

CLIMATE CHANGE AND ITS IMPACT ON NATIONAL SECURITY;

A CASE STUDY OF PAKISTAN



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

MASTER OF SCIENCE

in

INTERNATIONAL RELATIONS

by

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**SCHOOL OF POLITICS AND INTERNATIONAL RELATIONS
QUAID-I-AZAM UNIVERSITY, ISLAMABAD
2019**

QUAID-E-AZAM UNIVERSITY
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ABSTRACT

Climate change is an emerging security challenge of modern times. It has threatened all the major dimensions of national security. It has global as well as regional impacts. Particularly, Pakistan is one of the most vulnerable countries facing challenge of climate change. As far as Pakistan is concerned national security spectrum needs to be broadened. National security is not only traditional security; environmental security needs to be part of it. All the major security concerns come under the umbrella of national security. Economic security, water security, food security, human security and sovereign state security are the major dimensions which are directly or somehow indirectly threatened by changing climate. If this issue will not be addressed maturely and effectively, it will be a major security concern as compared to terrorism or any other security threat. Water security highlights the importance of water dispute among arch rivals India and Pakistan. Water scarcity can lead to any major military combat among two nuclear states and can have devastating consequences for human civilization. In a nutshell, climate change is gradually becoming a serious security threat with regional and global outreach. Policy makers in Pakistan need to consider environmental security as important as any other form of security. As, it is carrying a huge potential of destructing and devastating consequences.

ACKNOWLEDGMENTS

Thesis writing has never been an easy task but with the help and support of Almighty Allah and my teachers I was able to complete this uphill task. It is difficult to overstate my deepest gratitude to my supervisor, Dr. Muhammad Mujeeb Afzal. With his inspirations and great efforts of explaining topics clearly and simply made possible to complete my thesis. He made difficult issues easy for me with helpful ideas. During the period of thesis writing he provided me an encouragement, sound advices and good ideas. His guidance from initial stage till final level had enabled me to develop an understanding of the subject. A special thanks to all faculty members of SPIR including Dr Nadeem Mirza, Dr Zafar Nawaz Jaspal, Dr Syed Qandeel Abbas, Dr Ahmed Ejaaz Malik, Dr. Farhaan Siddiqui and Director of SPIR, Dr Nazir Hussain for their assistance that they provided me at all levels. Lastly I offer my regards and blessings to my family and to all those, especially Dr Mujeeb Afzal who took time out of his busy schedule for helping and showing me a right path not only in my thesis work but also a way for my whole life. I dedicate this research work to my best teacher Mam.Uzma Razzak Gardezi and my inspiration Kinza Iftikhar.

Muhammad Ihtesham Ul Haq

April 5, 2019.

ACRONYMS

AF	Adaptation Fund
ASL	Above Sea Level
CCT	Carbon Credit Trading
CDM	Clean development Mechanism
CRU	Climate Research Unit
EU	European Union
FCPF	Forest Carbon Partnership Facility
FFC	Federal Flood Commission
GCF	Green Climate Fund
GCISC	Global Climate Impact Studies Centre
GDP	Gross Domestic Product
GEF	Global Environmental Facility
IPRI	Islamabad Policy Research Institute
IRSA	Indus River System Authority
ISPR	Inter Service Public Relations
ISSRA	Institute for Strategic Studies, Research and Analysis
ITFC	Intergovernmental Task Force on Climate Change
ITMO	International Transfer of Mitigation Outcomes
IWT	Indus Water Treaty
MASL	Meters Above Sea Level
NCCP	National Climate Change Policy
NDMA	National Disaster Management Authority
NHRA	National Hazards Risks Atlas
PAK-EPA	Pakistan Environmental Protection Agency
PIDE	Pakistan Institute of Development Economics

PKR	Pakistani Rupees
PMD	Pakistan Meteorological Department
RSCT	Regional Security Complex Theory
SAARC	South Asian Association for Regional Cooperation
SDPI	Sustainable Development Policy Institute
TFFS	Task Force on Food Security
UNFCCC	United Nations Framework Convention on Climate change
WAPDA	Water and Power Development Authority

INTRODUCTION

Climate change has emerged as a global phenomenon in recent times having regional as well as national impacts. It has evolved as a serious challenge to national security. It ranges from global security implications to national security as well as human security. Climate change has evolved from an environmental issue to a security challenge in late 90's and recent years. It is a highly sung phenomenon because of its security challenges which it has imposed around the globe. In modern times climate change adds such security factors which would have serious consequences in future. Climate change, if not dealt effectively, it would be proved as an actor resulting in massive political, social and security challenges for the entire human civilization.

Historical Review

Climate change is a change in set patterns of weather which existed for a long period of time. Climate change is caused by different factors. It includes biotic processes, disturbance in solar radiation, tectonic movements and volcanic eruptions. Human activities are referred as major causes of climate change, commonly known as global warming. There is not any globally accepted definition of climate change or global warming. There are two types of forcing mechanisms causing climate change. One is known as internal mechanism while other is known as external mechanism.

External mechanism includes natural processes like solar output and volcanic eruptions. While internal mechanism mostly involves human activities like emission of Greenhouse gases and procedures of deforestation. It results in number of disasters. It is increasing the global temperature unprecedentedly. This rise in temperature is causing rapid melting of glaciers. It causes massive flooding around the globe killing thousands of people. Hurricanes, seasonal droughts, unusual rain and snow, and rising sea levels also have their impacts on the inhabitants of the globe. Sea levels are changing drastically posing serious threats to the coastal lines of many countries around the globe. Increasing temperatures are directly influencing vegetation process. Agriculture has direct effects resulted by climate change.

There are no historical traces where the term climate change was ever used for the first time. During the late 18th century geologists for the very first time noticed the changes in global climate. By the end of 19th century it was decisively believed by the geologists that global climate is changing and it is effecting vegetation, human lives and water resources on the whole. It was proposed that change in concentration of carbon dioxide could change the global climate. In 1985 a conference was held named “Assessment of the role of carbon dioxide and other greenhouse gases in climate variations and associated impacts”. In 1990’s it was agreed upon that next century would be warmer and it would affect the life globally. Two major global agreements were signed during this era, which are most vital in this regard which are as fallows.

- Kyoto Protocol
- Paris Agreement

Kyoto Protocol

United Nations Frame work Convention on Climate Change helped out the parties in drafting an international agreement on climate change for the very first time in history. It was unanimously agreed upon by 192 parties that Green House gases are affecting the climate and are causing rise in global temperature. All the parties developed consensus to reduce the emission of carbon dioxide. Kyoto Protocol was signed in Kyoto, Japan in December, 1997. Its major objectives were to implement such policies which can help reducing emission of Green House gases. Kyoto Protocol acknowledges the responsibilities of countries on the basis of their economic development. Those countries which are more developed were declared more responsible for the emission of Green House gases.

Following were the major goals set by the Kyoto Protocol.

- Reducing Green House gases emissions.
- Encouraging countries to adopt green investment schemes.
- Adopting clean development mechanism.
- Stabilizing Green House gases concentration.
- Business action on climate change.
- Implementation of environmental laws.

- Implementation of environmental tariffs.
- Zero politics on global climate change.
- Establishing low carbon economies.
- Counter mechanisms for deforestation.

Paris Agreement

Another important global agreement within United Nations Framework Convention on Climate change (UNFCCC) signed by 195 members. It deals with Green House gases emission, mitigation and adaptation towards climate change, and finance for mitigation and adaptation. On December 12, 2015 it was agreed upon by all the members that each country will determine, plan and report its contribution in mitigating climate change. A global climate change mitigation fund was also created to help developing and under developed nations to fight the threats imposed by climate change.

Following are the major objectives of Paris Agreement.

- Determining contributions of members in mitigating climate change.
- Holding global temperature increase less than 2 degree.
- Increasing ability of the member states to adapt the effects of climate change.
- Making finance to lower Green House gases emissions.
- Adopting sustainable development.
- Ensuring Green development.
- Counter air pollution.
- Encouraging environmental friendly policies.
- Implementation of environmental laws.
- Financing under developed countries for adaptation.
- Ensuring environmental security for every individual of the planet.¹

Climate change has posed different sorts of threats to individuals as well as to countries and different regions. Some are economic in dimension. Some are related

¹ United Nations Climate Change Conference paper, “23rd Annual , Conference of the Parties (CoP) to the 1992 *United Nations Framework Convention*” Paris, 2015

to security. Following points will examine the threats posed by climate change at different levels.

Climate Change as Global Security Threat

Climate change is affecting almost all the parts of globe. Asia and Africa are the most vulnerable continents. World's most under nourished population live in afore mentioned areas of the world.² High possibility of diseases like dengue, hepatitis, and malaria also exists. According to an estimate in 2050 there would be 600 million people in Africa directly water stressed.³ In Asia, increasing floods would be affecting the lives over a billion people, while agriculture production would fall by 50% by the year 2020.⁴

Lack of capacities, poverty and mismanagement of resources collectively possess national security threats. Countries laying on the fault lines would be involved in mistrust and exploitation of water resources against each other which would lead to unrest and security conflicts in different regions. Darfur conflict is one of the most prominent examples of conflict caused as a result of conflict change. It was result of a 20 year Sahelian drought. In recent times Arab Spring also has its roots in effects of climate change. Rising food prices fuelled the turmoil in Tunisia and later on it just took over the entire Middle East.⁵ Disturbing and unusual weather patterns are making dry regions drier and wetter regions more wet. Recent deadly California fires and repeated hurricanes in American continents also highlight the threatening aspect of climate change. Thousands of people were forced to flee their houses. Billions of dollars infrastructures destroyed as well. Floods, desertification, droughts and low yield rates are all result of these natural disasters. Almost 12 million hectors of land has been destroyed by rivers and oceans every year, which are causing serious human and physical security issues.

² FAO Report, "The State of Food Insecurity in the World"(2015) Rome

³ Ibid

⁴ Ibid

⁵ Ines Perez , "*Climate Change and Rising Food Prices Heightened Arab Spring*", Scientific American online journal , 4 March 2013, <http://www.scientificamerican.com/article.cfm?id=climate-change-and-rising-food-prices-heightened-arab-spring>

Climate Change and Regional Security

A lot of discourse going on security situation in South Asia focused mainly on interstate conflicts, border issues, nuclear threats and terrorism. On the other hand environmental security challenges have not been considered seriously. Climate change, water scarcity, food security and energy security have not received much needed attention. Floods in Bombay, Dhaka, Colombo, Kerala, Interior Sindh and Punjab of Pakistan, heat waves in Karachi and smog in Delhi are few of the prominent examples that climate change is a considerable reality in the region. These natural disasters gave an idea to the policy makers in South Asia that climate change is a pressing security issue in the region.

As South Asian region is totally dependent upon agriculture for its livelihood. It is expected that people will be more vulnerable to heat waves and floods. These heat waves and floods are multi-faceted threats. On one side threatening for food security and on other hand these are challenging national and human security. In summer of 2015, 3500 people died because of heat waves in different regions of South Asia. According to experts such events will be more frequent in future as temperature will rise time and again. It will not only kill the people but also decrease the agricultural yield leading towards food security dilemma in the region.

