shocks are a prime driving force of nearby struggle.

The accelerated range of intense climatic events might also motive primary displacements of food- and water-deprived populations that migrate toward city centres, thereby increasing the hazard of conflict. In parallel, struggle additionally drives mobility: in 2014, every day conflicts and violence forced humans to escape their houses and are searching for protection either internally or across borders. Fewer refugees (simplest 1 percentage) have back, much less than at any point over the past 30 years. In the identical 12 months, children constituted 41 percentage of the refugee populace, the best percent in extra than a decade.

In different phrases, the effects of climate trade on sources, agriculture, health, and livelihoods threaten to expand the social and environmental pressures, which are the resources of conflicts, and will therefore come to be main factors of destabilization and migration in this century. Weather trade impacts agro-ecosystems simultaneously, which in fact has an effect on crop production, which causes financial and environmental effects, which influence living standards and meat safety.

In different phrases, effect interprets from climate to the environment, to the efficient sphere, to financial and social dimensions. The impact is chosen by astonishment itself and the degree / level of sensitivity of the loaded device at every step of this load transmission cycle. Depending on the vulnerability of the instrument, pressure delivery can be enhanced or decreased. Vulnerability can increase over the years when households and constructions encounter regular hurricanes that erode their base / asset gradually. The ultimate impact on crop security and nutrition these processes, as well as the part performed by the multiple vulnerabilities at each stage.

In its replication report (IPCC, 2014(a)), the IPCC states that exposure and sensitivity are driven by a large number of cultural and financial variables and strategies which to present have been incompletely considered. It also notes that climate risks exacerbate other stressors, often with a negative impact on livelihoods of people living in poverty. Therefore, every biophysical and social vulnerability is crucial since the impact of weather trade on food safety can be taken into account. Social vulnerability explores populations ' demographic, social and monetary characteristics and various characteristics which affect their risk advertising and their ability to respond to negative shocks. A social vulnerability lens is important to see why there are changes in impacts for positive individuals, homes or communities even in the same geographic region.

2.2.2. Asia

It is expected that glacier melts within the Himalayas will boom floods and rock rivers from unsettled slopes and influence water resources for three many years to come. This may be accompanied through reduced river flows as the glaciers recede. Due to climate trade, which in conjunction with population boombing and a growing demand for more residual needs could adversely affect over one billion people by utilizing cooling water available in vital, South, East and Southeast Asia, mainly in large river basins 2050s.

Coastal regions, specifically closely populated mega-delta areas in South, East, and Southeast Asia, will be at finest threat due to elevated flooding from the ocean and, in a few mega-deltas, flooding from the rivers. Weather trade is projected to impinge on sustainable improvement of maximum growing international locations of

Asia, because it makes it more difficult for herbal resources and the atmosphere to urbanize rapidly, industrializes and develop finance. Alternating weather is forecast to reduce air performance, presenting a risk to the performance of living air irrespective of standard therapy (Jimenez Cisneros et al., 2014). This could compound the risks of water-related diseases that reduce nutrition absorption. According to the WHO (2014), trade in primarily income-low communities is expected to cause booming diarrheal disorders. (Neil Adger and Pramod 2007)

2.2.3. Climate conflicts in Asia

Blended with negative governance, climate change represents the most important and most global environmental variable to peace and security. Its affects are set to fall disproportionately on the arena's maximum inclined populations, with the Asia Pacific area dealing with a number of the maximum widespread challenges.

(Welzer) explains the weather related conflict in a very basic way - the capacity for violent battle will increase when the survival conditions of corporations of people are threatened. Weather change threatens these situations in a number of ways in Asia. There could be extra common and greater intense natural screw ups, persisted massive-scale food and water shortages, mass displacement and migration, and large competition over land and sources.

In valuable Asia, the Tianshan mountain variety acts as a crucial water source for millions inside the landlocked location. Kazakhstan, Uzbekistan, and China are many of the many nations that depend upon the range as a reliable resource. However, growing average temperatures reason glacial retreat and a reduction in vital seasonal snowfall. Of the 10,000 glaciers in the Tianshan range, almost they all have retreated inside the last 50 years. Some have even lost upwards of 20% of general quantity. Furthermore, researchers determined that snow cover within the middle of the mountains has fallen via 672km² per 12 months, generating a profound effect on water sources. (Chen, S. 2017) in the remaining decade, the water storage capability of the variety has fallen through 223 million cubic meters consistent with 12 months, doubtlessly leading to the drying up of rivers which can be fed by means of the range.

Daily times (2017) opposition over the restricted water assets are set to intensify as fears over water and meals protection growth. Chinese researchers warn that as this continues, the relationship among affected international locations could be tested. Equally daunting are the strained Indo-Pak family members worsened by using the melting Himalayas. The ‘frozen battle’ on the Siachen glacier is the best battlefield inside the global, taking location at 19,000 toes. The glacier is placed at the border between the 2 nations and battle stems from geopolitical disputes. As water availability tightens, the rights to the water that feeds into the Indus Basin remain fought over. At some stage in components of the 12 months, the water does no longer even attain the ocean, making it a closed basin. 237 million people depend on the Indus for water, with this figure expected to upward push to 383 million through 2050.

(Laghari et al, 2012)) determined that fast urbanization, environmental degradation, unregulated and inefficient use of assets and poverty, all aggravated by using climate exchange might certainly result in endured demanding situations within the future. The center for climate and security asserts that disputes over distribution of the Indus have plagued local relations for decades. Despite the Indus Water Treaty, a settlement to maximize and shield water resources, both nations suffer from troubles of unequal allocation. The ones not able to irrigate their land for agriculture lose their livelihoods while simultaneously developing a meals security difficulty. If these issues accentuate as predicted, the long records of interstate violence threatens to flare up again.

As Antos, 2017 puts it, “although there are several water-sharing agreements between those nations, their strength, and durability continue to be unsure. With weather exchange comes handiest further water uncertainties, and without more potent local agreements, South Asia could suffer even greater security risks than are already present within the place.” Transboundary conflicts frequently make for more glamorous headlines, but intra-country violence is arguably extra destabilizing. Years of excessive drought in India has created deep hostility between susceptible organizations. Over 330 million have been tormented by this inside the final five years, more than the entire populace of America. Many had been displaced and thousands and thousands greater misplaced their fertile farmlands. Authors have even warned that violence over shortage might also simply be beginning, “the current drought has illustrated simply how climate alternate creates persistent monetary issues in South Asia including unemployment. These conditions can contribute to militancy, terrorism, and organized crime, annoying present conflicts and giving upward push to new ones. ”unless guidelines to assist make sure employment and monetary repute of the masses are applied, this may be a dark glimpse into the future.

The economic ramifications of weather change are being felt somewhere else. (Chen, 2017) located that growing temperatures should inhibit China’s paintings on reviving the Silk avenue exchange course. This financial belt is meant to growth connectivity from China through primary Asia to Europe, to permit for less difficult trade. However, the path passes through some of arid areas, along with the Taklimakan wilderness, which can be vulnerable to environmental degradation and water shortage. Fears develop that regions sharing rivers may build dams to stockpile the restricted sources, consequently lowering flows downstream. Chinese language government concerns that this will cause mass struggle and jeopardize the financial advantages for all international locations along the path.

On the other hand, melting arctic icecaps off the North coast of Russia ought to well provide financial possibility. Worldwide warming makes the Northern Sea delivery course (NSR) viable and nearly twice as rapid as finishing the alternative journey thru the Suez Canal. Exchange connections among Russia and many Asian international locations would be greater, however vast hostility over sovereign rights to uninhabited islands will possibly outweigh any capability blessings. (Weingartner, ok. 2017)

Japan and China remain at loggerheads over claims to land inside the East China Sea, with each attempting to exercise rights to the one of kind economic zones that maritime law provides. The tale is a good deal the identical within the South China Sea, with continued arguments among China, Indonesia, the Philippines and many more. If the NSR sees greater business interest thru contested waters because of weather trade, tensions all through the place could be magnified. Conditions like this must be dealt with with care. China is heavily militarized and has threatened to use force to guard their claims. The argument via a few is that weather trade in different areas has created heightened tensions and accelerated the hazard of conflict in Asia, making it an vital situation of national and regional security. Ibid

In line with (Mustafa, 2009), the United nations estimates that annual water demand in Pakistan will rise by way of 10%, whereas no fine change within the overall water availability is predicted – as an alternative, declining water availability is predicted, due to weather change. Demand for meals, and mainly fat and protein-primarily based ingredients, will growth at the same time as demand for carbohydrates is likely to decrease through the years. This demand for extraordinary types of meals has principal implications as regards the call for water to supply such meals. (Beddington et al. 2012)

Rasul et al. (no date) note that temperatures in the direction of the stop of the century will growth with the aid of five ranges and in northern areas via even higher than 7 degrees. Mid-century temperature will increase are expected to be 2–3.five tiers. Those findings are consistent with contemporary modelling developments. they also note that for every 1, 2 and three degree upward thrust in temperature crop water requirements will growth via 11%, 19% and 29%, respectively, implying that at 2 diploma rise, crop water requirements will almost double water desires in the northern regions. Those are the implications of temperature on crop manufacturing. This indicates the pressure that will be placed on water assets due to call for from the agriculture area.

Because of extended human activity, environmental and climate modifications, ground water assets of the Indus basin have come to be rather vulnerable (Mool, P okay et al., international Centre for included Mountain development (ICIMOD) 201227). The future of glaciers feeding the Indus River because of the Karakoram Anomaly is somewhat optimistic (glacier surge) reported

by using researchers like Hewitt, okay., 2005. However, Pakistan has a challenging situation in terms of the latest extreme events (droughts and floods) and huge climatic losses.

Due to high habitation, financial sports, tourism and military strategic positioning in the place, glaciated and the snow cover are decreasing. Siachin's withdrawal from India and Pakistan is well established because of military establishments (ICIMOD, 2004, Kashmir at the edge climate change impacts file, 2007). An alarming reduction in the snow cover and the melting of smaller glaciers is proposed by Indian research on Chenab and Jhelum catchments. (Arjimand Hussain Talib ActionAid, 2007). About 20 glaciers have shrunk or gone missing.

3. Conceptual framework

The IPCC Third Assessment Report (TAR) describes vulnerability as

“The degree to which a system is susceptible to or unable to cope with, adverse effects of Climate change, including climate variability and extremes. Vulnerability is a function of the Character, magnitude, and rate of climate variation to which a system is exposed, its Sensitivity and its adaptive capacity.” (IPCC, 2001, p. 995) (IPCC Def. 1)

3.1. Vulnerability

Meanings of vulnerability inside the environmental change will fall into classifications, seeing vulnerability it's far viable that (I) as far because the measure of (capability) damage brought on via a selected environment associated event or chance (Jones and Boer, 2003), or (ii) as an express that exists inside a system earlier than it studies a risk occasion (Allen, 2003).

The developing collection of writing on vulnerability and adaptation contains an occasionally baffling cluster of terms: vulnerability, sensitivity strength, adaptation, adaptive capacity, Risk, hazard, coping range, adaptation benchmark, etc. (IPCC, 2001; Adger et al., 2002; Burton et al., 2002). The connections between these terms are frequently vague, and a similar term may have various implications when utilized in various settings and by various creators. Specialists from the normal perils field will in general spotlight on the idea of hazard, while those from the sociologies and environmental change field regularly want to talk in wording of vulnerability (Downing et al., 2001; Allen, 2003). Social researchers and environmental researchers frequently mean various things when they utilize the expression "vulnerability.". while social researchers will in general view vulnerability as speaking to the arrangement of socio-economic that decide individuals' capacity to adapt to stress or change (Allen, 2003), climate researchers frequently see vulnerability regarding the probability of event and effects of climate and atmosphere related occasions (Nicholls et al., 1999).

The term 'vulnerability' is utilized from numerous points of view by different research networks, for example, those worried about secure environment, sustenance security, normal

perils, calamity chance administration, general wellbeing, worldwide natural change, and environmental change. (Liverman, 1990) noted, vulnerability could be compared to notions, for example, flexibility, insignificance, helplessness, versatility, delicacy, and hazard.