If global temperature keeps increasing with the same fashion, it would not only make South Asia strained of food and water but also generate a competition for resources among countries. Such competition will inflict new conflicts among the competitors. Climate immigrants will also be an upcoming challenge to tackle. Increasing sea levels will not only swallow the territories but also force millions of people to migrate. As this region is already one of a politically hostile region in the world, climate migrations will result into more conflicts and more destabilization. This security is no more less threatening than terrorism and any other traditional security threat.

Bangladesh and Maldives have already started serious steps to adapt to threatening effects of climate change. Bhutan is already considered as the most carbon negative country in the world. India has recently devised its national action plan to combat climate change. Pakistan also recently adopted its national climate change policy. These two nations traditionally focus more on their bilateral border security

and political issues but did not pay much heed to the threats imposed by climate change. It is need of the hour that both New Delhi and Islamabad should cut down their military spending and divert it to combat effects of climate change. Until these two countries will not tackle this issue with co-operation instead of competition, smaller countries will not be able to play any effective role.

South Asian region has massive potential to meet its energy demands in solar, hydro and wind power. It will cut down emission of Green House gases to a greater extent. A collective regional effort can be more effective in adaptation and mitigation of the climate change effects. South Asian policy makers should realise the Importance of climate change security nexus. It would only be possible when climate change will be considered as threatening as any other traditional security challenge.

Climate Change and National Security of Pakistan

Climate change is directly linked to sustainable development in Pakistan. Pakistan requires targeted measure to mitigate climate change effects. Adaptation to climate change effects will assure sustainable development in Pakistan. Environmental security is a new addition to the prevailing challenges of Pakistan. Ascending water scarcity, decreasing land production and rising sea levels are major threats and climate change is making them more deadly and fatal. Risks of natural disasters are making the security situation more vulnerable.⁶ Climate change is becoming a threat multiplier for the national security of Pakistan, as Pakistan is placed at 8th position by German Climate Change Index list of most vulnerable countries. Following are the major ecological change patterns of Pakistan mentioned by German climate change index.

- Unusual precipitation patterns
- Seasonal and long term droughts
- Unusual water availability patterns
- Intensive and frequent heat waves
- Massive floods

⁶ Karim, Khan, "Climate Change Cost Pakistan 3.5 Billion Dollars in 18 Years" Dec 09, 2009

Available on <http://freebird.instablogs.com/entry/climate-change-cost-pakistan-35-billion-in-18-years/#ixzz0qnHzBhRM>

- Rising sea levels⁷

It is estimated that climate change will increase the severity of monsoon rains making floods more frequent. Rapid melting of glaciers will raise the sea level. Cities of Karachi and Gawadar will be under direct threat of any tsunami. Following are the major security challenges climate change will pose in near future to the national security of Pakistan.

- Food insecurity
- Risks to public health
- Water scarcity
- Territorial losses as result of coastline inundation
- Erosion of coastal regions as result of rising sea levels
- Human security challenges by natural disasters
- Infrastructure losses.

Strategic Implications of Climate Change

While considering the effects of climate change on strategic environment in Pakistan, following are the major concerns for policy makers in Pakistan.

- Threats to human security in Pakistan as flood and heat waves in last eight years have killed around 5000 people across the country.
- Threat to food security as agriculture will lose its 25% productivity by 2050.
- Threat to the coastal areas of Sindh and Baluchistan because of rising sea levels.
- Possibility of conflicts among provinces over water distribution: a threat to national integration
- Threat of conflict between India and Pakistan over water usage of Indus Water Basin as water scarcity pressurising both countries to strive for more water
- Possibility of Water Wars
- Threat of climate change and halted military preparedness

⁷ Annual Report German Global Climate Change Index, Berlin.

Theoretical Framework

Regional Security Complex Theory (RSCT) is a theory dealing with regional securitization. It was proposed by Barry Buzan and Ole Weaver in 2003. This concept of theory tells how security is interlinked in a particular geographical region. Usually security concerns do not travel from far off regions. Most likely threats occur in a region. Terrorism and environmental security issues are prominent examples of it. Different actors interact with each other in overall security of any region.

Conceptualization; Competition vs. co-operation

Interdependence of security in a region is an interesting area of study. Regional Security Complex Theory (RSCT) is different from regionalism which usually focuses regional integration. Copenhagen school of security studies is mostly concerned with state security, individual and political security, societal security, economic security and environmental security. Environmental securitization is defined as; removal of all fears which environment possess for individuals, states and the entire globe. Environmental security is the major focus of this study. Environmental security in Pakistan is regarded as the emerging security concern of the modern security studies, as a result of security concerns arise as a result of climate change. Climate change in Pakistan is posing direct threats to the individuals, sovereign state security of Pakistan and peace in the region.

Rising sea levels, floods, and seasonal droughts have put human security on risk. Same is the case with territorial security of Pakistan. Major cities of Pakistan are under direct threat from rising sea levels. There exist fair chances of drowning of cities of Karachi and Gawadar as a result of any possible tsunami. Copenhagen school of thought also addresses the relation between states on environmental securitization. It also focuses on how environmental problems can cross borders and emerges as a conflict between states. In this perspective another environmental conflict among India and Pakistan is looming around. Recent hot exchange of words on Indus Water Treaty (IWT) among state officials highlights the implications of climate change on the bilateral relations among India and Pakistan. In a nutshell, water scarcity is a reality in the region and “Water Wars” on distribution of water is no more an exception but a reality. This powder keg in

South Asia has the capacity to get fire anytime which could escalate a nuclear combat in the region which can result into loss of millions of innocent lives.

While developing theoretical framework for this study, security management cannot be ignored. As climate change is not threat for a single country, in fact it is a security challenge for the whole South Asian region. Both the countries India and Pakistan are facing water scarcity but resource management is still ignored. Both the countries are competing for more water but lack in co-operation. For the survival of both countries and a healthy security environment, both countries need to go for co-operation instead of competition. Both the countries need to develop such a framework with consensus that can avoid any other conflict coming out of water scarcity and climate change challenges.

Both the countries India and Pakistan spend a lot on traditional securitization of their respective territories but both have not yet adopted a clear environmental security policy. There needs to be an environmental security nexus between the two neighbours. Bilateral collaboration among the two countries will result into following environmental security achievements.

- Security nexus for environmental security will secure coastal regions.
- Environmental security will assure individual security as the later one is dependent on the first one.
- Co-operation in mitigation measures will fizzle out food security threats from the whole region.
- National security has greater inter dependence upon environmental security. Environmental security will assure national security.
- This type of security Nexus will help national integration on both sides of border. When there will e environmental security, there will be faint chances of conflicts among states and provinces over the distribution of natural resources.
- Security nexus for environmental security will avoid any further conflict between India and Pakistan consensus will be developed over distribution of resources in general and water in particular.

Hypothesis

Climate change has emerged as most modern security challenge for many countries. It has its security implications on global level, regional level and national level respectively. Pakistan being the 7th most vulnerable country in German Climate Change Risk Index is facing serious existential threats by climate change. Pakistan's national security is directly threatened by effects of climate change. Around 4500 people died in three massive floods between 2010 and 2015. In addition to it around 1500 people died in one year as result of heat waves in Karachi. Climate change is also threatening for territorial security as well, because sea levels are rising 3 meters annually and depleting lands around 45 square kilometres every year.⁸ Rising sea levels are really threatening coastal regions of Sindh and Baluchistan. Land erosion will be higher in future. When we consider its regional security implications, water dispute India and Pakistan came to limelight. Its significance would be highlighted more with worsening climate change effects. There is not any serious military collision witnessed over water till now but its possibility cannot be ignored. It is also threatening to food security in Pakistan. As Pakistan will be losing its 25% yield by 2040 and there will be less food and more mouths to feed.⁹ Pakistan has recently adopted its climate change policy but serious efforts need to be done. Environmental securitization is as important as any other traditional securitization. Because major securities are inter-linked and inter-dependent upon environmental security.

Research Questions

The whole study will focus preliminarily on security issues; keeping in view the implications of climate change, following questions will be addressed.

1. What is the linkage between climate change and national security of Pakistan?
2. How water dispute between India and Pakistan can change the security situations in the region?

⁸ Ministry of Climate Change, Pakistan Report 2016, "Environment and Climate Change Outlook", chapter 7, online publication.

⁹ Akhtar Ahmed, "Iron Status of Pakistani Population-Current Issues /Strategies. Asia Pacific Journal of Clinical Nutrition". Vol. 22, No. 3, 2013: 340-347.

3. What would be the impact of climate change on utilization of resources and food security in Pakistan?
4. What should be the national decision making process keeping in view the inter-link between security management and resource management?

Definition of the Problem

Climate change has emerged as a serious security threat to Pakistan in recent times. It has direct impacts on human security and national security of Pakistan. In addition to it, this phenomenon has serious implications on bilateral relations between India and Pakistan. As both Pakistan and India are threatened equally by climate change so mutual response is the only way forward to avoid damages and any conflict in future, as experts are already of the view that water wars is a possibility in this region. Lack of mutual cooperation will lead to conflicts in the region. Pakistan has recently adopted its National Climate Policy in 2016 but not implemented yet. There is a potential national security effect which should be addressed as soon as possible. If this issue is not addressed timely, maturely and effectively it would be disastrous for region, for Pakistan and for millions of lives.

Literature Review

John d.Dryzek, Richard B.Norgaard, David Scholsberg, (2011), *The Handbook of Climate Change and Society*, Oxford University press London. Climate change can shift geography and demography of death and disease almost everywhere. It can also result in profusion of climate refugees. Unite Nations High Commissioner for refugees recently put it “By 2050 the world might have as many as 1 billion climate refugees.” Collectively, it will be a humanitarian disaster. Climate Change poses direct threats to sovereign state security. Stability and continuity of governments and states including their ability to defend themselves militarily will be compromised fatally. Climate change also brought hazardous effects for soliders’ health. An unfit soliders result in decreased operational capacity. Another horrible impact is loss of territorial integrity and rising resource conflicts. Climate change will change the territorial boundaries of some nations. As in case of South Asia rising sea level is major threat to port cities of India and Pakistan. Soon they can be part of sea. Similarly less availability of old resources will create a competition for the new ones. “Water Wars” between China and India, and

Pakistan and India are few of major future possibilities in the regional strategic environment.¹⁰

Shafqat Kakakhel, (2016), “Climate Change, Impacts and Security Implications for Pakistan” Institute of Strategic Studies, Islamabad, Pakistan.

The relevance of climate change impacts in the context of Pakistan’s foreign and security policies is highlighted by the fact that 78% of the country’s surface water resources supplied by the Indus Water Basin originate outside its borders. The Indus and its major tributaries originate in the Tibetan Plateau and pass through Indian occupied Jammu and Kashmir. The Indus Water Treaty (IWT) signed in 1960 regulates the flow of three western rivers: the Indus, Chenab, and Jhelum into Pakistan and Azad Kashmir. Climate change induced reduction in the flows of western rivers is a potential resource usage tension between India and Pakistan.¹¹

Brahma Chellany, (2015), *Water, Peace and War*, Rowman and Littlefield publishers, United Kingdom.

Two nuclear powers sharing water from Himalayan and Tibetan Plateau looks to be involved soon in a water conflict. As a result of shrinking water resources, India alleged of being using waters from Pakistani assigned rivers. And Pakistan claiming to be made a water deprived country by such Indian acts, can push Pakistan to engage in a military conflict sooner or later. The controversial hydro power projects by India can fume up the relations between two volatile neighbouring nuclear powers.¹²

Brahma Chellaney, (2012), *Water: Asia’s New Battleground*, Georgetown University press Washington D.C.

¹⁰ John S.Dryzek, Richaard B.Norgaard, David Scholsberg, (2011), *The Handbook of Climate Change and Society*, Oxford university press, London.

¹¹ Shafqat Kakakhel, (2016), “Climate Change, Impacts and Security implications for Pakistan” Institute of Strategic Studies, Islamabad Pakistan.

¹² Brahma Chellaney, (2015), *Water, Peace and War*, Rowman and Littlefield publishers. U.K.

More than five decades after the vaunted treaty was signed, water has returned as a hot button issue in Pakistan and India relationship. Pakistan's propagation that India is using more water from the western rivers than it is supposed to be using. While India is questioning the feasibility of the Indus Water Treaty (IWT) that Pakistan is given more water than it actually needs. These heated arguments can bore a new conflict between the two arch rivals.¹³

Muhammad Daim, (2017), "Why India must refrain from a Water War with Pakistan", The Diplomat magazine.

"Water belongs to India that cannot be allowed to go to Pakistan" and "Water and blood cannot flow together" these are the statements by Indian Prime Minister in recent times. In response to it Pakistan's foreign office responded as "Revocation of the Indus Water Treaty (IWT) by India can be taken as an act of war" furthered the narrative of a looming water war. In the presence of nuclear weapons, advanced ballistic missile programmes and huge armies on both sides, a traditional war is highly unlikely between the two rivals. Instead a water war is in the making, largely from India. Growing agricultural needs, depleting water reservoirs and domestic energy woes may push Pakistan to take a hard line, which could eventually unleash water war in no time.¹⁴

Michael Kugleman, (2016), "why India Pakistan war over water is so dangerous", foreign policy magazine New York, U.S.A

If India were to annul the Indus Water Treaty (IWT), the consequences might well be humanitarian devastation in what is already one of the world's most water starved countries. An outcome would be far more harmful and far more reaching than the effects of a limited war. India should preserve its decision to keep Indus Water Treaty (IWT) in place. Rescinding it could have disastrous consequences for Pakistan and also carry damaging results for India. With India Pakistan relations nearly on a war footing, threatening a course of action that risks humanitarian

¹³ Brahma Chellaney, (2012), *Water: Asia's New Battleground*, Georgetown University press Washington D.C.

¹⁴ Muhammad Daim, (2017), "Why India must refrain from a water war with Pakistan", The Diplomat.

devastation could bring the sub continental powder keg one dangerous step closer to explode.¹⁵

Avasna Pandey, (2018), “Climate Change in South Asia: a Grave Security Threat” Institute of Peace and Conflict Studies, New Delhi, India.

A lot of discourse developing on South Asia security mainly focussed on inter-state rivalry, border issues, nuclear weapons and terrorism. But a less attention has been paid to climate change, water security, food security and energy security. The recent floods have killed around 4500 people around the region. And this number is expected to multiply many folds in future. Heat waves also killed 3000 people in last two years. Frequent increase in temperature will decrease agricultural yield by 15 to 30 per cent. It will affect 60 million people. Pakistan and India being the major parties in the region are more responsible to work with co-operation. A joint climate change force from the platform of S.A.A.R.C can help the region to mitigate effects of climate change. Pakistan and India should behave sensibly and should shift their focus from traditional security towards environmental security.¹⁶

Afifa Kiran, Qurat-ul-Ain , (2017), “Climate change: Implications for Pakistan and way forward”, Institute of Strategic Studies, Research and Analysis, Islamabad, Pakistan.

Climate change is a global phenomenon with regional, global and national impacts, has evolved as a significant threat challenging different aspects of national security. This security problem ranges from different dimensions of human security to national security, regional and global security. Pakistan is a country among one of the most vulnerable countries in list of climate change risk index. Pakistan adopted its first climate change policy in 2012 to make it resilient towards climate change and mitigating its effects. It has induced many threats to human security in form of heat waves, massive flooding, and health risks associated with climate change. Although local and international institutions have started working

¹⁵ Michael Kugleman, (2016), “why India Pakistan war over water is so dangerous”, Foreign policy magazine.

¹⁶ Avasna Pandey, (2018), “Climate Change in South Asia: a Grave Security Threat” Institute of Peace and Conflict Studies, New Delhi, India.

on it but solid and target based policies will not only lessen the effects but also make Pakistan capable to mitigate the climate change effects.¹⁷

Saeed ur Rehman, (2010), “Global Climate Change: Impact on Pakistan’s Political Economy” Institute for Strategic studies, Research and Analysis, Islamabad, Pakistan. Region of South Asia, home of 23% of the world’s population, is one of the most poverty stricken regions in the world. Endemic morbidity, increasing number of deaths, health risks, deaths due to heat waves, massive floods, cyclones and storms, forest fires, unusual rains and seasonal droughts would be noticed. Decline in crop yield would directly affect the poor and working class of the society. Agriculture, hunting, forestry, fishing and dairy are the major fields to be effected rapidly. It would create food insecurity in the region. It will also result in conflicts and mass migration. Conflicts over division and usage of resources and climate migration would be another addition to the security problems of Pakistan. These adverse effects would be more detrimental day by day, which is creating a persistent fear for the future.¹⁸

Danial Moran, (2011), *Climate Change and National Security*, Georgetown University press. (P-85-102)

The environmental stress from climate change may accelerate both internal and external security challenges for Pakistan. It is not only climate change that will create internal conflicts but extreme weather conditions will also be challenge for authorities to cope with. The security aspects of climate change, broadly defined to include the security of individual lives and futures, along with that of the state and international system generally, have become a major source of global concern. The capacity of a state is quite crucial because it will determine the ability of the state that how much climate change will affect a country and its inhabitants. States with low institutional capacity are the most vulnerable to face these challenges which

¹⁷ Afifa Kiran, Qurat-ul-Ain , (2017), “Climate change: Implications for Pakistan and way forward”, Institute of Strategic Studies, Research and Analysis, Islamabad, Pakistan.

¹⁸ Saeed ur Rehman, (2010), “Global Climate Change: Impact on Pakistan’s Political Economy” Institute for Strategic studies, Research and Analysis, Islamabad, Pakistan.

climate change will bring in their political and social fabric in general while in their national security and economy in particular.¹⁹

Winston Yu, Andre Savitsky, Donald Alford, Casey Brown, James Wescoat, Shermon Robison, Dario Debowicz, (2013), *The Indus Basin of Pakistan, The Impacts of Climate Risks on Water and Agriculture*, the World Bank Washington D.C.

There are many sectors which are linked to each other and also to the future investments. Many forums and reports in Pakistan recognize the importance of role of water management in overall food security of the country. The Indus Basin of Pakistan, like other complex river basins faces a common set of institutional and policy challenges which can be stated as follows.

- International treaty tensions over upstream development
- Sectorial integration across water, agriculture, environment, climate and energy agencies at the national level.
- National-provincial co-ordination
- Inter-provincial water conflict resolution

Now all these factors collectively create political challenges for the policy makers. Climate risk management and adaptation should be the way forward. Otherwise food security would be raising its head soon as a real threat.²⁰

Mark J.Lacy, (2005), *Security and Climate Change, International Relations and the Limits of Realism*, Routledge press, Madison Avenue, New York, U.S.A.

International community has responded with a sense of fatalistic passivity to the challenges of climate change. Realistic security is far more different from environmental security. Environmental security is a global challenge which our new generations will be facing soon. Realists talk about the traditional security and selfishness of human nature. But ignored eco-system security. Environmental

¹⁹ Danial Moran, (2011), *Climate Change and National Security*, Georgetown University press. (P-85-102)

²⁰ Winston Yu, Andre Savitsky, Donald Alford, Casey Brown, James Wescoat, Shermon Robison, Dario Debowicz, (2013), *The Indus Basin of Pakistan, The Impacts of Climate Risks on Water and Agriculture*, the World Bank Washington D.C.

security is as necessary as any other security in the world. Every born child and every inhabitant of this planet is threatened by climate change. World leaders should avoid politicising it. They should sense the centrality of environmental security which would be security dilemma for every individual. Everyone has to mainstream a policy for environmental security, because it is as vital as any other traditional security.²¹

Shakeel Ahmed Ramay, (2012), “Climate change and National Security”, Sustainable Development Policy Institute, Islamabad, Pakistan.

Pakistan is currently facing multi-dimensional challenge including terrorism, fiscal crises, food insecurity, and shortage of water and climate change. Terrorism had affected all the major sectors of Pakistan. Now Pakistan is facing another major challenge which is climate change. At the moment Pakistan does not have major policies to combat the negative effects of climate change. One of the main concerns is lack of crafted policies and implementation plans. In the absence of policies and reliable data Pakistan would not be able to prepare itself to combat the challenges of climate change. The major sufferers would be poor communities, farmers, fisher folk, and almost every individual. At the moment it only looks as a food security threat but with the passage of time it will multiply its magnitude and it will be an existential threat for Pakistan.²²

Syed Mohammed Ali, (2017) “Climate Change as a Security Threat Multiplier” George Washington University, Washington D.C, U.S.A.

Great numbers of think tanks and security Analysts have now agreed upon this statement that climate change is evolving instability of the modern world. A huge number of analysts have pointed it right that climate change is the biggest existential threat for Pakistan. It has more serious challenges than militancy. Now climate change can further fuel insecurity and instability. Recent unprecedented damage by floods and heat waves are prominent examples of what climate change

²¹ Mark J.Lacy, (2005), *Security and Climate Change, International Relations and the Limits of Realism*, Routledge press, Madison Avenue, New York, U.S.A.

²² Shakeel Ahmed Ramay, (2012), “Climate change and National Security”, Sustainable Development Policy Institute, Islamabad, Pakistan.

potential have for Pakistan. But Pakistan has no significant pragmatic intentions of international donors to help it out of the situation. It is a high time for the experts and other decision makers to re think it and act now.²³

Arshad Rafiq, (2017), “Aspects of Climate Reality in Pakistan” Institute of Strategic Studies, Research and Analysis, Islamabad, Pakistan.

Pakistan’s national security policy revolves mainly around defence institutions and geo physical concerns. Most of the existing policies are visualized in traditional security parameters. It mainly addresses the challenge of terrorism or the chronic rivalry with neighbouring country India. Most of the experts found a direct connection of Pakistan internal as well as external security threatened with water availability, energy crises and food shortage. There are fair chances of internal insurgency in Pakistan as these are deeply rooted in drought like conditions. Therefore it is need of the hour; the national security of Pakistan should be reframed by connecting it with the availability of water, energy and food security in the country. It is carrying a potential threat that could be moral and humanitarian crises of the worst kind since the dawn of the civilization.²⁴

Sharoon Shahzar, (2018), “Climate Security for Survival”, Shaheed Zulfiqar Ali Bhutto University, Pakistan.