Then again, the perspective on vulnerability as a state for example as a variable portraying the internal condition of a system has emerged from investigations of the basic factors that make human social orders and networks helpless to harm from outer hazards(Allen, 2003). In this definition, vulnerability is something that exists inside system freely of outside perils. For some human systems, vulnerability saw as an innate property of an existing system emerging from its inner qualities might be named "social vulnerability" (Adger, 1999; Adger and Kelly, 1999). For vulnerability, emerging absolutely from the inborn properties of non-human system or frameworks for which the expression "social" is not fitting the expression "inherent vulnerability" may be utilized. Social vulnerability is dictated by variables, for example, neediness and disparity, poverty and inequality. Marginalization, food entitlements, access to insurance and housing quality (Blaikie et al., 1994; Adger and Kelly, 1999; Cross, 2001)

This idea of vulnerability relates most near 'affectability' in IPCC phrasing. It respects (social) vulnerability as a from the earlier state of a network that is dictated by financial and political variables (Dow, 1992; Blaikie et al., 1994; Adger and Kelly, 1999). Relevant examinations recommend a causal structure that focuses on the differential capacities of communities to adapt to cope up pressure. Vulnerability as per this view, seen as the socio economic for differential sensitivity and exposure, relates near the 'non-climatic variables' in this structure.

By recognizing social and biophysical vulnerability, we can resolve the obvious clash between various definitions of vulnerability in the environmental change writing. By recognizing the wide identical between biophysical vulnerability and the common dangers idea of hazard, we can put the investigation of social vulnerability inside a hazard the risk management structure. Inside this structure, the hazard presented to a human system by a specific kind of hazard will be an element of the seriousness and likelihood of event of the risk and the manner by which its results are probably going to be interceded by the social vulnerability of the human framework being referred to. Hazard might be evaluated regarding result, for instance in wording human mortality and bleakness or potentially financial misfortunes. This might be post hoc for a specific occasion or set of occasions, or regarding likely or foreseen result. On the other hand, hazard might be

evaluated probabilistic-ally as the probability of a specific result. Social vulnerability, then again, is bound to be estimated as far as prescient factors speaking to components, for example, monetary prosperity, well-being and instruction status, readiness and adapting capacity to regard to specific risks, etc.

3.1.1. Internal vulnerability and external vulnerability

Internal vulnerability components allude to characteristics of the vulnerable framework or network itself. Vulnerability factors that can be constrained by the thought about community, for example, the land use inside their jurisdiction, are additionally viewed as inward. All other vulnerabilities components are indicated as outside. The designation of a specific factor as inward or outside may rely upon the extent of the. National arrangements, for example, would be viewed as interior in a national evaluation yet as outer in an appraisal at the shared level.

3.1.2. Socioeconomic and biophysical

Socioeconomic vulnerability elements are those that identify with economic resources, the circulation of intensity, social organizations, social practices, and different attributes of social groups normally explored by the sociologies and the humanities. Biophysical powerlessness factors, interestingly, are identified with framework properties examined by the physical sciences. These two classifications may at times cover, for example because of built infrastructure.

3.2. Risk hazard

The risk hazard framework is connected to evaluate the dangers to certain esteemed components ('exposure units') that emerge from their presentation to explicit risks. Like 'weakness', the term 'hazard' is likewise deciphered in various ways. The utilization of the term in this paper consistently alludes to the idea indicated as threat (Sarewitz et al, 2003). A general definition for 'threat outcome' is normal misfortunes resulting from cooperation's between regular or human-initiated perils and vulnerable conditions (United Nations, 2004). The hazard structure acknowledges two variables that determine the hazard within a particular framework: 'hazard', which is a potentially harmful physical opportunity, human movement depicted by its region,

intensity, reappearance, and 'vulnerability' which means the link between seriousness of the hazard and the extent of damage caused (UN DHA, 1993; Coburn et al., 1994; UN, 2004). The vulnerability connection is dynamically indicated as 'risk misfortune relationship' in normal dangers look into, 'portion reaction relationship', or 'presentation impact relationship' in the study of disease transmission, and 'harm work' in macroeconomics.

The hazard risk approach is most broadly connected in the specialized writing on disasters. It for the most part expect that danger occasions are uncommon, and that the risk is known and stationary (i.e., the hidden procedure does not change after some time). The separate vulnerability definition alludes to physical frameworks, including manufactured foundation, and it is clear as opposed to logical. Vulnerability idea is portrayed as inward biophysical vulnerability. The terms 'affectability' and 'susceptibility' are additionally used to indicate this idea.

Moss et al. (2001) acknowledge three elements of environmental vulnerability. The physical-natural measurement represents the harm brought about by environmental change. It alludes to the climatic conditions in a district and to the biophysical effects of environmental change, for example, changes in agrarian profitability. The financial measurement alludes to an area's ability to recuperate from outrageous occasions and adjust to change over the more drawn out term. The third measurement, outer help, is characterized as how much a locale might be aided its endeavors to adjust to change through its partners and exchanging accomplices, diasporic networks in different districts, and worldwide courses of action to give help.

This conceptualization of vulnerability, unlike the United Nations (2004), includes factors outside the fragile structure, for example, attributes of the stressor and the normal degree of outer help. A few scientists recognize biophysical (or regular) defenselessness from social (or financial) helplessness. Notwithstanding, there is no concession to the importance of these terms. The reasonable structure for coastal vulnerability appraisal created by Klein and Nicholls (1999) sees 'characteristic vulnerability' as one of the determinants of 'financial vulnerability'. Shaper (1996), conversely, respects the 'biophysical' and the 'social' measurement of vulnerability as autonomous. As per the wording proposed by Brooks (2003), finally, social vulnerability might be seen as one of the determinants of biophysical vulnerability.

3.3. Adaptive Capacity

The “IPCC summarizes the determinants of adaptive capacity as financial resources, technology and capabilities, infrastructure, institutions, and equity in Operational Institute” II’s third review document (TAR) (Smit et al., 2001).

The capacity of performers within the scheme to regulate and influence resilience is the adaptive potential in resilience research, often described as Adaptability ' (Walker et al., 2004).

Human beings have an impact on resilience by enabling interactions between a system's human and environmental elements (Walker et al., 2006). Thus, the more adaptive potential within a state, the greater the likelihood that the system might be resilient within the climate strain face i.e. In a manner that maintains the country or the status quo, humans can manipulate social-ecological interactions. Adaptive prospective is also an asset within the resilience literature that can promote transitions or modifications, transformation implies transportation to a brand-new system state when the modern country is typically unsustainable while the uni is in a resilient but unwanted situation (Folke, 2006).

It Refers back to the potential of the population to evolve to changes in the instances, brought approximately by using weather exchange. It relies upon the socio-economic situations of the populace exposed to climate alternate as well as public and private institutions. We measure socio-monetary conditions of the population by household consumption in keeping with capita, the employment rate in addition to the literacy fee. The satisfactory of organization, in popular is measured by means of a few governance variables which includes loss of corruption, accountability, and transparency and so on.

Probable the most prominent researcher within the area Homer Dixon normally eludes the term 'environmental safety' in prefer of 'environmental scarcity'. Its miles the shortage of renewable sources. Domestic violence is a reflection of stricken members of the family between state and society. nonviolent nation-society members of the family relaxation at the capacity of the country to respond to the wishes of society—to provide, in different phrases, key additives of the survival strategy of the society's contributors—and at the potential of the nation to maintain its dominance over groups and institutions in society (Homer-Dixon and Percival, 1995, p. five). The

most apparent connection between climate change and violent conflict, however, is the link to the access and control of natural resources such as land and water.

The framework decides the exact connection between resource shortage and episodes of fierce clash. Relevant components incorporate the amount and vulnerability of ecological assets, the equalization of political power, the nature of the state, examples of social cooperation, and the structure of economic relations among social gatherings. These variables influence how assets will be utilized, the social effect of ecological shortages, the complaints emerging from these shortcomings, and whether complaints will add to brutality.

There are three sorts of ecological shortage: (1) supply-instigated shortage is brought about by the corruption and exhaustion of a natural asset, for instance, the disintegration of cropland; (2) request incited shortage results from populace development inside a district or expanded per capita utilization of an asset, both of which uplifts the interest for the asset; (3) auxiliary shortage emerges from an inconsistent social appropriation of an asset that moves it in the hands of moderately few individuals while the rest of the populace experiences genuine deficiencies.

Two examples of association among these three kinds of shortage are normal: resource catch and ecological marginalization. Resource catch happens when expanded utilization of an asset joins with social inequalities when powerful groups among the society foresees future deficiencies and move asset circulation to support them, exposing the rest of the populace to shortage. Environmental minimization happens when expanded utilization of a resource joins with basic imbalances in dispersion: denied access to the resources, groups that are more fragile move to naturally delicate locales that therefore turned out to be degraded (Homer Dixon, 1994: 15-16).

Shortage produce a few regular social impacts, including lower agricultural production, relocations from zones of natural shortage, and debilitated organizations (Homer-Dixon, 1991: 91). All together for these social impacts to cause elevated complaints, individuals must see a relative diminishing in their way of life contrasted and different gatherings or contrasted and their yearnings and they should see minimal possibility of their desires being tended to under business as usual (Gurr, 1993:126).

Resource shortage compromises the fragile give-and-take connection between state and society. Falling rural creation, relocations to urban territories, and financial constriction in districts

seriously influenced by shortage regularly produce hardship, and this hardship expands requests on them state. Simultaneously, shortage can meddle with state income streams by diminishing monetary profitability and in this manner charges; it can likewise build the influence and action of rent seekers,' who become increasingly ready to deny tax on their expanded wealth and to impact state approach to support them.

3.4. Table Possible Interaction between Climate and Security

Source: (Wisner, 2007).

	Direct impact		Indirect Consequences				Slow-onset
	Water	Food	Health	Mega-projects	Disasters	Bio-fuel	Sea level
Short term (2007-2020)	Local conflict over water	Failure to meet MDGs	Failure to meet MDGs	Long history of development-induced displacement from 1950s	Nation states begin to lose credibility due to inability to prevent large disasters	Isolated food – fuel competition & price spikes	Small number of displacements
Medium term (2021-2050)	Increased local & some international conflict over water	Significant displacement due to famine	Interacts with food production problems	Displacement of rural poor due to CDM & large scale dams & other state based mitigation & adaptation projects	Significant political unrest due to failure of DRR & inadequate recovery in many countries	Food-fuel competition increases & biodiversity erosion	Increasing displacement & national/ international tension
Long term (2051-2100)	Major international conflict over water	Major displacement & political upheaval	Major displacement due to epidemics	Major urban upheaval and other political fall out from mega-project displacement	Major upheaval with international implications due to unattended weather catastrophes	Major discontent due to food-fuel competition	Major international tensions due to population displacement

4. Climate change as a threat multiplier: case study of Pakistan

Similar to other developmental nations, environmental change in Pakistan is a genuine worry with its huge natural, social, and financial effects. Pakistan has an miscellaneous atmosphere ranges from mellow winters and sweltering, dry summers in the north to semi-bone-dry and parched zones in the west and the south. Yearly precipitation in the nation shifts from 50mm in dry and semi-dry territories to 2000mm in wet timberlands. The temperature differs by height to beneath solidifying in northern mountains during winter to 35–50°C in focal and southern fields during summer (Ahmad, et al. 2007)

IPCC Fourth Evaluation Report (2007) uncovered that in the northern district of Pakistan monsoons would boost. So because of changes in climatic parameters (precipitation and temperature), the nation is presented to normal dangers like dry seasons, floods, extraordinary downpours and tornados. At the point when these risks join with the vulnerabilities as prohibition, neediness and confused political choices and activities, at that point it makes individuals progressively powerless against the effects of the environmental, change (Mustafa, 2011).

Agriculture is the most powerless division to environmental change. Agribusiness profitability is being influenced by various variables of environmental change including precipitation design, temperature climb, changes in planting and collecting dates, water accessibility, evapo-transpiration and land reasonableness. Every one of these components can change yield and agrarian efficiency (Harry M. et al 1993). The effect of environmental change on farming is numerous folds including lessening of agricultural terrains.

In Pakistan, wheat is planted in winter season, ideally in November. Evaluated land, on which wheat is developed in Pakistan, is 9045 thousand hectare and per hectare wheat yield is 2657 kg. (Zia Khan et al).