As Pakistan was always being dwindling with its political turmoil, one of the major threat to humanity has been ignored which is globally known as climate change. It is such a potential threat that cannot be neglected. Pakistan is the 7th most vulnerable country threatened by the challenges of climate change. But question is; have someone seen any ground breaking work on climate security in Pakistan. The answer is simply “No”. All the major masses of the society have side-lined the issue of climate change. Government needs to prioritise its funds but at the same time the threat of climate change had been undermined significantly. Political violence or terrorism is no more a threat but climate change is. Environmentalists

²³ Syed Mohammed Ali, (2017) “Climate Change as a Security Threat Multiplier” George Washington University, Washington D.C, U.S.A.

²⁴ Arshad Rafiq, (2017), “Aspects of Climate Reality in Pakistan” Institute of Strategic Studies, Research and Analysis, Islamabad, Pakistan.

also believed that South Asia could be uninhabitable by 2100. It is an alarm bell for all but shockingly this biggest security challenge has been ignored by the governments as well as by the rest of the world.²⁵

Donald Wallace, (2018), *Climate Change, Policy and Security: State and Human Impacts*, Taylor and Francis Publishers Sweden.

In modern times mostly states prioritize national security over human security concerns. Regional and global security has been dealt traditionally. Emerging phenomenon of climate change has rung the bell for major powers like; United States of America, China, Russia, Japan and European Union needs to lead from the front to securitize the whole world from threat of climate change. As above mentioned parties are major contributors to total global greenhouse gases emission. It is necessary for the major economic powers to finance all the developing nations and under developed countries to mitigate the challenges of climate change. As these nations are more vulnerable as compared to developed nations. There should be multiple strategies to be adopted by the international community to address climate change from both human security and the state security perspective.²⁶

Himalayan Glaciers: Climate change, Water Resources and Water Security, (2012), Annual Report by National Research Council of the National Academics, The National Academics Press, Washington D.C., U.S.A.

Rising temperatures are causing glacial outbursts in Himalayas. Pakistan's and India's agriculture is highly dependent on Himalayas water basin for irrigation and fresh water usage, but water scarcity in region in recent times has emerged as another major challenge in south Asia. Water security is linked to the regional security of the region. Any conflict on water can escalate a new military conflict in one of the most hostile regions of the world. Mutual co-operation is the only way out for Himalayan region countries. In addition to it environmentalists are of the

²⁵ Sharoon Shahzar, (2018), "Climate Security for Survival", Shaheed Zulfiqar Ali Bhutto University, Pakistan.

²⁶ Donald Wallace, (2018), *Climate Change, Policy and Security: State and Human Impacts*, Taylor and Francis Publishers Sweden.

view that glacial melt is on a high so water management and resource management is the only solution for Himalayan region at the moment.²⁷

Aymen Ijaz, (2016), “Climate Change and Pakistan”, Islamabad Policy Research Institute, Islamabad, Pakistan.

The economic survey of Pakistan tells us that during 2010, 2011 and 2012 floods 4500 people were killed and economy faced a loss of 16 billion dollars in form of infrastructure destruction, agriculture losses and rehabilitation processes. This climate change will severely impact the agriculture, industry, health and economy sector in particular in Pakistan. Governments should take long term measures such as water management, improved energy consumption and conservation, use of renewable resources, controlling deforestation, building of dams and reservoirs and emergency plans for disaster prone areas.²⁸

Muhammad Iqbal, Munir Ahmed, Muhammad Azeem Khan, Ghulam Samad, Muhammad Aslam Gill, (2014), “Review of Environmental Policy and Institutions”, Pakistan Institute of Development Economics, Islamabad, Pakistan.

In Pakistan it is the need of the hour to establish formal institutions addressing environmental issues and disaster management. Presently good number of institutions with overlapping functions helped shaping the response to climate change in country. Designing and executing policies to mitigate and combat the climate change impacts, relying heavily on institutional setup. It is responsibility of federal and provincial level authorities and departments to design such policies.²⁹

Sajid Amin Javed, Munir Ahmed, Muhammad Iqbal, (2014), “Impact of Climate Change on Agriculture in Pakistan”, Pakistan Institute of Development Economics,

²⁷ *Himalayan Glaciers: Climate change, Water Resources and Water Security*, (2012), Annual Report by National Research Council of the National Academics, The National Academics Press, Washington D.C., U.S.A.

²⁸ Aymen Ijaz, (2016), “Climate Change and Pakistan”, Islamabad Policy Research Institute, Islamabad, Pakistan.

²⁹ Muhammad Iqbal, Munir Ahmed, Muhammad Azeem Khan, Ghulam Samad, Muhammad Aslam Gill, (2014), “Review of Environmental Policy and Institutions”, Pakistan Institute of Development Economics, Islamabad, Pakistan.

Islamabad, Pakistan. Climate change is one of the most celebrated areas of research and vulnerability of agriculture to climate change in Pakistan has earned a general consensus. The issue bears special importance for developing economies for their maximum reliance on agriculture in terms of contribution to economic growth, exports and employment share. Affecting agriculture means direct effect on the livelihood of 45% of Pakistan's population. As a major portion of Pakistan's population is linked to agriculture for their bread and butter. Pakistan needs to improve its yield to 50% by 2050 to feed all of its population and this challenge seems to be turning into a food security threat for Pakistan.³⁰

Research Methodology

This study will include qualitative method of studying. The research will be explanatory and descriptive, comprises of historical background using secondary data. In addition to it, interviewing people who are having expertise in the subject. Researchers and other stakeholders will also be contacted. Minutes from Paris agreement, Kyoto Protocol, National climate change policies of Pakistan and other official documents, reports related to the study, research articles and books will be used as references. The study is relied on books and internet as main sources. Many of these sources provide accurate data and descriptions.

Division of Study

This study consists of following sections.

Section 1: Climate Change and National Security of Pakistan

Section 2: Water Security and Climate Change: India-Pakistan Water Dispute

Section 3: Climate Change Implications for Economic Security and Food Security in Pakistan

Section 4: National Decision Making and Policy Recommendations

³⁰ Sajid Amin Javed, Munir Ahmed, Muhammad Iqbal, (2014), "Impact of Climate Change on Agriculture in Pakistan", Pakistan Institute of Development Economics, Islamabad, Pakistan.

CHAPTER 1

CLIMATE CHANGE AND NATIONAL SECURITY OF PAKISTAN

All across the world, in every kind of environment and region known to man, increasingly dangerous weather patterns and devastating storms are abruptly putting an end to the long running debate over whether or not climate change is real. Not only is it real, it's here and its effects are giving rise to a frighteningly new global phenomenon; the man-made natural disasters³¹.

(Barack Obama, April 3, 2006)

Over a period of time climate change has emerged as a serious security challenge. It is being the most debateable security challenge of modern times. We can say climate change is the most sung phenomenon of the modern security studies. Following are the few points which need understanding before treating climate change as a security threat.

- Is climate change a global phenomenon?
- How climate change is a determinant of the security in Pakistan?
- Types of securities and potential threats to human and national security of Pakistan.
- Climate change linkage to water security and food security in Pakistan.
- Possible impacts and ways to combat climate change.

Climate Change as Global Phenomenon

Climate change has impacted almost all the regions around the globe. Asia and Africa are more vulnerable to it. As 850 million under-nourished people are living in the region.³² Experts are of the view that almost 600 million people will be water stressed by 2050. It is also estimated that agriculture yield would fall by 50% till 2050. Massive flooding and glacial outbursts would affect one billion people in next 20 to 30 years. 10,000 square kilometres of land will convert into desert in

³¹ Barack Obama, speech, "Energy Independence and the Safety of Our Planet", April 3, 2006, <https://www.theguardian.com/environment/climate-consensus-97-per-cent/president-Obama-gets-serious-on-climate-change>.

³² FAO Report, "The State of Food Insecurity in the World"(2015) Rome

central Asia only.³³ Following are the data points provide by world disaster report which tells the number of people died as a result of natural disasters from 2000 to 2010. These points justify the link of human security and climate change.

- From 2000 to 2010, 230,181 people died as result of droughts and food insecurity around the globe.
- Earth quakes and tsunamis killed 453,553 people in a time span of 10 years.
- 90,000 people died because of deadly heat waves from 2000 to 2010.
- Floods killed almost 54,795 people globally.
- Forest fires due to extreme temperatures took lives of 636 people.
- Hurricanes and wind storms killed 172,334 people from 2010 to 2018.

These numbers did not include the number of people died in 2010, 2012 and 2013 floods in Pakistan, china and Australia.³⁴ Table 1 is a detailed picture of number of natural disasters occurred throughout the world. Most of these natural disasters occur due to human activity and they have direct links to human security and national security of number of countries.

Table 1: Reported Disasters

Types of disasters	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Total
Droughts/ Food insecurity	43	43	40	23	19	28	20	14	20	23	273
Earth Quakes& tsunamis	31	25	37	40	42	25	24	21	23	22	290
Heat waves	31	25	15	26	19	29	32	25	11	26	237
Floods	158	157	171	160	132	195	229	218	169	150	1739
Forest Fires	30	14	22	14	8	13	9	18	5	9	142

³³ ibid

³⁴ World disaster report 2000-2010.

Mass Movement	28	24	20	2	15	12	20	10	12	31	193
Volcanic Eruptions	5	6	7	8	5	8	12	6	17	3	61
Windstorms	102	108	124	330	127	130	76	105	111	85	1054
Sub-total Cliamto, hydro, meteorological disasters	394	371	392	42	332	407	386	390	328	325	3655
Sub-total Geophysical Disasters	37	31	45	42	48	33	37	27	33	26	359
Total Natural disasters	431	402	437	372	380	440	423	417	361	351	4014

Source: World Disaster Report 2000-2010

By the end of year 2025 almost 200 million people around the globe will be threatened directly by the heat waves and rising sea levels. Now onwards human security and climate change are linked forever. Climate security is an integral part of national security and human security as well. Table 2 is a detailed picture of ten years showing the number of people died as a result of natural disasters caused by human activity. It also proves the severity of climate effects and its linkage to human and national security. Numbers of people died as result of climate effects are much higher as compared to the number of people died as result of war on terrorism.

Table 2: Number of People Killed by Natural Disasters

Types of Disasters	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Total Number of People Killed
Droughts/ Food Insecurity	76,3 79	76,4 76	76,9 03	38	80	88	208	99	6	3	230,181
Earth quakes & Tsunamis	216	21,3 48	1636	29,6 17	227, 290	76,2 47	6692	780	87,9 18	8815	453,553
Heat waves	94	1787	3014	74,7 48	556	814	5,10 4	1044	1608	1122	90,4743
Floods	6025	5014	4236	3772	7100	5764	5863	8565	4037	3419	53,795
Forest fires	47	33	6	47	14	50	13	150	86	190	636
Mass movement	1012	786	1089	706	313	646	1638	271	504	658	7,623
Volcanic Eruptions	N.A	N.A	200	N.A	2	3	5	11	9	N.A	230
Wind- storms	1354	1914	1475	1031	6653	5250	4324	6035	1409 85	3306	172,334
Sub-total Climato, hydro, meteo- logical Disasters	85,7 58	86,0 10	86,7 28	80,3 42	1471 6	12,6 12	17,1 55	16,06 5	1472 26	8700	555,312
Sub-total Geo- physical disasters	227	21,3 48	1,89 6	29,6 17	227, 336	76,2 44	6708	791	8804 7	1851	454,065
Total Natural Disasters	85,9 85	107, 358	88,6 24	109, 959	242, 052	88,8 56	23,8 63	16,85 6	235, 273	1055 1	1,009,377

Source: World Disaster Report 2000-2010

Climate Change Indicators in Pakistan

Climate change and sustainable development in Pakistan are directly linked to each other. Environmental security is the key to greater progress in Pakistan. Climate change is a threat multiplier for Pakistan. Water scarcity, decreasing land productivity, food insecurity, floods and droughts are worsening the conditions for Pakistan. Following are the major indicators of climate change effects in Pakistan.

- Increasing droughts
- Frequent and intense heat waves
- Weather related natural disasters
- Rapid land erosion
- Changing sea level

It is also expected that droughts and severity of floods would be unusual. Monsoon length would also be varying. Although Pakistan is contributing very less to total international greenhouse gases emission but stand at 8th position of most vulnerable countries to climate change. Pakistan recently adopted its climate change policy.

Climate Change Policy of Pakistan

In order to mitigate the climate change effects Pakistan recently adopted its climate change policy after the approval of federal cabinet. Goal of this climate change policy is to mainstream climate for economic and social sector of Pakistan while implementation contains all those policies and priorities which are adoptable and implementable. Adaptation, mitigation and transfer of technology are major challenges while capacity building, providing financial support and awareness are those areas which needs more attention. Pakistan needs to position itself and present itself to the world for finance to help adaptation. Following are the major facility funds which can help Pakistan in adaptation and mitigation.

- Green Climate Fund (GCF)
- Clean Development Mechanism (CDM)
- Adaptation Fund (AF)
- Global Environmental Facility (GEF)
- World Bank's Forest Carbon Partnership Facility (FCPF)
- Carbon Credit Trading (CCT)

It is need of the hour for Pakistan to establish a climate change fund to finance climate change programmes and projects. Pakistan government has a national climate change policy implementation committee which will ensure the effective implementation of national climate change policy and national action plan specifically dealing the climate change effects. The composition of the committee is as under:

- Federal Minister for Climate Change (Chairman)
- Secretaries for the Ministries of Climate Change and Planning and Development, Foreign Affairs, Science and Technology, Industries and Production, Finance, Water and power , Food and agriculture, Health and Defence
- Member infrastructure of Planning Commission, Additional Chief Secretaries of Provincial Planning and Development Department
- Chairman of National Disaster Management Authority (NDMA)
- Secretaries of Provinces, Azad Jammu and Kashmir, Gilgit Baltistan and FATA Environment departments
- Heads of
 - Pakistan Meteorological Department (PMD)
 - Global Change Impact Studies Centre (GCISC)
 - Pakistan Environmental Protection Agency (PAK-EPA)
 - National Energy Conservation Centre
- Chief of Environment, Planning and Development Division
- Three representatives from the Corporate Sector, Chamber of Commerce and Industries
- Three experts from the field
- Three experts from the Civil Society Organisations
- Director General of Climate Change.³⁵

18th amendment in constitution of Pakistan has given provinces the authority to implement policy. Every province has its own separate climate change policy based upon the national climate change policy. Following are the salient features of national climate change policy.

- Pursuance of sustainable economic growth policy addressing the challenges of climate change.
- Integration of national climate change policy with other inter-related national policies.
- Adaptation and mitigation in most cost- effective manner.

³⁵ Ministry of Environment, official document, “Hazardous Waste And Hazardous Substances Rules 2016” drafted by National *Environmental* Quality Standards (*Environmental* Laboratories Certification) Regulations, available on <http://environment.gov.pk/information-services>

- Ensuring water security, food security, and energy security in country to face challenges of climate change.
- Minimising risks of extreme weather events such as floods, droughts, and tropical storms.
- Facilitation in inter-provincial and inter-ministerial decision making and co-ordination mechanisms.
- Use of opportunities and finances available on national and international level.
- Encouraging economic incentives and public private investment in adaptation measures.
- Awareness campaigns, skill development and institutional capacity building.
- Conservation of natural resources and long term sustainability.³⁶

National Security of Pakistan; Climate Change as Determinant of Security

Pakistan's major climate threats are floods, droughts and sea intrusion. The consequences of these threats are water scarcity, food insecurity, health issues and climate induced migrations. Environmental stress is more threatening because of low state capacities to counter it. In presence of a hostile neighbour who is always ready to fuel Pakistan's internal vulnerabilities, climate change becomes more serious threat to the national security of Pakistan.

Possible Interaction of Security and Climate Change

Following are the major interactions of climate change and security in Pakistan.

- Military preparedness and its linkage to climate change impacts.
- Floods, heat waves : potential threats to human and national security
- Water security and its dependence on climate change
- Food security and its dependence on climate change
- Water availability and its inter-relation with national integration
- Loss of cultures and indigenous people

³⁶ Ministry of Environment, official document, "Hazardous Waste And Hazardous Substances Rules 2016" drafted by National *Environmental* Quality Standards (*Environmental* Laboratories Certification) Regulations, available on <http://environment.gov.pk/information-services>

- Loss of social-ecological system
- Change in geography and demography
- Climate refugees
- Sovereign state security and its inter-dependence on climate change

Climate Change and its Linkage to Military Preparedness

Defence budget in Pakistan has always been under debate. In recent budget of fiscal year 2018-19, defence budget has crossed the mark of one trillion rupees. Most of the time it has been said that it is the lowest in region. Defence budget in Pakistan is always India-centric because of the volatile security environment. 19% increase in defence budget has been observed for year 2018-19. Now the question arises how climate change can impact economy of any country directly and military preparedness indirectly. As we know that agriculture is considered to be the back bone of economy in Pakistan. Agriculture is contributing 21% of the total G.D.P and 45% of the labour force in country is engaged to it. It is livelihood of millions of people. But due to climate change a gradual loss in the production has been observed.

Pakistan has 5% less production in wheat last year. Production of maize and sugarcane dropped by 1.9% and 2.4% respectively.³⁷ Economy of Pakistan also depends upon export of raw material in fibre but production of cotton also dropped down by 3.6%. As we know that a major portion of national revenue generation of Pakistan is dependent upon agriculture. But less production in agriculture straightforwardly means less revenue generation. Climate change has impacted adversely upon the agriculture sector. Defence budget of Pakistan and military preparedness is highly dependent upon the national revenue generation. When climate change will impact the agriculture industry, it will lead to less revenue and it will compromise defence preparations as well. In a nutshell it can be concluded as climate change is threat to military preparedness and military capability.

³⁷ Economic Survey of Pakistan 2018-019.

Climate Change; Direct Threat to National Security and Human Security in Pakistan

Now a days climate change can be said a security problem which comprises of human security as well as territorial security. There are so many natural resources which are essential for human survival, but these are negatively impacted by climate change. Climate change is a serious challenge to the capacity of state, in case of availability and sustainability of livelihood and food security of its people. Pakistan is a country struggling with extreme weather conditions, security of fresh waters, rapid melting of glaciers, and unusual rain problems. Pakistan has been ranked 8th in the list of most vulnerable countries to climate change by German Watch Global Climate Risk Index in 2016. Climate change is a unique and complex phenomenon. It is such a threat multiplier which can demolish entire human civilization.

Its complex nature makes it more difficult for policy makers to design any effective counter policy in prioritising the resources for purpose. Cyclone storms, floods, droughts, and heat waves are direct threats to human security. Pakistan had massive floods in 2010 followed by two less damaging floods in 2011 and 2012. More than 3000 people died and economy faced a loss of 16 billion dollars. In addition to it, heat waves are also damaging and a challenge to human security. Over 8000 people died in heat waves from 2013 to 2018. Table 3 shows the number of people affected and killed by floods in last 20 years.

Table 3: Number of People Died and Affected by Floods

Years	Number of People Affected	Number of People Died
2003	8 Million	484
2007	12 Million	1050
2010	20 Million	2000
2011	5.3 Million	361
2012	2.6 Million	100
2013	1.5 Million	80

Source: Economic Surveys of Pakistan 2003-04, 2007-08, 2010-11, 2011-12

After floods climate change is posing another threat which is directly linked to territorial integrity of Pakistan. Losing some of the territory which has a prominent strategic significance can be another strategic implication for national security of Pakistan. Economic hub of Pakistan Karachi and Gawadar are also under serious threat of sea intrusion. As sea level is rising 1.4 meters annually and it will continue to rise with rapid melting of glaciers. Karachi is under sea level. It is predicted by many studies that sooner or later Karachi would be sinking under sea. Loosing economic hub of Pakistan to sea would not only be a blow to economy but it will also be an irreparable strategic loss to Pakistan. The rising sea level is also a threat to the coastal areas of Sindh and Baluchistan. Climate change is not only threatening to the territorial integrity of Pakistan but also threatening to the lives of millions of people.³⁸

Possibility of sinking of major chunk of coastal areas in Pakistan because of rising sea level is much higher than the rest of the world. All the security implications which climate change is posing are key factors centralising the security of individuals, communities and states. Pakistan needs to deal it in a broader perspective. The climate change has impact on economy, food, health, environment, personnel, community security and political security. The major threats are water security, lack of opportunities and capabilities, frequent floods, migration, human security and military security. We can include all the factors like environmental, social, and economic and natural resources. Military security involves threats to military infrastructure, military preparedness and operational duties. Military security threat has the potential to alter the international boundaries.³⁹

Following factors provide the evidence to the claim that climate change is a potential threat to human security and national security of Pakistan.

- Heat Waves and Floods: In recent years, almost 10,000 people died because of heat waves in plain areas. Floods also contributed a high mortality rate which is around 6000 deaths from 2010 to 2015. So we can

³⁸ United Nations Population Division (DESIPA) Report, "Population and Land Degradation"(2015) <http://www.un.org/popin/fao/land/land.html>

³⁹ United Nations Population Division (DESIPA) Report, "Population and Land Degradation"(2015) <http://www.un.org/popin/fao/land/land.html>

join the entire three phenomenons in a simple relationship. Climate change is pivotal in heat waves and unusual rains and glacial melting. As a result, heat waves and floods kill people. When we consider the severity of natural disaster causing security implications for national and human security, heat waves and floods are more fatal. Only a single flood has the potential to impact millions of lives, destroying of infrastructure, injuries and economic losses. Table 4 gives a detail picture of 2010 flood and damage done by it.

Table 4: Pakistan Flood Loss in 2010

Province	Deaths	Injured	Houses Damaged	Population Affected
Baluchistan	54	104	75,956	700,000
Khyber PakhtunKhawa	1156	1198	284,990	3,800,000
Punjab	110	262	497,700	6,000,000
Sindh	410	1235	876,249	7,274,250
A.J.K	71	87	7,106	200,000
Gilgit Baltistan	183	60	2,830	100,000
Total	1984	2946	1,744,471	18,074,250

Source: National Disaster Management

- Loss of Cultures and Indigenous People: climate change is posing threats to the cultures and indigenous people of coastal areas of Pakistan. According to study, half of Karachi is expected to be engulfed by sea around 2060. Coastal areas like Kutch in Sindh, Hub in Baluchistan are at high risk because of sea intrusion and land degradations by sea level. Arabian sea level is arising 1.6 metres annually and it is engulfing land of coastal areas of about 15000 square kilometres annually. It would result in loss of indigenous cultures of fisheries and force people to migrate.⁴⁰
- Loss of Social-Ecological System: Pakistan’s social and ecological system is vulnerable to land erosion and acid rains as well. It will be more damaging in future. Acid rains are acidifying river systems and irrigation

⁴⁰ United Nations Population Division (DESIPA) Report, “Population and Land Degradation”(2015) <http://www.un.org/popin/fao/land/land.html>

sources. These acidification factors are acidifying the agricultural Lands and water reservoirs. The foods produced by these lands are creating health issues for general population. Collectively climate change is damaging social-ecological systems of Pakistan.