Per head, utilization of wheat in Pakistan is around 120 kg, which makes the significance of this nourishment crop. The water accessible for the development of wheat in Pakistan is 26 MAF which is yet 28.6% lower than the typical prerequisite of water (Rose award et al., 2008). It is significant

for a country to make its cultivating part capable to redesign sustenance security, individual fulfillment and to propel quick money related advancement. The proof from immature nations demonstrates that horticulture division has a major offer in Pakistan's Gross domestic product (Total national output). Thusly, the progression of the economy cannot be practiced without development of farming segment.

The Monetary Overview of Pakistan (2011-12) its principal customary resource is arable land and cultivating zone's pledge to the Total national output is 21 percent. The farming division assimilates 45 percent of work power and its share in charges is 18 %. Given the piece of agribusiness zone in money related advancement and its affectability to change in precipitation and temperature, it is indispensable to consider the impact of ecological change on various farming harvests in Pakistan. There are two harvests periods in Pakistan explicitly, Kharif and Rabi. Rabi yields are collected during the long stretches of November to April and Kharif harvests are created from May to October consistently. These two seasons make Pakistan a cultivating network depends on regular downpours. Ecological change generally affects agribusiness from side to side changes in precipitation and temperature.

The horticulture part in Pakistan accept a critical part as the pay of in excess of 47 percent of the populace is dependent on this region. This segment is under threat from natural change. It is foreseen that temperatures will increment by 3°C by 2040 and 5°C to 6°C before the finish of this century. Due to this circumstance, Asia can lose 50 percent of its wheat generation (MOE, 2009). Also, Agribusiness part of Pakistan is powerless against ecological change in light of its land region (Janjua et al, 2011). This investigation uncovers that because of anthropogenic activities, temperature of earth is rising, and it may have negative effect on the creation of wheat. Using Vector Auto Backward (VAR) show on the yearly data from 1960 to 2009, the examination did not find significant negative impact of natural change on wheat generation in Pakistan.(Shakoor,2011) examined negative impact of temperature on horticulture yield, besides found the constructive outcome of precipitation on agribusiness age. Examinations relied upon the wheat yield and concentrate assumed that the negative impact of temperature is more than the constructive outcome of precipitation for Pakistan.

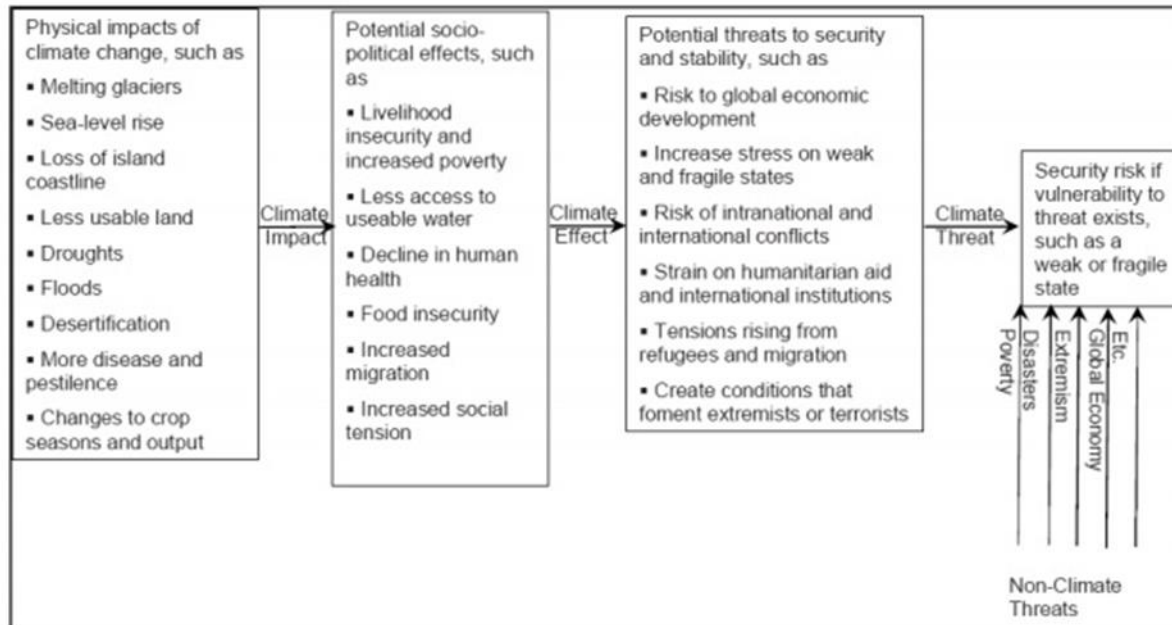
It is vital for a nation to make its agriculture segment effective to improve sustenance security, personal satisfaction and to advance fast monetary development. Hence, the advancement

of the economy cannot be accomplished without improving the farming segment. As per the (Financial Overview of Pakistan ,2011-12), its primary regular asset is arable land and agribusiness part's commitment to the Gross domestic product is 21 percent.

There are two yields seasons in Pakistan to be specific, Rabi, and Kharif. Rabi harvests are developed regularly in the long stretches of November to April and Kharif yields are developed from May to October. These two seasons make Pakistan a rural economy and its presentation relies upon the atmosphere during the entire year. Environmental change for the most part influences horticulture through changes in temperature, precipitation

The Congress Research Report (Congress Research Report, 2011) shows that water and water related results for example dry seasons, flood, and ocean level ascent and so on. Would turn into a noteworthy territory of worry for national security. They would actuate numerous financial and socio-political issues for example employment frailty, movement, wellbeing and so forth. These would prompt shakiness of the state bringing about a threat to security at the provincial and universal level. The table underneath represents the perils of environmental change in this sense.

4.1. Figure



Source: Congress Research Report, 2011

Agribusiness is and the wellspring of business for many individuals. The nation's real fares are reliant on agribusiness, both legitimately and in a roundabout way. It is likewise a wellspring of work and income for most of the populace. Any adjustment in the rural arrangement of the nation can shake the establishments of the nation. The horticulture division's exhibition relies upon following;

- CO2
- Temperature
- Sun oriented Radiation
- Precipitation
- Others (wind speed and course, soil dampness, water vapor, and so forth.)

These are likewise pointers of environmental change somehow. A higher centralization of CO2 in the climate prompts emerge in temperature, which influences precipitation and dampness, and so forth. Plant science discloses to us that CO2 is a fundamental segment for plant development and photosynthesis. In light of this, a few scientists have anticipated that efficiency of farming will increment in the coming year. In any case, higher temperature will be a prevention and an

inordinate measure of CO₂ will influence profitability in a negative manner (Rosenzweig and Hillel, 1995).

4.2. Climate Change and Agriculture Sector of Pakistan

Worldwide environmental change influence every monetary part somewhat, yet agrarian segment is the most touchy and defenseless against the antagonistic impact of the environmental change as world horticulture, regardless of whether in creating or created nations, stays reliant on climatic assets. Horticulture efficiency is related with different variables of environmental change including temperature climb, changes in precipitation design, changes in planting and collecting dates, vapor-transpiration, water accessibility, and high grouping of CO₂ and land appropriateness [Alexandrov, et al. (2000)].

Two sorts of yields are developed in a year in Pakistan for example Rabi crops (Oct-April) which incorporates wheat, grain, Gram and Oil seeds and Khraif crops (May Oct) incorporate Rice, Maize, Sorghum, Millets, cotton, and sugarcane. As the nation is lying in a bone-dry and semi-dry locale, is vigorously subject to flooded farming, and is confronting the unfavorable effect of environmental change with higher icy liquefy, delayed dry seasons, sweltering winters, and early summers. The impacts of environmental change are generally increasingly articulated in Pakistan because of its over-dependence on nature for essential survival, high populace development rate, and thickness, low ability to alleviate the negative effects of environmental change, and destitution. These long haul effects of environmental change are relied upon to undermine our biodiversity (loss of species and their natural surroundings), water accessibility, sustenance security, human wellbeing, and by and large prosperity. Notwithstanding such a high level of weakness of horticulture to environmental change in creating nations, little research work has been done and exceptionally restricted if there should be an occurrence of Pakistan.

In Pakistan, varieties exist in atmosphere, elevation, geology, soil, season, and culture. The nation has ten agro-natural zones/areas isolated dependent on varieties in physiographic, soil structure, atmosphere, agribusiness land use, and numerous different components that influence farming (PARC, 1980; Muhammad, 1986). These primary agro-environmental zones of Pakistan are “Indus delta, Southern inundated plain, sandy desert; Northern watered plain, Barani

(precipitation), wet mountains, and northern dry mountains, western dry mountains and dry western level.”

The effects of environmental change will intensify the current poor condition of this division. The rural segment has experienced various inadequacies, Nevertheless, after parcel the pace could not be kept up and now we are seeing sharp declines in nourishment, creation because of various reasons for example administration, advertise disappointments, skewedness of land, and so forth. The Green Upheaval in 1960 gave a lift to agribusiness from 1960 by the presentation of high yielding harvests, compound sources of info, and current innovation. Pakistan kept on receiving the rewards of the Green Insurgency however; development pace of profitability is diminishing with consistently need enthusiasm of government. More than two-third (62 percent) of the nation's populace lives in rustic regions and their job relies upon horticultural and agro-based exercises (Government of Pakistan, 2010).

Nevertheless, Pakistan has a very restricted base in the agrarian innovative work area. Over the most recent 64 years, Pakistan was just ready to build up a couple of assortments, because of the use of ordinary techniques to deliver new assortments. Albeit a few assets have been assigned to hereditary research and hereditarily changed life forms, these stay restricted and Pakistan has not had the option to make any unmistakable progress. Miniaturized scale and large scale investigation of the past and current circumstance uncovers that there are two fundamental explanations behind this; right off the bat, the absence of prepared assets and besides, the inaccessibility of present day offices and innovation.

Agriculture is the fundamental wellspring of work and work in Pakistan. Inferable from the contrary impacts of environmental change, individuals will lose gaining sources in farming. It will have two classes of effects; nourishment uncertainty and the movement of individuals. The previous will cause a prompt clash and battle between individuals. As we saw in 2007-08, in specific pieces of the world uproars out broke because of more expensive rates of sustenance and non-accessibility of nourishment for example Philippines, Egypt, and Haiti, India and Vietnam (The Monetary Occasions, 2008).

Pakistan is as of now experiencing an exceptionally extreme sustenance uncertainty emergency. SDPI directed an examination in 2010, which shows that sustenance uncertainty is expanding in Pakistan (Nourishment Weakness in Pakistan, 2009). As per the examination, about 48.7% of the

populace is sustenance shaky and the 2010 floods have added more numbers to this classification. Future floods will further confuse the circumstance. SDPI's examination likewise attempted to discover the connection between sustenance security and harmony, however reasoned that in spite of the fact that there is no exact proof accessible to set up the connection between nourishment security and harmony, the most nourishment unreliable regions are additionally the most exasperates zones in Pakistan, for example North, South Waziristan, Dera Bugatti and so on.

4.3. Agriculture implications

Farming creation in Pakistan is personally connected to the accessibility of water in the Indus Stream and its tributaries that feed the Indus Bowl Water system Framework and empower crop development in the to a great extent bone-dry and semi-parched Indus Fields. Land inundated by the Indus Bowl Water system Framework creates around 90 percent of Pakistan's all out horticultural generation.

Pakistan's agribusiness area is additionally a basic wellspring of nearby vocations; around 67 percent of provincial Pakistanis are monetarily reliant on horticulture in one manner or the other (Maqbool and Bashir, 2009). Farming additionally creates around 22 percent of Pakistan's Gross domestic product and 70 percent of its fare profit (FAO, 2015). While the Indus Bowl is lavishly blessed with land and water assets, a variable atmosphere tests farming generation inside this locale and hydrology, the effect of regular risks like floods and quakes, concerns in regards to the manageability of rural creation, and proceeded with undernourishment of around 20 percent of the populace (FAO, 2016). A similarly huge concern is the Indus Bowl's inexorably lacking and maturing water foundation, especially its restricted water-stockpiling limit because of too couple of repositories and the sedimentation of existing supplies.

The Indus Waterway Water system Framework is additionally described by huge wasteful aspects at the channel, conduit and field levels, due to some extent to poor administration and low water rates that don't create adequate assets to cover existing activity and upkeep costs. Notwithstanding these challenges, Pakistan is encountering a decrease in per capita water accessibility as its populace increments and economy develops.