- Change in Demography and Geography: consecutive floods, melting glaciers, and rising sea levels reserve the potential to change the demography and geography of Pakistan. Floods and glacial outbursts can damage the infrastructure and territory starting from Gilgit Baltistan to the Kutch of Sindh.
- Climate Refugees: According to United Nations High Commissioner for Refugees “in 2050 the world would have to deal one Billion refugees. It is expected that Pakistan has to deal 5 million refugees in next 15 years.”⁴¹
- Sovereign State Security: Climate change is threatening to the normal functioning of government and state institutions in Pakistan. It will also decrease military operational capacity. It will expose soldiers to more harsh weather conditions. It will need new logistical plans to carry out assigned duties. Exposing soldiers to harsh weather conditions will result in compromise on their health.
- Water Availability and National Integration: water insecurity leads to security issues of different dimensions, loss of livelihood and opportunities, houses, basic services and food will lead to societal unrest. This unrest can lead to conflicts and violence across masses. Crime rates like murders and robbery for sake of earning will go on a high. Migrations across the country will create a bad law and order situation which can disturb national peace and internal security. Water security will also lead to conflict among provinces. As it is reported most of the times by Sindh officials that they have reservations over the water distribution. They claimed that Punjab is using water more than its allotted share. Such type of events would be more frequent and detrimental for the national security of Pakistan.
- Food Security and its Interdependence on Climate Change: It is a well-established fact Pakistan is an agricultural country. Owing to the effects

⁴¹ United Nations Population Division (DESIPA) Report, “Population and Land Degradation”(2015) <http://www.un.org/popin/fao/land/land.html>

of climate change people will lose their earning resources. It would have two impacts: food insecurity and mass migration of people. Pakistan is already struggling with its food security. About 48% of population is food insecure and frequent floods have added more numbers to it.

- Loss of Territory and Resource Conflicts with Neighbouring Country: Climate change can change the geography of Pakistan as result of territorial loses to sea. Water wars due to water scarcity in the subcontinent are also one of the future possibilities. Pakistan is getting scarce of water every passing day. And striving for more water will push India and Pakistan engaged into another conflict.

CHAPTER 2
WATER SECURITY AND CLIMATE CHANGE:
INDIA-PAKISTAN WATER DISPUTE

Water sharing between India and Pakistan seemed to be a developing issue despite presence of Indus Water Treaty (I.W.T) signed between the two parties. During recent years water insecurity regarding use of water and water resources has increased. In this debate Pakistan is a natural complainer because of its geographical location. As both nuclear powers had fought four wars since independence, now issues of rivers flowing out of Indian held Kashmir have now emerged as new flashpoint.

Indus Water Treaty

It was obvious that India can regulate water of Pakistan because of its upper riparian. Right after independence, India took a full advantage of its control over Kashmir and cut off supply of fresh water to Pakistan in 1948. In 1952 negotiations started between the two parties with the help of World Bank as negotiator. Finally both parties signed Indus Water Treaty (IWT) in 1960. Under Indus Water Treaty, three eastern rivers (The Ravi, The Sutlej, and The Beas) were assigned to India while three western rivers (The Indus, The Jhelum, The Chenab) were given to Pakistan. India was also advised to use water up to a limited extent which should not impact Pakistan. But recent water scarcity has raised voices from Indian authorities to annulment of this treaty. Violating such an agreement possesses a possibility of a war over water. India has started using water as a weapon and Pakistan's strive for assigned water under treaty can lead to another conflict in the region. Recent statements by Indian premier like "water and blood cannot flow together" and "we will not let Pakistan use our waters" are telling the aggression and sensitivity of the water security situation in the region. As Mark Twain says: "*Whiskey is to drink and water is to fight over.*"

Kashmir Issue

There are different opinions about the nature of Kashmir issue between India and Pakistan. Mostly it is known to be a territorial issue among India and Pakistan. In addition to it, it is also known to be an ideological issue. But analysing it with the

prism of environmental security, it is emerging as a conflict over resources, mainly water. Kashmir issue has become prime important because of climate change. Most of the rivers flowing through Pakistan have their tributaries in Indian held Jammu and Kashmir. Himalayan snow and glaciers present in Jammu and Kashmir provide a major portion of water to Pakistani rivers. Kashmir issue is expected to get more attention as result of the prevailing water scarcity in region. India has also launched many controversial hydro-power projects in Jammu and Kashmir. It is claimed by Pakistan that India has violated the Indus Water Treaty. Kashmir issue no longer looks a territorial issue. It would transform into a water dispute among India and Pakistan.

Controversial Hydro-Power Projects in Jammu and Kashmir

As Pakistan is highly dependent on the rivers flowing out of Kashmir, for its energy and irrigation purposes, Indus Water Treaty worked well for almost 50 years over the water distribution among both parties but in recent years India has started a massive hydro power program in Himalayan region. Pakistan conceives it as a serious water security threat. Following are the few major projects which India has started on the rivers which flow through Pakistan.

- **The Baglihar Dam**

India started Baglihar Dam on Chenab in 1999. It has a capacity of 450 megawatts. Pakistan believed it as a violation of Indus Water Treaty because India is building larger storage than it should have. Although World Bank is of the view that India can use waters up to a limited extent for its energy demands. But Pakistan is of the view that planned height of Baglihar Dam is 144.5 meters, which would disrupt the flow of water in Pakistan. In addition to it Pakistan claims that the dam's bondage capacity is 37.722 million cubic meters of water and it is double to the water bondage allowed under Indus Water Treaty. Pakistan fears that India's manipulable storage can manipulate the flow of water any time and it would be considered as a declared war against Pakistan.

- The Kishenganga Dam

The Kishenganga dam was started in 1994 in Indian held Kashmir. This is a 330 Megawatt project and India is building it on the head tributary of Jhelum. In May 2010 Pakistan took this dispute to the court of arbitration. Situation got more worse when India planned a series of projects on the head waters of all the three major rivers of Pakistan. Now Pakistan has capacity of storage for 40 days only. Pakistan is of the view that due to presence of water tributaries in Jammu and Kashmir, India has the ability to hold and release water which is considered to be a real threat to water security in Pakistan.

- Wullar Barrage

India started Wullar Barrage 40 kilometres away from the line of control on the main Wullar Lake which is head stream of river Jhelum. Later on, Pakistan's protest against India on the platform of World Bank halted its construction in 1987. Since then this issue is under consideration and both parties have been unable to develop any consensus on this issue.

Indus Water Basin

Conflicts like Wullar, Kishanganga and Baglihaar develop a thought that India would deprive Pakistan from its legitimate share in Indus water system. Similarly less availability of old resources and plentiful water will create a competition for new resources. In such situation "water wars" between India and Pakistan become a major future possibility in regional strategic environment.⁴² Figure.1 is a detailed description of flow of water from Indian held Kashmir passing through Pakistan.

⁴² John S.Dryzek, Richaard B.Norgaard, David Scholsberg, (2011), *The Handbook of Climate Change and Society*, Oxford university press, London.

Figure.1: Indus Water Basin



Source: Pakistan Meteorological Department

Indus water basin shows all the major rivers of Pakistan have their tributaries in Indian held Jammu and Kashmir. With climate change challenges Pakistan is more concerned of Indian attitude because stopping supply to Pakistan and sudden release of water in Pakistani rivers can create a security situation in Pakistan anytime.

Growing Competition and Possibility of Water Wars

Water scarcity and less availability of resources will create a competition in the region for existing ones. It has been mentioned in public speeches by Indian Prime Minister Narendra Modi that water and blood cannot flow together and we will not let Pakistan use our water. Pakistan responded it as it will be considered as a declared war against us in case our water would be stopped. In such an environment water wars seems a possibility in near future and millions of lives would be on stake. It will be the most disastrous security challenge for the entire world as both the countries are carrying weapons of mass destruction. And these wars carry the potential to be transformed into a nuclear combat.⁴³

The relevance of climate change impacts in the context of Pakistan's foreign and security policies is highlighted by the fact that 78% of country's surface water resources supplied by the Indus Basin originate outside its borders. The Indus and its major tributaries originate in Tibetan Plateau and pass through Indian held Jammu and Kashmir. The Indus Water Treaty signed in 1960 regulates the flow of three western rivers into Pakistan and Azad Jammu and Kashmir. Climate change induced reduction in the flows of western rivers is a potential source threat in India Pakistan relations.⁴⁴

Two nuclear powers sharing water from Himalayan and Tibetan Plateau looks to be involved in a conflict sooner or later. Depletion of glaciers in the region due to climate change is on a high. And due to results of shrinking water resources, India is using waters from Pakistani assigned rivers which can lead Pakistan to a water insecure country and can push Pakistan in a military conflict. The controversial hydro power projects by India can fume up the relations between two volatile nuclear powers.⁴⁵

More than five decades after the vaunted treaty was signed, water has returned as a hot button issue in Pakistan and India relationship. Pakistan propagating that India

⁴³ Syed Mohammed Ali, (2017) "Climate Change as a Security Threat Multiplier" George Washington University, Washington D.C, U.S.A.

⁴⁴ Shafqat Kakakhel, (2016), "Climate Change, Impacts and Security implications for Pakistan" Institute of Strategic Studies, Islamabad Pakistan.

⁴⁵ Brahma Chellaney, (2012), *Water: Asia's New Battleground*, Georgetown University press Washington D.C.

is using more waters from western rivers than it is supposed to use. While India questioning the feasibility of Indus Water Treaty on the other hand and claims Pakistan is given more water than it actually needs. India is also asking for annulment of this longstanding treaty. These heated arguments can bore a new military conflict between the two arch rivals.⁴⁶

Co-operation Instead of Competition: Need of a Climate Security Nexus

“Water belongs to India that cannot be allowed to go to Pakistan” and “water and blood cannot flow together” are the statements by Indian Prime Minister show the sensitivity of the climate security in region. Pakistan responded it as “revocation of Indus Water Treaty by India can be taken as an act of war”. It furthered the narrative of a looming water war. In the presence of nuclear weapons, advanced Ballistic missile programmes and huge armies on both sides, a traditional war is highly unlikely between the two rivals.⁴⁷

Growing agricultural needs, depleting water reservoirs and domestic energy woes can push Pakistan to take a hard line, which can eventually unleash a war between the two competitors. If India were to annul the Indus Water Treaty, the consequences might well be humanitarian devastation in what is already one of the worlds’ most water starved countries. An outcome far more harmful and far reaching than the effects of a limited war. India should preserve its decision to keep Indus Water Treaty in place. Rescinding it could have disastrous consequences for Pakistan and also damaging for India. With India Pakistan relations nearly on war footing, threatening a course of action that risks humanitarian devastation could bring the sub continental powder keg one dangerous step closer to explode. Still there is hope that both countries will engage in talks to take measures to avoid the serious threats climate change is posing for the regional security situation as well as avoiding any military combat. If both countries would not seriously take it on then water is enough to fight over. Co-

⁴⁶ Brahma Chellany, (2015), *Water, Peace and War*, Rowman and Littlefield publishers, United Kingdom.