Water demand in the horticulture area is anticipated to build substantially more than in different segments to meet the developing nourishment necessity needs of an extending populace (Amir and Habib, 2015). Climate change is an extra stressor on this previously tested framework—

prompting agribusiness being distinguished as maybe the division progressively powerless against changing atmosphere dangers. The area is required to be influenced by a foreseen ascend in mean temperatures on a yearly and occasional premise, changing precipitation designs, the potential for progressively visit and extraordinary outrageous climate occasions, for example, floods and dry seasons, and by changes in the developing season. Of specific concern is the potential effect of a changing atmosphere

On water, streams in the Indus Bowl given the suggestion for flooded horticulture. The Indus Bowl and its tributaries are largely encouraged by the softening of frigid and yearly snowfall in the HKH mountain ranges, which gives somewhere in the range of 50 and 70 percent of the bowl's water stream (Yu et al., 2013). Modified soften designs in the HKH runs alongside potential changes in storm examples could bring about changes in the spatial and fleeting dispersion of water assets on a yearly and between yearly premise (GOP, 2012)— with consequent ramifications for inundated agribusiness and domesticated animals creation. At present it is foreseen that all out water streams in the Indus Bowl in the close term (for example prior to 2050) will remain moderately steady. Despite the fact that there could be an expansion in streams because of higher run-off as temperatures warm and a move in the planning of pinnacle water stream to prior in the year (Immerzeel et al., 2009).

These climatic changes will bring the two dangers and open doors for Pakistan's horticulture segment. Potential effects include: decreases in water accessibility, which would prompt moves in yield turns and adjust planting and collecting designs in the coming a few decades; a decrease in the generation of the nation's primary money crops; diminished oat creation in southern Pakistan of up to 20 percent while minor upgrades might be involvement in the northern belt; and a potential decrease in domesticated animals generation of up to 30 percent because of more prominent weight on rangelands because of longer dry spells and more prominent challenge for restricted assets as individuals and creatures relocate to riverine zones. Simultaneously there is the potential for raised temperatures to accelerate crop development and for respects increment because of a more extended and more blazing summer season (GOP, 2012).

Environmental change will disproportionately affect horticultural creation the nation over. In Punjab and Sindh, constrained ability to store water could negatively affect around 20 to 25 percent of cultivable land, rendering it unfit for horticulture. Also, it has been anticipated that a 4°C

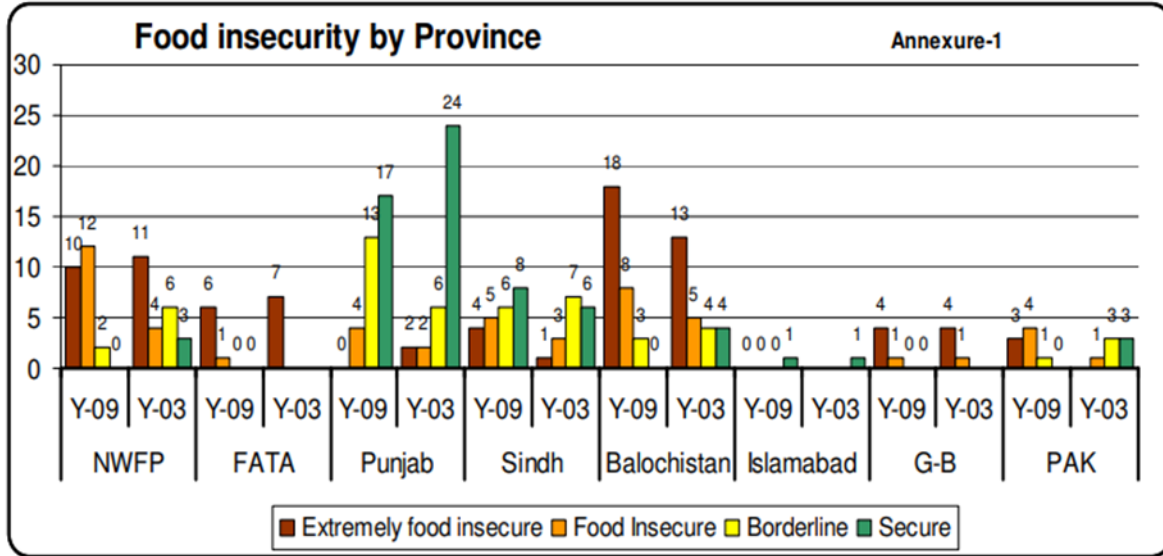
increment in temperatures and 3 percent ascend in precipitation by 2080 could bring about a misfortune in agrarian efficiency of up to 13 percent in these two regions (Dehlavi et al., 2014).

Yu et al. (2013), who recommend that progressively unfriendly change could possibly be knowledgeable about Sindh, have created comparative outcomes. All the more emphatically, in Pakistan's northern lower regions, wheat, maize and rice yields could increment because of longer and more sizzling summer seasons (Rasul and Ahmed, 2012).

The potential ramifications for the nation's primary money harvests has been the focal point of the vast majority of The (generally constrained) inquire about finished to date on environmental change and horticulture in Pakistan. These examinations have recognized potential atmosphere dangers for explicit harvests:

- Wheat: A reduction of 8-10 percent in wheat yields may happen. The populace should diminish its reliance on wheat and move to utilization of coarse grains, for example, grain, sorghum, millets, oats, and coarse rice (Janjua et al., 2010).
- Rice: Generation might be diminished by up to 20 percent contrasted and current figures (Tariq et al., 2014).
- Maize: Maize yield will be significantly diminished as temperatures increment up to 1.8oC in focal territories of Punjab. In the event that the present situation of a steady increment in temperatures proceeds, the ware yield may diminish by 20 percent past 2050 (Khaliq, 2008). Cotton and sugarcane: Cotton (Raza and Ahmed, 2015) and sugarcane (Zhao, 2015)

4.4. Table



Source: (Food Insecurity in Pakistan, SDPI, 2009)

An ongoing report (Qureshi and Syed, 2015) gives a circumstance investigation of the water assets of Lahore. Assessed water use for Lahore demonstrates a declining pattern for farming water use, because of fast urbanization, while household water and mechanical water use demonstrates a high use, with subsequent effects on ground water assets in Lahore, the second biggest city in Pakistan.

Global Association for Discussion of Nature (2009) completed an investigation on environmental change in Pakistan. Its economy is subject to rural and this division is dependent on atmosphere. This examination primarily called attention to the issues and difficulties that emerge because of environmental change. It featured the plausible effects of environmental change as far as diminished water accessibility, which will thusly diminish per hectare creation of yields. Utilizing a territorial environmental change model, they anticipated that the ascent in temperature will decay the harvest yield by 15-20% in the southern Pakistan though there will be a minor improvement in the yield in the northern region of Pakistan. In addition, plant maladies, weeds, and nuisances' assaults will increment bringing about diminished harvest generation and the

animals, ranger service and fishery industry will be contrarily influenced too. They anticipated that the general effect of environmental change on rural area will be negative, unfavorably influencing the economy of Pakistan.

A few investigations have demonstrated that agribusiness in Pakistan is especially helpless against environmental change. Baig.et.al (2011) directed an examination on the effect of environmental change on wheat generation in Punjab. The target of the examination was to discover the mean extreme temperature, mean least temperature, satisfactory precipitation, and other monetary factors that affect wheat generation in the blended zone of Punjab area. The investigation results demonstrated that environmental change effectly affects wheat efficiency at the planting, vegetative and development phases of wheat development.

Shakoor et.al (2011) did an investigation evaluating the effect of atmosphere on agrarian ranch incomes of Rawalpindi division of Punjab. Cross sectional and time, arrangement information was dissected by the utilization of Ricardian model (Mendelson et.al. 1992). The harvest chose for study was wheat, as it is developed in bounty in Punjab. The examination results demonstrated that atmosphere factors do influence the yield incomes. The ascent in temperature was found to have a negative and an ascent in precipitation a positive effect on farming incomes.

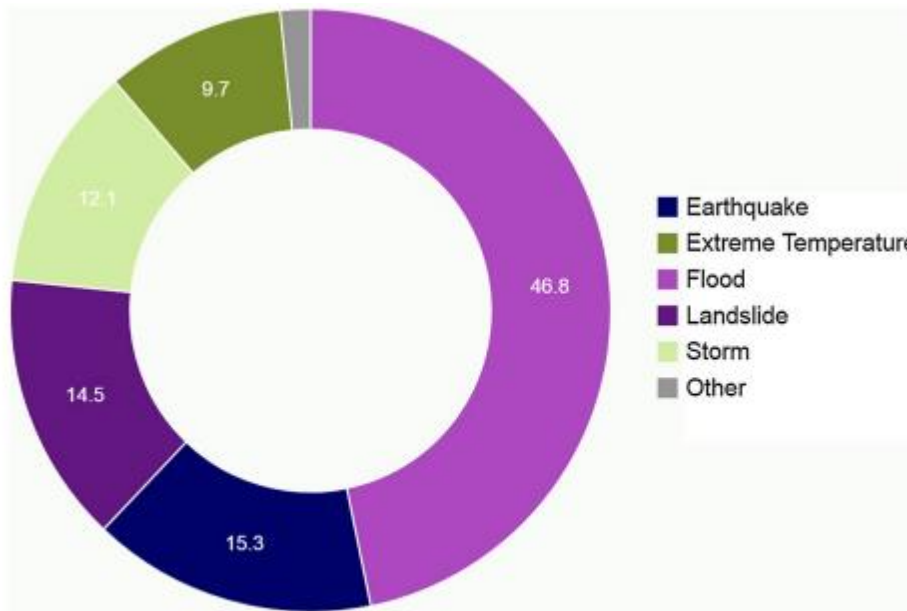
Rehana et.al (2012) evaluated the effect of environmental change on major horticultural harvests (wheat, cotton, rice and sugarcane) utilizing a board information from 1980-2008 on chose regions of Punjab. The examination was huge as it considered the effect of environmental change at four germination phases of the yields. The examination found a positive effect of the environmental change on wheat creation and a negative effect on rice, cotton, and sugarcane generation.

4.5. Implication for water sector of Pakistan

Practices of water flow may not be powerful enough to adapt to the impacts of climate change on water supply unswerving quality, flood threat, well-being, horticulture, vitality and biological ocean systems. In numerous areas, water the board cannot attractively adapt even to momentum atmosphere inconstancy, with the goal that enormous flood and dry season harms happen. As an initial step, improved joining of data about momentum atmosphere fluctuation into water-related administration would help adjustment to longer-term environmental change impacts. Climatic and non-climatic components, for example, development of populace and harm potential, would compound issues later on. (High certainty) Source: IPCC 2008

4.6. Table

Frequency of events in Pakistan reported on international level from 1990–2014 data. These shares help in predicting the expected future losses for improved resilience. Source: EM-DAT International Disaster Database <http://www.emdat.be>



Hazard and Exposure

4.7. Climate Change Impacts on Indus River Basin

Pakistan is a characteristic asset based economy with in excess of a fourth of its territory zone (22.2 million ha.) under horticultural use. Because of its very different physiographic and climatic conditions, it is grouped into eleven topographical, ten agro-environmental, and nine noteworthy natural zones. This one of a kind topographical position opens the nation to numerous dangers from frigid soften cataclysmic events and dry seasons, to ocean level ascent. Pakistan likewise has low woodland spread (4.5%), with a deforestation rate as high as 0.2-0.4 % per annum. Besides, the nation has a profoundly delicate monetary base. In 2007, Pakistan's Human Improvement File (HDI) positioned it 0.572 (141 out of 182 nations). Per capita total national output (Gross domestic product) positioned it 125th on the planet and riches is appropriated exceptionally unevenly.

Actually, one-fourth of the populace in Pakistan is delegated poor. (Bhatti M.A. what's more, J.W. Kijne, 1990.)

The Indus Waterway Bowl is critical to the economies of a few nations of South Asia. It comprises of six primary streams (the Indus, Jhelum, Chenab, Ravi, Sutlej, and Kabul waterways) starting from ice sheets in the Western Himalayas and gives water system to in excess of 16 million hectares of horticultural land and creates up to 13 giga Watts of power through hydropower plants in Pakistan, India, and Afghanistan. Icy retreat and changes in precipitation designs from anthropogenic atmosphere changes are relied upon to modify altogether waterway bowl conduct and imperil hydropower age and flooded horticulture creation. Starting transient increments in water stream may jeopardize the supportability of downstream foundation. Expected long haul decrease in water streams will diminish control age potential and water system supply, with emotional effects on by and large horticulture yields of these nations, therefore changing individuals' employments. This will be especially calamitous for Pakistan where an expected 50 % or a greater amount of stream run-off streaming into the Indus Bowl Water system Framework starts from icy soften (Toxophilite, 2001).

In addition, the Indus Bowl Water system Framework underpins the water system of 75% of the nation's developed territories and 34% of the nations' electric age limit. So also, misfortune in inside this specific situation, there is developing worry about the potential effects of environmental change on Pakistan's water assets, especially those inside the Indus Bowl. Rising temperatures prodding higher dissipation rates, rising oceans prompting more noteworthy saltwater interruption in beach front territories, progressively frigid soften expanding the risk of icy mass lake upheaval floods, and the potential for increasingly exceptional precipitation and changes in storm and winter precipitation examples are only a portion of the potential effects of environmental change on the Pakistan's hydrologic assets. These effects are required to contrarily influence parts, for example, farming, vitality, wellbeing, producing, and the arrangement of residential and civil water supplies. Hydropower age limit may straightforwardly incite the carbonization of the power part (nations coming back to warm power plants to compensate for decreased hydropower potential). A subsequent increment in ozone depleting substance emanations would contribute further to climatic a worldwide temperature alteration and resulting chilly liquefy.(Donald J.B. 2008)

An ongoing report (Qureshi and Syed, 2015) gives a circumstance examination of the water assets of Lahore. Assessed water use for Lahore demonstrates a declining pattern for horticulture water use, because of fast urbanization, while local water and mechanical water use demonstrates a high use, with resulting impacts on ground water assets in Lahore, the second biggest city in Pakistan.

4.8. Recent Trends of Climate Change and water in Pakistan

Ongoing pattern of environmental change in Pakistan is dependent on most recent 70 years atmosphere information aggregated by “Pakistan Meteorological Office in Specialized Report No.PMD-22/2009 demonstrates:

- Ascent in mean every day temp of 0.6 to 1.0 degree centigrade in dry waterfront territories and parched Western/North-Western Mountains.
- 10 – 15% lessening both in winter and summer precipitation in beach front belt.
- 18 – 32% expansion in precipitation in storm zone (sub-damp and moist zones).
- Further lessening of 5% in relative stickiness over and fields of Baluchistan.
- 3 – 5% decline in overcast spread over focal and southern Pakistan bringing about increment in daylight.
- Monsoonal Zone of Pakistan (a locale that gets practically 65% of absolute storm downpours) has moved 80 – 100 Km from North East (KPK + Kashmir) towards North West (KPK + North West Punjab), in this manner, the likelihood of event of overwhelming precipitation occasions during storm season, later on, would be all around likely over North West Pakistan rather than North East. In this way, the regions along western streams (Indus and Kabul) would be amazingly helpless against flood scenes as experienced during this season.
- This pattern will offer ascent to increment in recurrence of extraordinary occasions, for example, overwhelming downpours, glimmer floods, dust/tempests, hailstorms, heat waves, thickness, perseverance of mist and so on”.

4.9. Hydrology of the Indus Basin

A decent comprehension of the hydrological forms that decide stream in the Indus Bowl is required to survey how environmental change will influence this framework. The bowl's hydrology is controlled by the joined impact of three unmistakable systems and their reactions to climatic conditions: the chilly system, the nival (snowmelt) system, and the precipitation system. The frigid system produces around 25 to 35 percent of water stream in the Indus Waterway (Immerzeel et al., 2010; Mukhopadhyay and Dutta, 2010; Savoskul and Smakhtin, 2013). Its stream examples are described by huge variety in reactions because of the characteristically assorted geology and atmosphere of the locale (Toxophilite et al., 2010; Asian Advancement Bank, 2010; Mill operator et al., 2012).

Precipitation system is largely subject to varieties in the planning and force of the Indian storm, which is the essential factor impacting spillover in the southern lower regions of the himalayas and the Indus Fields (Yu et al., 2013). The precipitation system is the primary driver of swamp flooding as it delivers progressively serious spillover.

As featured, stream designs in the chilly, nival and precipitation, a mix of components including physical variables (height and geology), timing, and climatic conditions impacts systems. A key driver of the entire framework is winter precipitation, which shapes the frosty and naval systems by sustaining frigid territories and decides the collection of snow spread. Changes in temperatures and precipitation examples are the primary factors that impact changes in the Indus Bowl's hydrological system as they thus decide factors, for example, regular limits, evapotranspiration rates, ice sheet volumes, and paces of snow and icy mass soften.

In Pakistan, the water resources in its semi-to hyper-arid neighborhood are very rare. The fact that people and livestock and agriculture and other conflicting industries are able to access and safe drinking water is an outstanding situation. Regardless of the fundamental importance of water to sustainable development and the mismanagement of rare and valuable water resources, Pakistan is an unpleasant truth. It is much unexpected to know that Pakistan loses two-thirds of its inventory of this truly vital asset annually due to poor water governance and lack of garage equipment. (National Water Policy,2002). The supply of water per annum in Pakistan in 1947 dropped from 5600 cm to 1200 cm in 2005. It is also forecast that by up to 1000 centimeters of annual

accessibility, Pakistan will become a water shortage, as the population as well as the request for booming water. (Country Water policy, 2002).

Water also is misplaced by unlined water publishing and channel transport. The fifth five-year plan indicated a reduction in transport losses in particular. The situation in Pakistan has further complex terrible infrastructure, strategy and water governance. Pakistan has a multitude of actions, for instance. Pakistan Penal code 1860, "Factories Act 1934", Indus River Machinery Act 1873 and Provincial irrigation Acts "Pakistan Penal code 1860" and Factories Law 1883. Most individuals, however, are young and do not fulfill today's requirements. There will be enormous rivalry between different industries for limited water in the future and disputes in the years to come, thus jeopardizing the security of the nation.

The agriculture of Pakistan depends on buildings for synthetic irrigation. The agricultural sector consumes about 93% of energy. The Indus River, Monsoon Rain and Ground Water are the principal contributors to irrigation structure. While the Indus River Gadget was initially the key provider, water use has expanded extremely in latest years. At present, approximately 40% of the country's irrigation needs are supplied by subterranean sewage. In important cases, water from the river machine is not available for increased use of ground water. Water is also a major source of safe electricity and hydropower, with a large number of countries. In 1998, Norway and the DR Congo gained nearly 99 per cent of water power. Within the same 12 months, Brazil accounted for approximately ninety one percent of home power from its hydro area (Arthur, 2011).

4.10. Table: History of natural disasters in Pakistan

<u>Disaster</u>	<u>Location</u>	<u>Date</u>	<u>Affected</u>	<u>Death Toll</u>
Earthquake/Tsunami	<u>Makran</u>	325 BCE		
Earthquake	<u>Quetta</u>	31-May-35		60,000
Earthquake/Tsunami	<u>Makran</u>	27-Nov-45		4,000
Flood		1950		2,900
Wind storm		15-Dec-65		10,000
Flood		Aug-73	4,800,000	
Earthquake	<u>Northern Areas</u>	28-Dec-74	97,000	5,300
Flood		2-Aug-76	5,566,000	
Flood		Jun-77	1,022,000	10,354
Flood		Jul-78	2,246,000	
Flood		Aug-88	1,000,000	
Extreme Temperature		11-Jun-91		961
Flood		9-Aug-92	6,184,418	
Flood		Sep-92	12,324,024	1,334
Wind storm		14-Nov-93		609

Flood		22-Jul-95	1,255,000	
Flood		24-Aug-96	1,186,131	
Flood		3-Mar-98		1,000
Drought		Mar-00	2,200,000	
Earthquake	<u>Muzarffarabad</u>	8-Oct-05	2.5 million	78,000
Flood		Jul/Aug-2010	20,000,000	

Source: (NDMA, 2011)

4.11. Table: Assessment of Costs Faced by Pakistan after 2010 Flood

5. The Impacts of Climate Change on Pakistan: Possible Implications for Human and National Security

With its geophysical capacities and political, socioeconomic, as well as Management, Pakistan has long been vulnerable to the horrible consequences of climate variability. The geological variables that are exhibiting to the outcomes of climate change affects encompass The position of Pakistan in the primarily warm subtropical area of low rainfall cost (60% of United States receives less than 250 mm of precipitation per year ; better 24% of the regions receive between 250-500 mm of rainfall). It's far arid and half-arid soil and land primarily situations. Additionally its Dependence on water furnished by means of the Indus River device fed largely via ice and snow melt in the excessive altitude Hindu Kush-Karakoram-Himalaya (HKH) glaciers which might be susceptible to rapid recession due to weather alternate-triggered boom in temperature.

In the most critical cases of monsoon storms and rainfall every year, which complement (up to 30 percent) the river runs and replenish the soil fluid, due to the stronger weather, varying timing and thickness. The significant dependency of Pakistan on its farm and cattle place, which represents 23% of its GDP ; 45% of employment and subsidies over 50% of its urban population. The industry and imports of Pakistan are largely focused on primarily agrarian farming. (File of the Pakistan making plans commission (project pressure on Climate change, 2008)

the boom in population has defined a development rate from 35 to 192 million in the 1940s, with annual growth of 2.5 or greater percent or poorly regulated industrialization and urbanization, a decrease in agricultural property, water supply and other herbal resources and restriction on the provision of basic services to individuals, in specific individuals with health and education.. Historical persistent vulnerability immoderate sports together with floods and droughts possibly to end up more frequent and further excessive due to climate change. (Pakistan is stated to have skilled 21 foremost floods among 1950 and2011) One thousand kilometers long coastline which is subjected to flooding by the cultivation of an area which would submerge large towns, along with Karachi, a salinity of farmland and aquifers that would threaten farming and fishing populations. (Ishrat Hussain, 2016)

5.1. Pakistan's socio-economic, governance deficits, and fault lines include:

Inactive charge of financial boom be around three-5% in recent years due to excessive energy scarcity attributable to “robbery, losses, non-restoration of dues and mismanagement; corruption; losses incurred by using massive public area businesses led via incompetent people. Negative law and order, terrorism; fragmentation and polarization of society and growth of intolerance and non-secular and ethnic divisions; abilities deficits rendering demographic dividend unachievable; inadequate use of contemporary communicate equipment; gender deficit ; era and competition deficit leading to gradual, poor high-quality business manufacturing and declining exports; decaying water infrastructure”.

Aid and deficit controls prevent and relieve regular flooding in communities with drought in Baluchistan, intense heat waves in Karachi and arid and semi-arid areas in Sindh as well as high rainfall in the northern areas. The determined and predicted harmful impacts of environmental shift on the various economic industries during 2014-15 in Pakistan were recorded in the reports collected using the 2008 Task Force (TFCC) as well as several Pakistanis and worldwide governmental and non-governmental companies.. These research indicates Pakistan's chronic weakness to climate change-induced enhanced ice melting, irregular monsoon winds triggering high rainfall and floods, and unfit rainfall, which could increase pre-modern damage and risk, and develop hydraulic drought, heat waves, cyclonic storms, hurricanes, and increasing sea-intrusion. The extreme influences are likely to be skilled through the Pakistan's sparkling water belongings. The consequences on Pakistan's number one sectors are in short referred to underneath. (world bank,2007) <http://facts.worldbank.org/indicator/SL.AGR.EMPL.ZS>

5.2. The Climate Change-Security Nexus: The Need for Recognition and Operationalization

In the event of Pakistan the domestic security-climate trading link is recognizable both in the traditional concept of domestic security, which specializes in defending national sovereignty, autonomy and territorial integrity from the use or danger of stress, and in the wider sense. The modern social security concept is based on inner stability and equilibrium, sustainable socio-economic growth, and the eradication of inequality and accessibility of basic supplies and facilities that include households, employment, schooling, healthcare, and access to atmosphere and water, and cheaper food and energy.