⁴⁷ Muhammad Daim, (2017), “Why India must refrain from a Water War with Pakistan”, *The Diplomat* magazine.

operation will not only keep both countries stress free but also encourage calmness and richness in the region.⁴⁸

India and Pakistan are the major players in the region and both are threatened by climate challenges at the same time. Both the countries have to come forward from their traditional volatile relations and joining each other in an environmental security nexus would be instrumental in combating security challenges imposed by climate change. Confidence building measures over the distribution of resources generally and water particularly would be pivotal and a win-win situation for both the parties. Both the countries have to develop a framework to neutralize the threats of climate change if this issue is not addressed effectively it would have disastrous effects on bilateral relations as well as the security of the region. Co-operation instead of competition is the only way of survival of millions of inhabitants of the region.⁴⁹

⁴⁸ Syed Mohammed Ali, (2017) “Climate Change as a Security Threat Multiplier” George Washington University, Washington D.C, U.S.A.

⁴⁹ Sharoon Shahzar, (2018), “Climate Security for Survival”, Shaheed Zulfiqar Ali Bhutto University, Pakistan.

CHAPTER 3

CLIMATE CHANGE IMPLICATIONS FOR ECONOMIC SECURITY AND FOOD SECURITY IN PAKISTAN

Climate change has implications for different dimensions of security. Food security and economic security are also threatened by the climate change. Long droughts, unusual rains and melting of glaciers causing floods are causing challenges to economic and food security in Pakistan. Pakistan is an agricultural country and it's highly dependent upon the rains and the waters from rivers coming out of Himalayan region. Pakistan's agriculture is playing role of back bone not only for economic progress but also very vital for food security challenges. But climate change has struck Pakistan quite badly and it is expected that its implications would be more fatal in future. Pakistan faced three massive floods in 2010, 2011 and 2012 respectively. Collectively Pakistan's economy got a blow of 16 billion dollars. Major portion of this loss comprises of agriculture, livestock and infrastructure. Not only floods are doing the damage but many other natural phenomenons caused as result of climate change also playing its role in economy decline. These include extreme temperatures in form of heat waves, seasonal droughts, heavy and unusual rains, monsoonal storms, cyclones, unusual fogs, melting of glaciers, glacial outbursts, landslides, avalanches in mountain areas, and threatening inflows in Indus water system.

As Pakistan is an agricultural country and it is highly dependent upon the water from Indus river system for its irrigation purposes. It is believed that agriculture is back bone of economy of Pakistan but climate change would result in devastating impacts on agriculture and food security in Pakistan. Livestock and fisheries are also under threat due to acidification of oceans and lands. It is also threatening for infrastructure. It would directly or indirectly economic security in Pakistan. During three floods of 2010, 2011 and 2012 Pakistan's economy bear a loss of 16 billion dollars in form of destruction of crops, infrastructure, food imports to fulfil the domestic demands, and cost of rehabilitation process.⁵⁰ It is expected that this type of loses will multiply many folds with frequent natural disasters. In addition to it

⁵⁰ Sajid Amin Javed, Munir Ahmed, Muhammad Iqbal, (2014), "Impact of Climate Change on Agriculture in Pakistan", Pakistan Institute of Development Pakistan.Economics, Islamabad,

health sector will also be challenged. Health issues among citizens will put more pressure on already dwindled economy.

Economic Security and its Inter-Dependence on Water Security

By and large uneven rains, droughts, destructive floods, monsoonal storms, heat waves, melting of glaciers, landslides and avalanches would also be factors influencing Pakistan's economy in a massive way. Adverse effects on agriculture, industry and health will cause more deteriorating effects for economy. Climate change possesses a threatening challenge to water, food and energy security to Pakistan. These all factors collectively influence the economic growth in country. This climate threat has the potential to make or break economy in Pakistan. It can leave everlasting effects on the quality of life in the region. Therefore this rhetoric is most alarming for economic prosperity in Pakistan.

Following are the major sectors suffered as result of water scarcity and climate change effects. All the later mentioned sectors are directly linked to economic progress of Pakistan.

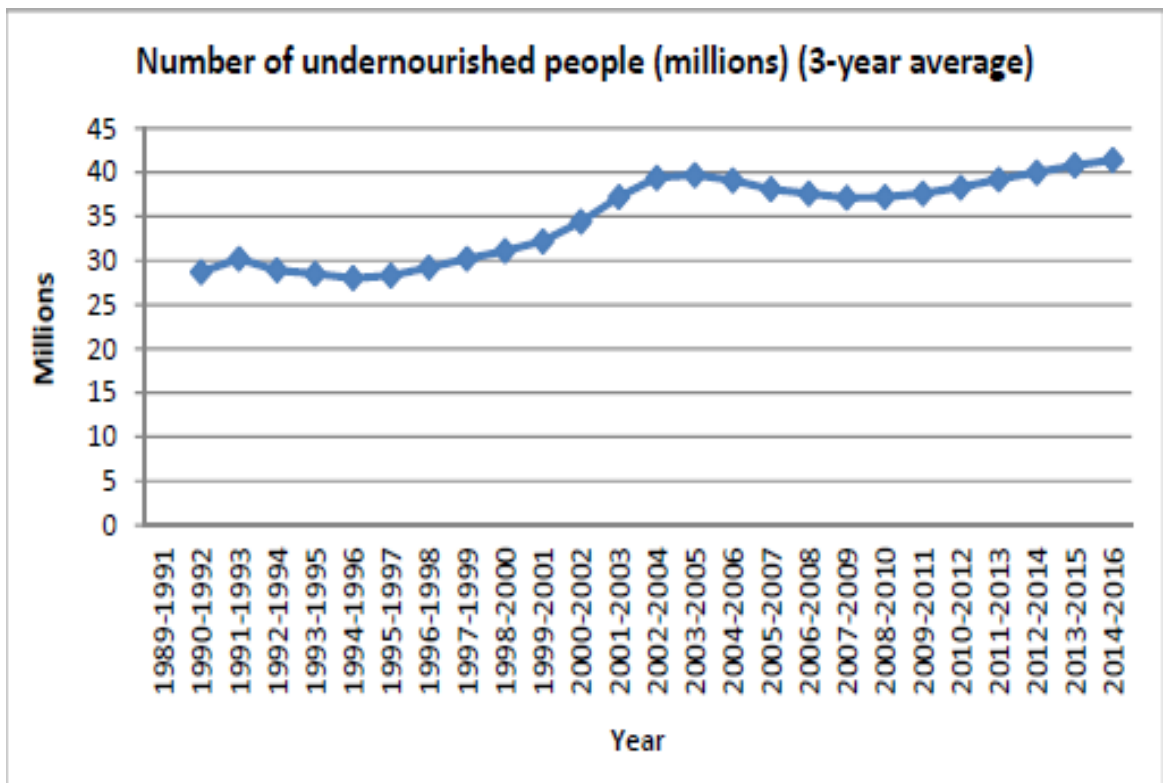
- **Water Scarcity and Unemployment:** It is estimated that 45% of Pakistan's labour force is associated with the agriculture industry. In addition to it 66% of population living in rural areas are directly or indirectly associated to agriculture industry for their bread and butter. Pakistan has 68% of its exports are agro based. In a nutshell, it can be said that economy of Pakistan and agriculture has a hand to glove relation. Agriculture in Pakistan is highly dependent upon the water coming from Indus water system. Most of these rivers are flowing out of Indian held Jammu and Kashmir, so water security because of climate change is one of the major threats for agriculture. As Pakistan is critically dependent upon the water from Indus Basin, so growing population, high water withdrawals from earth and Indian rapid construction of dams is making Pakistan; a water scarce country. This water insecurity will have long lasting impacts on the livelihood of millions of people associated to this particular sector of life. It will increase unemployment which will burden the economy and adverse effects will be witnessed by all the major sectors of economy.

- Energy security: Energy sector of Pakistan is highly dependent on the hydro power generation. At the moment 45% of Pakistan's energy demand is fulfilled by hydroelectric generation. As it is argued that Pakistan would sooner be a water starved country so its energy sector will have devastating effects of water scarcity. As in past energy crises haunted Pakistan's economy very badly. Pakistan's economy is facing a loss of 5.8 billion dollars due to energy shortage. It is 2.6% of total G.D.P growth. It will stop industry to work. It will halt most of the exports which are dependent upon energy providence. In short, if Pakistan would be facing water shortage as it is facing today, its energy sector will also suffer. As a result it will affect exports of Pakistan in particular and economy in general.⁵¹
- Agriculture and Food Security: The most important section of this study is impact of climate change on food security and agriculture. Agriculture industry is considered to be backbone of Pakistan's economy. Agriculture not only provides food to the consumers but also raw material to the domestic industry. It also provides employment to a major portion of population of Pakistan. Agriculture is the largest source of export earnings for Pakistan. It is estimated that 45% of labour force in Pakistan is linked to agriculture sector. Furthermore, 66% of population living in rural areas are directly or indirectly dependent upon agriculture for their bread and butter. Pakistan has 68% of its exports are agro based. In a nutshell, we can say that economy of Pakistan and its agriculture are highly inter-dependent. Pakistan has the largest canal irrigation system in the world which is 56073 kilometres in length. The annual flow of Indus Basin rivers are around 145 million acre feet. Water from tube wells and other seasonal springs is about 40 million acre feet. But climate change has lessened this amount by 40 to 50 million acre feet annually. This decline in the amount of water has declined the productivity of yield causing a food insecurity situation in the country. It is expected that population of Pakistan would be around 300 million by year 2050. Currently population of Pakistan is around 200

⁵¹ Saeed Ur Rehman, (2010), "Global Climate Change: Impact on Pakistan's Political Economy" Institute for Strategic studies, Research and Analysis, Islamabad, Pakistan.

million. More people mean more hunger and more mouths to feed. Pakistan has to produce 50% more of what it is producing today. A major portion of population is already under nourished because agriculture industry is unable to bridge the gap of supply and demand. And this gap will widened as result of climatic impacts on yield. Figure.2 shows the number of undernourished people in Pakistan.

Figure 2: Number of Undernourished People in Pakistan



Source: Sustainable Development Policy Institute Islamabad (2016)

Now the question arises why such a huge number of people are undernourished. The answer is quite simple and straight forward. Climate change has already started affecting agriculture of Pakistan. Pakistan is not producing enough to feed its entire population. Climate change has halted the production in agriculture. Food security is another major concern for future of Pakistan. And it is outcome of the climate effect. It is expected that it will gradually increase with time. Table.5 shows the gradual production and losses in crops as results of climate change or disasters caused as result of climate change.