It is clear that 78% of ground waters supplied to Pakistan with the help of the Indus Basin arise outside of their border, the significance of climate change influence in the framework of Pakistan's foreign safety regulations. In the Tibetan peninsula, Indus and its significant affluents are located and Jammu and Kashmir are managed by the Indian. Any other important Indus-Kabul tributary comes from Afghanistan into Pakistan and merges with the Indus, contributing about a third of its flow. The 1960 Indus Waters Treaty (IWT) controls the flow to Pakistan and Azad Kashmir of the three western rivers Jhelum, Chenab and Indus. The decrease in trade in west river flows is a capacity to provide tensions in India's relationships with Pakistan. Reduction in the float of the Kabul River linked to weather exchange additionally poses protection dangers. The continuity of the Indus Basin and its permanent connection to the river must be ensured across its boundaries by Pakistan. Cooperation with Afghanistan, which is collectively useful in order to make optimum use of Pakistan's river, is an unnecessary priority of national security. Cooperation with Afghanistan, which is collectively useful in order to make optimum use of Pakistan's river, is an unnecessary priority of national security.

Slow economic growth negatively affects the safeguarding of readiness for the ok marine. Weather-based herbal events and house regulations and disturbances in attempt to prevent army events generally require military staff to be deployed in response to remedial activities and to heal peace. In relation to the increase in the sea level, natural disasters, primarily earthquakes, hurricanes and storms also damage the military,critical energy, and delivery infrastructure with severe national safety implications. The climate change as a main driver of Pakistan's natural and national security may be strongly argued for safety. The popularity of the critical significance to our country's defense of climate change would give the necessary boost to the intense effort to reduce the adverse effects of climate change on Pakistan. It also allows the State to contribute to worldwide attempts to address this not uncommon dange.(PDMA,2016;SDPI,2015;WWF2015)

5.3. Weak Government establishments and a fragile economy

The first determinant of the threat to domestic security or merely to the financial and humanitarian expenses of artificial processes is whether or not the comparative force of Asian nation governs organizations. The organizations currently claim not to be able to mitigate the hazards of external processes. Corruption and skilllessness are intrinsic to Pakistan's decisions in most cases. Like in many different emerging countries, the government changes needed to deal

with environmental shift risks, including relocations of inhabitants, preserving energy and changing technology would be controversial politically and expensive in the near term, although they will be essential for domestic long-term stability.(world bank,2009)

Not only can Pakistan's fragile institutions render it difficult for the state to safeguard people from the adverse impacts of global climate change, it is also probable, by hurting the economy and reducing tax profits, that global climate change will further strengthen state institutions. Such a vicious circle has been visualized in metropolitan areas. At the same moment, Pakistan's biggest revenue generator is susceptible to increasing oceans, storms and insufficient clean water. A tempest in Karachi over 20 years would increase questions about Pakistan's economic and political sustainability. In October 2005, the devastating earthquake in Pakistan underlined the limitations on the public and military organisations, but if the geographical location of the earthquake was nearer to important cities it is hard to think that they could handle. Less dramatic though, the extra prices associated with doing company in urban centers (as opposed to towns less susceptible to climate change) can discourage company investment and slow financial processes. (Gleditsch et al, 2007)

5.4. Exacerbating Ethnic, Regional, and Class Tensions

International temperature-accelerating resource weakness could lead to hazardous wedges throughout Pakistani society in these fault-lines. The dispute would be expected to overlap with differences between haves and nots, presumably when racial and cultural differences do not prove to be sufficiently lasting to prevent and provide fair distributions of violence. The dispute is expected. Comparative water inadequacy analyses in intrastate dispute reveal that war continues to explode when demand in the present cultural and financial disparities and dispute memory is unexpectedly restricted. Asia meets the factors which jeopardize its conflict with water inadequacy. (Nordås, 2005) In Pakistani national policy, disputes over irrigation law are generally opposed to the disadvantaged, disinhabited Baluchistan, Sindh, and the North West Frontier Province (NWFP) in the rich and politically dominant province of the geographical area. The very reality that transport to canal-irrigated soils in the Punjab and Sindh regions adds to racial conflicts even these days before autonomy for Pakistan's cultural geographical area alone. (Schubert et al,2004)

Water allocation among the four provinces of Pakistan is currently regulated by the Indus Water Treaty; however, the latest provincial assembly is protesting advice the problem is far from being resolved. There is latest example, the provincial government's geographic region dismissed the National River System Authority's call for involvement to curtail Punjab's withdrawal of water from the Tarbela Dam, which surpassed its agreed-upon seasonal consumption. Interprovincial war has been most evident in the context of huge dam construction over the previous decade. The Kalabagh Dam, which is scheduled to be built on the river in northern Asia, is designed to promote agriculture and energy production; however, Within the NWFP and Sindh, it is strongly opposed. NWFP residents would bear an unfair share of the dam's environmental impact with their associated degree and, perhaps for intelligent reasons, they jointly tend to be concerned with insufficient compensation from nearby geographic region, which could profit much more from the dam's ability to handle water concentrations and produce hydro power. Downstream, Sindh's inhabitants are challenging the "robbery" of water and thus the effect on Indus ' salinity near the sea's mouth, which could harm coastal mangroves and indigenous farming. In general, the trade-off between mismanagement of limited irrigation or power generation water resources is a vibrant which already triggers political debates among landowners and urbanists. (Hassnain,2008)

The ethnic and political cleavages of Pakistan do not seem to be limited to its provincial borders, but joint ventures extend to the multitude of significant towns in the country. At the time in domestic politics, which remains a Punjab-dominated sport, the financial and economic significance of Karachi is not reflected. Long-standing regional tensions burning with Karachi's perception of inequity can lead to continuous and intensive road demonstrations and violence if the Islamabad national government fails, as an example, respond properly to the outline of a climatic catastrophe. With the same logic, the regime in the state Punjabi region will most likely be acutely moved by political unruly. Sharp gains in the productivity industry of Punjab (brought about with the aid of water scarceness or better temperatures) might threaten the political stability of any authorities in Islamabad. In all events to come, Pakistan's poorest landowners and fishermen can most likely benefit from alternating temperatures and are the least able to protect themselves against greedy authorities ' predation and many strong activities by agriculture and industry. The impoverished abundance of Pakistan is the smallest amount of well-diagrammatic politics within the nation that, even in periods of elective civilian rule, a near-feudal oligarchical elite tends to dominate. Poor people are using protests and violence that can worsen over 20 years with few

means to solve their financial grievances. Societal and educational inequalities conjointly make a contribution to vast alienation and make permissive environment for extreme ideologies, as well as the ones of militant and terrorist businesses. (Kiani,2008)

5.5. Magnifying Demographic Trends: Urbanization and Migration

Pakistan can serve a role in present development and motion patterns over the next 20 years in ever-changing climate. Additional challenges enforced by scarcity of soil, reduced agriculture productivity and, consequently, devastation caused by floods and regular winds can exacerbate physical, political and cultural pressures linked to overflowing and relocation. Pakistan's demographic development has already tightened its highways, waterways and clinics for body facilities, faculty and so on, with very little doubt that investments in state-owned areas have not continued with easy aspirations. In that connection, the long-term consequences of global climate change certainly correspond (and exacerbate) to today's problems of economic and water and electricity degradation. These are the big difficulties already. UNICEF report currently that some one third of all Asia's fatalities are caused by waterborne diseases such as infectious diseases, cholera and infectious disease. (Dani,2008)

In addition to promoting more rivalry for rare assets between Asian nations, population stresses have diodeled several Pakistanis to search for possibilities overseas. Millions of Pakistanis are registered as overseas residents, mainly within the Asian nation's millions of Persian Gulf states and many within the United Arab Emirates, the UK (800,000), and thus us (600,000). The entire range of Pakistani citizens residing overseas, and illegal foreigners, residents and teachers, can amount to as many as 7 million. Pakistanis working abroad make significant donations to the economic structure of about 6 billion dollars. The mixed consequences of global climate change could speed up migration patterns in Pakistan. As farm productivity falls (and the population keeps growing), other and larger Pakistani farmers can not retain homes and move for job. If current patterns hold, these unqualified, uneducated men are likely to pursue opportunities in the energy-rich, labor-poor Gulf States. By implication, the financial system of Pakistan may become additionally dependent on regional stability and, indirectly, on the fossil fuel world marketplace. Therefore, political or economic shocks to the Gulf region may gradually be significant to the stability of Pakistan itself. (Gazdar,2003)

5.6. Conclusion

The global climate change hazards for Pakistan are decreased over the course of the era considerably. Yet, given the various discouraging social, economic, and political challenges facing Pakistan, it is affordable to consider whether or not state failure can be a realistic outcome within twenty consecutive years. The medium to long-term future of Pakistan is more difficult to predict than most countries, The uncertainties that lie in the chaotic politics of the country are often at the root of this trouble, in addition to the endemic absence of transparency in the few institutions (especially the military and intelligence agencies) that function as the central pillars of the state. In other phrases, the desire of the Pakistani State today is difficult to assess and even longer lasting. Any impetus nearer to optimism must be balanced, by the fact that Pakistan already exists in any part of the criminal record of the government, or in scarcely consequence, the Pakistani nation, with disastrous conflicts and herbal diseases jointly, endured first rate internal and outside pressure in the future, whilst not making any clear mistake. it might seem that the sinews of the Pakistani nation and society have manipulate along extra recognize actively than its formal establishments. In spite of this, once contend out over many years, the mounting threats posed by using a mixture of anti-kingdom aggressiveness, terrorism, sizeable alienation, poverty, ethnic and social struggle, and nearby animosities flip nation failure right into a potential proposition. In this context, it is best to characterize the potential impact of global climate change as an issue on Pakistan's social science, which is likely to exacerbate various additional major threats but unlikely to become the proximate reason for conflict or state failure. If the Pakistani state collapses before, it won't be because of global climate change alone— or indeed because of the other single cause. At a similar time, if Pakistan succeeds in achieving stability and prosperity over many decades in a row, they will have returned to greater value due to the predictable challenges that global climate change requires.

6. Analysis and Discussion

Pakistan is an agricultural economy and climate change have direct impact on agriculture and water resources. Elite interviews were conducted to find out climatic change and its impact whether negative or positive on Pakistan's agriculture and water resources and to establish if this scarcity might lead towards conflict. However, it was necessary to measure Pakistan's vulnerabilities towards climatic change and climatic risks Pakistan facing or might face in future to understand whole scenario. In short to have a better understanding of climate change as a threat multiplier in Pakistan. This is a Thematic based analysis in which interviews were recorded, transcribed and identified themes through Braun and Clarke method of thematic research. Initial codes developed were Risk, vulnerability, Resource scarcity and Conflict. Which later identified in two main themes i.e. socio-economic impacts and physical impacts under which all the initial codes are discussed.

6.1. Socio-economic Impacts

Climate change is affecting each vicinity of the globe, however in Africa and Asia, the vulnerability is a whole lot higher. Maximum of the arena has undernourished people 850 million live here unfold of viral and vector-borne diseases, such as dengue, hepatitis, and malaria are rampant. In Africa, consistent with an estimate, six hundred million people would be water careworn through 2050. In Asia, growing floods could affect humans by 2050, at the same time as agriculture produce could fall by means of 50% by 2020 making us vulnerable to food insecurity. Poverty, aid scarcity and lack of capacity emphasizes country wide protection issues because of present fault strains, distrust, and exploitation of water assets main to fissures, unrest and conflicts. Darfur is a high example, where war started as an ecological crisis, in part from weather exchange, fueled by using a 20-year Sahelian drought. Climate alternate was seen as a stress issue in Arab Spring too, as growing meals charges annoyed regional turmoil while political instability and socio-monetary fissures were already rife. Modifications in precipitation patterns have brought on dry regions to get drier and moist ones to get wetter, resulting in floods; desertification, droughts, and lower crop yields.

6.2. Risk and Vulnerability

This theme encapsulates the concept of climate change induced vulnerability and risk in Pakistan. Respondent responses helped in constructing an analysis under this theme.

Environment and climate change are inextricably connected to sustainable development. Pakistan calls for extra progress in environmental safety. During an interview with a respondent it was acknowledged that ... “water scarcity will grow, for now Pakistan have too much or too less water but at the same time Pakistan’s land productivity is decreasing, and weather changes are worsening those threats”(Personal interview, Hamnah Qureshi ,Environmental journalist, May 2019). It can be analyzed that the chance of water scarcity, exacerbated by way of weather change in addition to economic shocks, is including to existing vulnerabilities. It was asked during an interview with Prime minister of Pakistan climate change council that, “Weather change is inevitable and is a potential 'risk Multiplier' for Pakistan’s national safety as Pakistan is positioned very excessive in weather risk and Vulnerability” (Personal interview, Hamnah Qureshi, Pm Pakistan Climate Change Council, May 2019). Few Respondents during interviews also indicated that Pakistan’s three major weather demanding situations are related to floods, drought and sea intrusion. Most of the respondents agreed that Pakistan’s vulnerability will increase not alone because of climate change but because of mismanagement of authorities. The consequences are water and Food shortage, health troubles and populace displacement. Pakistan is ranked on seventh most vulnerable country, with a dying toll of 523.1 lives consistent with year i.e. 10,462 lives lost in two decades and monetary losses really worth Eight Billion.

Developing countries are considerably susceptible due to the fact of their speedy populace boom, unsustainable resource use, infrastructure constraints, quite excessive exposure and low adaptive potential. For example, approximately 95% of all disaster associated deaths occur in developing countries and other losses due to natural failures are twenty times extra in the growing global than as compared to advanced countries. Agriculture sector of Pakistan under climatic threat was discussed during an interview with environmental sciences professor, he mentioned when asked how Pakistan’s agriculture sector is vulnerable to climate change. Agriculture in the entire of the Indus Valley is beneath hazard, ensuing in direct and oblique influences on agriculture that would cost billions of bucks. This hazard interprets into direct influences to over a hundred million people and oblique affects to the whole burgeoning populace

of a hundred and eighty million, which is projected to growth to millions by few years. One respondent mentioned that ... “Producing high delta water-ingesting vegetation like sugarcane under a climate change situation may additionally not be viable” (Personal interview, Hamnah Qureshi , Professor of environmental sciences NUST ,May 2019). During an interview with one Pakistan’s Professor of agronomy, he also mentioned that Sugar costs have greater than doubled over the last 12 months, creating social unrest and political shame.

Respondents enlightened when asked about how Pakistan is vulnerable to climate change? Academicians focused more on natural hazards that will create more chaos to already existing situations. Forty percent of the humans are relatively susceptible and are frequently exposed to a couple of catastrophes. This exposure is predicted to be exacerbated with imminent impact of weather change. There was escalation inside the incidence, intensity and frequency in the climatic occasions in Pakistan which can be extra extreme and heavier precipitation that happened as in 2010. Each respondent mentioned about floods and consequences of floods in Pakistan. The deluge of 2010 has damaged all beyond information of volume and force. It affected more than 20 million populations, which is more than the ones hit by way of Tsunami in 2004. The livelihood of farm groups will be affected, and marginalized businesses like women, kids and the elderly could be negatively impacted thru full-size malnutrition.

Some respondents created a nexus between climate change, existing societal issues, and violence when asked how climate change in Pakistan can cause conflict. All together it can be considered that sectarian strife, regional disgruntlements, and militancy also are severe issues for Pakistan and together with climate change can create an uncomfortable situation. Climate change can make topics worse. A developing number of analysts are rightly pointing out that weather change is the biggest existential chance for Pakistan, even greater extreme than the challenge of militancy. However, climate change also can fuel similarly lack of self-reliance. There's already some proof to signify a correlation between agitation, extremist threats, and deprivation throughout many components of Balochistan and southern Punjab. Such issues will best be compounded by way of climate change.

The essential socio-communal areas being affected by climate change include human health, community assistances, water-related infrastructure, and hydropower technology. Those unique situations have created an international inter-dependence, which has imbalanced the nexus many

of the elements together with water, food and electricity substances to the communities around the world. Even though not going to be the number one purpose of violent conflict

Social and financial condition for instability including poverty and inequality are present in Pakistan, as are the possibility of environmental elements together with weather exchange and mismanagement of water sources exacerbating vulnerability. One respondent focused on Droughts, with exclusive characteristics, can arise in all climatic zones for brief and longtime relying at the situation of that place .He mentioned ... “In Pakistan, droughts occur frequently in Sindh and Baluchistan place due to low rainfall in the vicinity and different socioeconomic situations” (Personal interview, Hamnah Qureshi, Arid University, 2019). Another respondent connected droughts with socio-economic vulnerability and mentioned that “Drought is complex phenomenon because of its closer hyperlinks to socio-monetary conditions and is usually also carefully related to poverty and non-adaptive land” so it can be considered that water and agricultural practices main to the overexploitation of groundwater, deforestation and the depletion of grazing land.

6.3. Resource Scarcity and Conflict

This theme summarizes the concept of climate change induced environmental scarcity in Pakistan and risk of conflict. Respondent responses helped in building an analysis under this theme.

Pakistan earns 70% of its foreign exchange from agriculture. Except it maintains strong increase rates, its financial system will suffer immensely. Respondents view on resource scarcity and conflict reflected that current dispute over the development of the Kala bagh Dam at the Indus River inside the Pakistani Province of the Punjab highlights intra-Pakistani tensions over water resource sharing. One response was that ... “The Pakistani provinces of Sindh, Baluchistan, and the Northwest Frontier Province oppose the dam’s creation while the Punjab helps it as a means of fixing each electricity and water scarcity troubles” (Personal interview, Hamnah Qureshi ,Assistant Professor NUST, May 2019). The Lahore Chamber of commerce and industry has estimated that the dam would produce sufficient power to obviate the want to import 20 million barrels of water a year. Sindh that is the decrease riparian province, has been the most vocal opponent of the project for numerous reasons. Respondents view also reflected that in Panjab province of Pakistan, lack of structures inclusive of colleges, hospital and irrigation systems commonly contributes to vulnerability at the all levels. However, the effect of publicity and

vulnerabilities have been discovered unequal within a community and were taken into consideration as reasons of powerlessness and poverty. The poorest and landless humans tend to have houses within the low-mendacity regions of the main village whilst then again, huge holders, and affluent individuals are normally situated on better ground past the primary flood zones.

When asked how climatic change in Pakistan will affect rural area? Respondents mentioned In Pakistan, rural people make houses with low value and effortlessly to be had fabric referred to as pacca (manufactured from stone, brick and cement or katcha (wooden frame) the country is pretty much self-enough in food manufacturing (even though there are distribution problems). However, in the close to future the rate of increase in food manufacturing will now not be able to hold tempo with the surge in populace. Pakistan will want more water to develop more food and country will want to increase crop yields as properly. Three respondents have a similar idea that... “Natural useful resource shortage and weather alternate may be a catalyst that exacerbates simmering tensions and existing situations for instability” “(Personal interview, Hamnah Qureshi, Ministry of Climate Change, August 2019). In particular, a decreased availability of water and expanded rate of food commodities can increase the danger of violent conflict wherein the situations for instability exist in a region.

The question relevant to glacial melt in Pakistan is given more importance because of the speedy melting of glacial. Some respondents agreed that it will create water scarcity in urban areas some believes that glacial melt will be beneficial for Pakistan north’s Agriculture. One respondent who is already researching on this agenda mention that ... “Because of the speedy melting of glaciers, glacial lakes have advanced inside the Gilgit-Baltistan and Khyber Pukhtunkhawa place. Out of these, 33 lakes have been assessed to be susceptible to Glacial Lake Outburst Floods (GLOF) that could bring about the release of thousands and thousands of cubic meters of water and debris, and cause lack of lives, belongings, and livelihoods of around millions of human beings at risk of GLOF.” (Personal interview, Hamnah Qureshi ,Environmental journalist, May 2019)

This fast and unparalleled melting of glaciers possibly will have a catastrophic impact on the livelihoods of thousands and thousands of humans residing within the plains and impact water deliver, agriculture, food and water safety of millions of people. Also, as we experienced in 2010, flash floods as a consequence of heavier rains and swiftly melting glaciers not best fee large losses of life and livelihoods however additionally led to colossal damages to the infrastructure. About

14 million human beings had been affected and hundreds of humans ended up turning into eco-migrants.

6.4. Physical Impacts

Pakistan is a country with ecologically and geographically numerous functions and having massive populations living along coastal belts, river deltas and arid areas, which might be at direct chance of flash flooding, sea level rise and droughts caused by climate trade. Climate change increases fears of its brilliant socio-monetary and environmental effects. Pakistan is commonly uncovered to natural calamities like floods, droughts, earthquakes and cyclones Pakistan had suffered from 141 extreme climate occasions let its cyclones, storms, floods, Glacial Lake Outburst Floods (GLOFs) and heatwaves, and so forth.

6.5. Risk and Vulnerability

Pakistan is vulnerable to both impacts of climate change i.e. socio-economic and physical. Scientifically one respondents mentioned that ... “Fast depleting mangrove forests have made the coastal regions of Pakistan vulnerable to harsh climatic conditions specially cyclones, floods, sea level rise” (Personal interview, Hamnah Qureshi, NUST University ,2019) It can be predicted that Weather change in Pakistan has increased the average annual temperature by 0.120C and the annual upward push in sea degree by 1.1 mm causing greater rainfalls, sea intrusion, affecting agricultural output and extreme flooding. One expert in plant sciences responded that ... “Over the last few years’ deforestation in Pakistan has accelerated at a fast tempo of 2.1percentage in keeping with annum, the highest in Asia, accompanied through mangrove woodland depletion at an alarming fee of 2.3 % annually”(Personal interview, Hamnah Qureshi ,Lecturer GCU, June 2019).

Pakistan is blessed with one in every of the biggest semi-arid mangroves within the global but has not noted their ecological significance for lengthy, which has caused high-quality damage. Respondents when asked how Pakistan is vulnerable to physical impacts of climate change. Mentioned that Mangrove cover helps in protective coastal communities from harsh climatic conditions as they serve as a shield from storms and floods and serve as a capacity habitat for shrimps and marine life, also economically helping fishermen communities. Respondents view on mangroves also incorporated that in Sindh, due to climate trade mangroves are disappearing, even land is being lost, as tens of millions of hectares of land is lost due to sea intrusion. Apart from the coastal regions, wetlands of Pakistan also are going through the influences of climate change.

Migratory birds, which inhabit those wetlands, have now modified their patterns consequently affecting the entire atmosphere.

The Himalayan-Karakoram-Hindukush (HHK) glaciers are the 1/3 biggest ice mass on the earth, after the Arctic and Antarctic. It is suggested everywhere in the world that glaciers are receding for the reason that closing century, those within the HHK area are located to be melting faster than any others. Respondents explained when asked how Pakistan is vulnerable to glacial melt. One response was ... “The alarming situation is that if the existing velocity of recession continues, the HHK glaciers would possibly grow to be extinct by means of 2035. The excess of melting of HHK glaciers are expected to motivate flooding in the Indus and its tributaries for the approaching to three a long time than it is going to be preceded by way of reduced river flows because the glaciers retreat” (Personal interview, Hannah Qureshi ,Assistant Professor Arid University, May 2019). Pakistan is various sectors and elements are underneath extreme risks. Respondents view on the agricultural zone is that horticulture is under the effect of temperature and precipitation, sensitivity of population because of water, food, and human migration disaster, coastal belts because of rise in sea, glaciers because of growing of temperature, atmosphere, biodiversity, and forests are fantastically vulnerable to climate change. Respondents mentioned when asked about the nexus of climate change , agriculture and vulnerability that with the support of distinctive feature of its natural functions and incapacities, the maximum prone sectors and elements to weather change in Pakistan are agriculture area due to water scarcity and deteriorating soil, population region because of screw ups, migrations and irritating human safety problems, coastal belts due to sea level rise, mountainous and glaciers, surroundings and biodiversity and forestry are beneath extreme threats.

It’s a longtime reality that glaciers are at risk of weather change. Pakistan’s glaciers are receding at an alarming charge, mainly the ones on the lower elevations. The Himalayan and Hindukush glaciers are shrinking at a rate of .5 percent yearly. Pretty much 2 percentage of the entire water quantity on our planet is freshwater which is match for human intake; over 70 percent includes glacier ice and snow. In many parts of the world, inclusive of ours, that is one of the principal supply of freshwater deliver.

As the ice melts, it establish large glacial lakes, respondent view on society and glacial melt is that ... “It could threaten local communities which include Hassanabad village with glacier lake outburst floods. Within the brief-time period, experts expect greater of this flooding, but much less

ice in the glaciers could ultimately cause drought in the long time. In Pakistan, it's far anticipated that there are over 3,000 lakes as a result of melting glaciers in Gilgit-Baltistan and Khyber Pakhtunkhwa of which 36 are considered dangerous.” ”(Personal interview, Hamnah Qureshi ,Environmental journalist, May 2019) Whilst some glaciers in Pakistan are stable and a few are even gaining ice, they will though all begin to melt in time as the planet receives hotter with worldwide warming.

6.6. Resource Scarcity and conflict

Many in Sindh worry that the Kalabagh dam will irrigate land in the Punjab at the price of irrigating land in Sindh. Sindh additionally fears that the dam will reduce Indus water glide to the Arabian Sea, which is vital as a way to save you salt water intrusion from destroying coastal mangrove stands and farmland. Respondents view that an anticipated 85% of the Indus River Delta mangroves, that are important spawning grounds for fish and shellfishes, had been misplaced. Waft diversion, main to extended salinity tiers, in addition to commercial pollutants from Karachi and the local reducing of mangroves for food and fuel wood, is degrading the atmosphere. If modern-day water use plans continue inside the decrease riparian place of the Indus, Sindh can be positioned in extreme jeopardy. One respondent mentioned that ... “The hiking temperatures and thawing glaciers have raised alarm bells for food availability within Pakistan. That is due to the fact Pakistan has an extensive agricultural base dependent on the Indus river which originates from these glaciers.” The diagnosis that these glaciers will retreat in about subsequent four to five decades shrinking by way of 30 to 40% in their contemporary quantity may have a drastic effect at the production of water in depth plants—consisting of sugarcane, cotton, and rice—threatening food insecurity and trans-boundary conflicts. One respondent when asked how Pakistan can become resource scare country in relation to climate change? Responded that ... “Pakistan could lose up to 50% of her wheat production by 2050 due to weather trade, land degradation, water scarcity, water-logging and excessive evaporation charges due to excessive temperature. Vulnerability in crop productivity turned into bad for the economic year 2017-18, and this vulnerability is predicted to stay so viewing present climate change developments” (Personal interview, Hamnah Qureshi, Ministry of National Food, Security and Research, May 2019). All this may in all likelihood result in a chaos as a way to be very tough to address until right preventive measures taken faster in place of later.

Pakistan has these days experienced unprecedented damage as a result of recurrent floods and worsening droughts. We're an already enormously water-burdened country and this situation may want to come to be untenable in the subsequent decade. Yet, we preserve wasting water because of a dilapidated irrigation machine and unchecked groundwater use that has been depleting our water aquifers. One respondent explained his view on water scarcity in Pakistan that ... "Water is wasted on manufacturing of water-in depth coins crops like sugar to serve the pursuits of elite sugar barons." (Personal interview, Hamnah Qureshi, SDPI, June 2019) Few other respondents mentioned that a majority of our populace still is living in rural areas and although most of them very own no land, they in most cases rely on agriculture. Endured disruptions to agricultural manufacturing due to growing climate change will get worse the scenario for this already destitute populace. Glacial retreat and shrinking will lead to intense water scarcity in the close to future, as we have already started experiencing. It could additionally result in reduced agricultural output, especially in regions, which rely upon water emanating from glaciers. We are witnessing big deforestation, overfishing, accelerating losses of biodiversity, and the depletion of aquifers. We are additionally seeing sea degree rise and more common and harsher climate phenomena, which includes droughts, floods, and hurricanes. The impacts are enduring and extreme.

Respondents when asked about the connection between food insecurity and climate change mentioned that demand for food, water and strength is growing as numbers of people, and the quantity we devour in step with individual, increases globally. One respondent says that ... "Climate change and resource scarcity are themselves often linked; weather change may also adjust the supply of sources (e.g. water) and consequently changes in get entry to can result in disputes over allocation. The Indus River relies on glacial soften from the Himalayas for up to half of its waft making it noticeably sensitive to climate change."(Personal interview, Hamnah Qureshi,Center for Economics and Climate Change, June 2019) Along future potential water shortages, there is increasing chance of massive flooding because of fast glacial melting. Seasonal melt waters also feed vital hydroelectric power stations.

6.7. Adaptive Capacity – physical and socio-economic impacts

This theme discusses the concept of climate change and Pakistan's adaptive capacity. Respondent responses facilitated in structure an analysis under this theme.

Respondents were asked about the concept of adaptive capacity of Pakistan their responses reflected that , Ineffective capacity plans and over-exploitation of natural resources causing billions of greenbacks in harm and riding the economically unstable country. Further into poverty. Unawareness, lack of expertise and over-exploitation of natural assets are a few reasons and deforestation is one of the principal causes for increasing climate exchange affects. Ineffective capacity plans and over-exploitation of natural resources causing billions of greenbacks in harm and riding the economically unstable country. Further into poverty. Unawareness, lack of expertise and over-exploitation of natural assets are a few reasons and deforestation is one of the principal causes for increasing climate exchange affects. One response is that ... "Floods in Pakistan (2010, 2011, 2012,) are the result of climate change but if proper version measures were taken, their devastation could have been reduced significantly." (Personal interview, Hannah Qureshi ,SDPI ,June 2019)It has been learnt that Pakistan turned into in no way a catastrophe-susceptible country And acquired good enough rainfall and seasonal temperatures at some point of the 12 months, however as time passed the frequency of natural calamities increased, which highlights the reality that human unawareness have led the whole So far. It has been observed that people adjacent northern and coastal areas of Pakistan are witnessing the more serious impacts of climate. Unawareness, lack of expertise and over-exploitation of natural assets are a few causes and deforestation is one of the most important causes for increasing climate change affects.

Respondents view on adaptive capacity consists of disaster- preparedness, elevating consciousness, organizational and institutional changes, potential and infrastructure building, and local populace mobility. Whilst beneath mitigation tactics, the country calls for great steps to ensure a better food and water control mechanism, strength sufficiency, metropolis planning, waste control, and green technological approach. Each quick and lengthy-time period plans want to be devised on instant foundation to pacify modern extreme weather conditions and maintain them from worsening even further before it becomes too past due. At the same time as the situation in Pakistan is exceptional, there also are a few traumatic similarities.one respondent mentioned that... "Pakistan witnessed frequent and devastating floods and continuous droughts, mainly in Sindh and

Baluchistan. It is time to adopt early prevention strategies to deal with this emerging security challenge. Political, military actions and mobilization of financial resources would play central role to deal with these challenges” (Personal interview, Hannah Qureshi, Center for Economics and Climate Change,2019).

Early caution systems can play a key role in decreasing material losses and saving lives at some stage in a catastrophe, thereby increasing groups’ coping capacities and resilience. where there may be advanced caution of a disaster, human beings prepare before crisis strikes, both thru evacuation or defensive measures to lessen impact and losses. We sincerely lack the capability to deal with the imminent climatic demanding situations because of unawareness.

6.8. Discussion and Conclusion

Natural hazards in Pakistan originate in the main from meteorological phenomena including floods, storms, cyclones, landslides, and intense weather. Weather change and variability are principal dynamic pressures that increase the vulnerabilities of Pakistani society to failures. The prediction that the frequency and intensity of natural failures along with floods, droughts, intense climate activities, unexpected and unseasonal heavy rainfalls will growth has validated to be proper due to the head to head incidence of disasters around the globe each 12 months. Pakistan is in a chance inclined country and is hard hit with the aid of the terrible impacts of weather change in part, as it does not have enough resources to deal with and recover from severe large-scale failures and in part, because handling failures itself is complex and aid demanding. Amongst those failures, floods are greater often happening within the country leaving a huge range of populace inclined. Every year, monsoon rainfalls destroys agricultural land, kills cattle, and destroys infrastructures, which in the end effects economic system of Pakistan. The state of affairs will become get worse with time droughts in Sindh and Baluchistan, heatwaves in Karachi and climate caused landslides in the northern regions and Kashmir vicinity, resulting in human and financial loss.

For Pakistan, as a threat-inclined country. It is far increasingly crucial to pro-actively deal with natural hazards and the cumulative dangers that they pose. Key gaps in contemporary threat mitigation plans wishes to be identified in the main considering threats posed with the CC vulnerability, socioeconomic risk and different resiliency elements inclusive of demographics, poverty and livelihood alternatives. Creating focus among vulnerable communities will honestly

reduce the range of deaths and injuries because danger consciousness has been proved a powerful measure in reducing bad effects of disasters. To foster social ecological resilience studies and planning at the community level, aid ought to be given to local initiatives and businesses already working to beautify local resilience. Past risks occasions display that natural disasters in the country are seasonal and it's far impacting different areas of Pakistan differently because of its range in phrases of climate and topography. Every province and place face a diverse variety of hazard threats. For instance, the coastal areas of Pakistan are at risk of cyclones and tsunamis. Southern Punjab is mostly affected by the risk of droughts and flooding, even as Baluchistan is at danger for droughts, earthquakes, and flash floods. Furthermore, the Sindh province faces the opportunity of droughts and flooding, at the same time as Khyber Pakhtunkhwa is suffering from earthquakes, landslides, and avalanches and flooding. In destiny, disasters are predicted to hit Pakistan greater common and extremely.

Water scarcity is growing each single day and climate styles are getting remarkable. Glaciers, one of the fundamental water useful resource in Pakistan are bleeding, drifting, gushing and depicting uncharacteristic conduct. Winters are witnessing amazing and repeated snow fall whilst summers even in excessive altitude places like Gilgit-Baltistan have become equally warm as skilled hundreds of feet underneath in the plains of Punjab. Rapid population growth, urbanization, aggressive creation, environmental degradation and glacial melting resulting in Glacial Lake Outburst Flood (GLOFs) have simply proven their negative effects in recent years. GLOFs appear when glacier ice is not able to preserve resulting in the unexpected release of water. This melting and growth of glaciers has emerged as an extreme risk mainly in Gilgit-Baltistan area which houses few of the sector's longest glaciers.

As the temperatures could keep rising, rainfall could additionally increase stimulating diarrheal, viral and lots of vector borne sicknesses. Sea stage alongside coastal belt of Pakistan is already recommended via professionals to be growing badly eroding coastal regions and regularly inundating deltaic plains. Land alongside the coast is turning into salinized and habitation is progressively being misplaced.

Outcomes of weather change are not particular to Pakistan but however are being located around the globe even as efforts are being made to mitigate the destructive consequences. Thus weather change is inevitable however for Pakistan that's ranked excessive on weather danger

index, it becomes a capability danger Multiplier. Faced with a hostile neighbor sitting on flood gates and ever prepared to make the most of our internal vulnerabilities, climate change turns into a severe exploitable threat to Pakistan's national safety. These environmental and ecological troubles turn out to be more suggested due to insufficient and restrained capacity of the state and society to address those. Pakistan's military comprehends the safety risk related to weather change being the handiest powerful response multiplier in such situations. Slicing of lines of conversation, isolation of strategic areas, destruction of key bridges and blockades of crucial passes are common cases for military formations in particular the ones deployed within the north. Pakistan does recognize weather change as a threat multiplier hence tries to reinforce the ability of presidency to alleviate and mitigate its negative effects. However, regardless of some of coordinating bodies at federal and provincial degree, army remains on its own in responding to such situations within the field.

An all-encompassing collective effort is needed to understand, adapt and mitigate chance posed by way of climate change specially the risk it poses to country wide protection. Same sharing of obligations via nation, society and worldwide network is the exact requirement at present. Since, surroundings and climate exchange are inseparably linked to sustainable improvement, accordingly Non-authorities employer and neighborhood groups have to additionally play their role and shoulder their proportion of duty. Government additionally desires to remember the fact that country alone with its meagre resources cannot cope with these threats and wishes synergetic attempt assisted through Non-authorities and community help businesses. Government and state functionaries want to understand that those climatic dangers cannot be mitigated via character efforts and resources which if tried could result in environmental strain; exploitable via adverse forces to generate poor societal outcomes. Pakistan at presents seriously wishes this solidarity based upon partnerships at countrywide and international degrees.

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