Table.5: Gradual Loss in Production of Major Crops

Serial No.	Crop Name	Time period	Loss in Production in Tonnes	Loss in Production in percentage
1	Wheat	2013-14 to 2014-15	25.979 million tonnes to 25.478 million tonnes	1.9%
2	Maize	2013-14 to 2014-15	4.6944 million tonnes to 4.695 million tonnes	5%
3	Sugar Cane	2013-14 to 2014-15	67.5 million tonnes to 62.5 million tonnes	5%

Source: Global Climate Change Impact Study Centre (2015)

- Melting Glaciers and Floods Damage to Economy and Food Security: According to intergovernmental panel on climate change, the glaciers on Himalayas are melting more rapidly than any other resentment of glaciers all around the world. The major cause is increasing temperature. Greenhouse gases emission deforestation, pollution and forest fires are main reasons of increase in temperature. With rapid increase in melting of glaciers, chances of natural disasters like floods, avalanches, land soil and land erosion also increased. Increasing acidification of air as result of pollution has massively damaged the vegetation as well. Lands are acidified and producing less or becoming in cultivable. All these factors collectively become a serious threat to food security in Pakistan. Table.6 shows the land erosion situation in Pakistan.

Table.6: Status of Land Degradation in Pakistan

Water Erosion	17%
Wind Erosion	8%
Salinity and Sodicty	9%
Water Logging	5%
Low Organic Matter	96%

Source: Global Climate Change Impact Study Centre (2016)

Pakistan faced a loss of 16 billion dollars in floods of 2010 and 2012. It resulted in destruction of crops on hundreds of acres, ruined infrastructure and killed almost 4500 people. Natural disasters and economic progress of any country are inversely proportional to each other. Repeated natural disasters always halt economic activity in any country. In case of Pakistan it is expected that it would replicate many folds in future. A detailed picture of economic loss of flood of 2010 has been shown in table.7.

Table.7: Assessment of Costs Faced by Pakistan after 2010**Flood**

Province/ Region	Damage Costs in P.K.R Millions	Damage Costs in USD Millions	Reconstruction Option 1 P.K.R Millions	Reconstruction Option 1 USD Millions	Reconstruction Option 2 P.K.R Millions	Reconstruction Option 2 USD Millions	Reconstruction Option 3 P.K.R Millions	Reconstruction Option 3 USD Millions
Azad Kashmir	7,303	86	13,190	155	13,886	163	16,009	188
Baluchistan	52,676	620	27,258	321	34,359	404	58,116	684
F.A.T.A	6,271	74	7,595	89	7,873	93	9,544	112
Gilgit Baltistan	4,165	49	6,627	78	6,893	81	10,027	118
Khyber Pakhtun	99,625	1,172	105,957	1,247	109,942	1,293	179,844	2,116

khawa								
Punjab	219,272	2,580	93,521	1100	107,903	1,269	117,650	1,384
Sindh	372,341	4,380	227,850	2,681	253,791	2,986	269,704	3,173
Federal/ Cross Cutting Sectors	93,117	1,095	95,911	1,128	95,911	1,128	96,866	1,140
National Total	854,771	10,056	577,908	6,799	630,556	7,418	757,760	8,915

Source: World Bank Report (2011)

- **Livestock and Dairy:** Another key player providing food and employment to a major portion of society is livestock. Water availability, agriculture, crop production and livestock are interconnected. If there will be less water available for livestock and agriculture, it would decrease production in both sectors. As a result economic progress slows down. Although Pakistan is not much dependent on its fisheries but livelihood of a major portion of coastal areas' population is associated with oceans. Acidification of oceans has also disrupted the eco system of oceans. As a result it will burden economy of Pakistan indirectly and livelihood of people associated to this business directly. Table.8 shows the annual losses of different sectors after floods.

Table.8: Annual Losses in Different Sectors after 2010 Flood

Serial No.	Year	Category Damaged	Annual Losses in U.S Dollars
1	2011	Livestock	1840.3 Million Dollars
2	2011	Agriculture	1.84 Billion Dollars
3	2011	Rehabilitation	2.7 Billion

		Fund	Dollars
4	2012	Livestock, Agriculture, Infrastructure	6.07 Billion Dollars
5	2014	Livestock, Agriculture, Infrastructure	5.39 Billion Dollars

Source: Economic Surveys of Pakistan 2011-12, 2012-13, 2014-

15

The economic survey of Pakistan tells us during three floods in 2010, 2011 and 2012, economy of Pakistan faced a loss of 16 billion dollars. This climate change will severely impact the economic and food security in Pakistan. It has directly influenced agriculture, livestock fisheries and health budget. Government should take long term measures such as water management, improved energy consumption and conservation, use of renewable energy resources, controlling deforestations, building of new dams and reservoirs and emergency plans for disaster prone areas for minimum damage.

“Water is not only for life--- Water is Life” are the words used by Secretary General of United Nations, tells the importance of abundant water for socio-economic growth of any country. Pakistan has not constructed any major water reservoir since 1970. This directly affects the production sectors and burdened the economy. The productions are falling 4 to 5% annually. Last year Pakistan has face a loss of 1.44% of total G.D.P due to the impacts of climate change. The Paris Agreement has granted Pakistan 6.5 Billion dollars to mitigate the challenges of climate change. But only getting money would not be enough. Effective planning and modern adaptation techniques can make Pakistan more resilient to climate change effects.⁵²

⁵² Aymen Ijaz, (2016), “Climate Change and Pakistan”, Islamabad Policy Research Institute, Islamabad, Pakistan.

CHAPTER 4

NATIONAL DECISION MAKING AND POLICY RECOMMENDATIONS

Pakistan established its first “National climate change policy” in 2012 but it was not implemented effectively. National climate change divisions were also established at provincial levels but they also did not performed according to the expectations. Government of Pakistan also approved “Pakistan Climate change Bill” in 2016 but a very minor development has been done under this bill. It is still in the pipeline of implementation. Pakistan is also signatory of Paris Climate Change Agreement along with 190 other states and aims to mitigate the effects of climate change at domestic as well as global level. Pakistan also intends to establish Pakistan Climate Change Council to implement Kyoto Protocol and Paris Climate Change Agreement. Another measure “Green Pakistan” program has also been launched to make our lands forest covered. A very small work has been done on climate change in Pakistan and it needs to be addressed on priority bases, as Pakistan is most pronged country towards climate change. Following are few of the strategies needed to be adopted on emergency basis. If not implemented, the consequences would be disastrous for millions of lives.

- Implementation of Paris Agreement: Pakistan is one of the most vulnerable states to climate change. It is imperative for Pakistan to highlight this threat on all international forums to curb down emission of greenhouse gases. Pushing the whole world for a possible transition to hydro, solar and wind power energy is the most sung solution to counter the emission of greenhouse gases. Proactive diplomacy for the major powers to control these emissions will be instrumental in this regard. Pakistan should also seek major powers to finance the mitigation measures in Pakistan.
- Water Management: Pakistan is expected to be a water starved country by 2025. Pakistan is one of the countries which are wasting millions of acre feet water annually and it flows down to oceans. Pakistan had not built any major water reservoir since 1970. Building of dams is the need of the hour. Pakistan has a potential of producing 35000 megawatts electricity by constructing dams on its

rivers. It will not only give the national grid surplus energy but also save our agro lands from the effects of any possible flood in future.

- **Improved Energy Consumption and Conservation:** Up gradation of our supply system and consumption is also one of the major needs. Governments should launch awareness campaigns about how to consume energy and save energy for future. Major operating systems should be shifted to solar run systems. Introducing solar charged and electric engine vehicles will also be beneficial for the security of natural resources. If it would not be planned today, it would adversely impact progress of Pakistan in coming time.
- **Use of Renewable Resources:** controlling the emission of carbon dioxide in the atmosphere should be part of our national climate change policy. Pakistan is massively dependent on the coal and furnace oil to fulfil its energy demands. It is the right time for transition from coal to hydro, wind and solar energy resources. These are not only eco-friendly but also quite cheaper as compare to coal and furnace oil.
- **Capacity Building:** Pakistan is highly threatened country by climate change. It lacks capacity to adapt and mitigate the challenges posed by climatic effect. To mitigate these challenges Pakistan is getting 6.5 billion dollars fund under Paris Climate Change Agreement. But only getting finance never ensures security. Pakistan needs to develop its capacity to counter the threats of climate change.
- **Conflict Resolution Mechanism:** There needs to be a conflict resolution mechanism for Pakistan. A two pronged conflict resolution mechanism is fairly needed. On one side it should work to resolve provincial conflicts over management and distribution of natural resources, while on other hand it should be focussed only on the resource conflicts with India. If such a mechanism will be devised and adopted effectively, it will not only strengthen national integration but also ensure regional security.
- **Controlling Deforestation:** Complete ban on tree cutting is also necessary to control the rising temperature. Pakistan has only 4% of

its land covered with forests. Forests not only control temperatures but also purify the environment, minimise the chances of floods, sea erosion and land sliding. As a result infrastructure and agriculture would not face any massive damage. In addition to it, trees provide a healthy atmosphere to the wildlife which is also necessary for human survival. Indirectly forests also contribute to the economic progress of any country.

- **Establishing Institutes:** Pakistan has serious threats from climate change but lack of political commitment and collective irresponsibility are adding fuel to it. Pakistan is lagging behind in establishing any specialized institution which can address climate change. Pakistan still does not have any effective implementation of climate change policy. It is highly recommended that Pakistan has to design and implement an effective and serious climate change policy. Pakistan lacks research institutes and research experts of the field which halts the formation of effective policies.
- **Implementation of National Climate Change Policy:** it is highly recommended for the national and provincial governments to take serious measures to implement “National Climate Change Policy 2012” and “National Climate Change Policy 2016”. In Pakistan it is the need of the hour to establish formal institutions addressing environmental issues and disaster management. Presently good number of institutions with overlapping functions helped shaping the response to climate change in country. Designing and executing policies to mitigate and combat the climate change impacts rely heavily on institutional setup, federal and provincial level ministries and departments.
- **Effective National Disaster Management:** Although Pakistan has a well-established national disaster management institution, but due to lack of commitment and corruption it had not performed as per expectations. These institutions should have well trained and highly skilful professional staff who can predict the accurate forecast of any heavy rainfall or drought. They should have a mechanism to

inform governments prior to any natural disaster. There should be an emergency cell which should be monitoring water coming from India and all other rivers. It would help to take precautionary measures to minimise the damage caused by any natural disaster.

- **Importing Technology:** Pakistan is far behind in latest technology needed for adaptation. It is high time to import technology for agricultural and meteorological purposes. There should be mechanisms which can predict weather more accurately. Emergency precautions before any natural disaster will not only minimise the death toll but it will also help authorities to minimise the infrastructure destruction and economic decline.
- **Public Awareness:** Campaigns with the help of targeted media hype and publicity campaigns will help to mitigate the challenges of climate change. Sensitizing local communities and training should be done to avoid the effects of natural disasters. Public should be trained to save human lives during any natural disaster. It will help to improve human security situation in country during any disaster.
- **Diplomacy for Green Development:** Pakistan is one of the most vulnerable countries which are directly threatened by climate change. It needs to track down a diplomacy centralised to major powers to adopt green development. U.S.A, China, Japan and India are the major contributors to global greenhouse gases emissions. Pakistan needs to convince these powers to curb down the emissions by shifting their economies to green economies and financing it to adapt and mitigate the challenges of climate change.

CONCLUSION

This study can be concluded as; three consecutive floods in 2010, 2011 and 2013, almost 4500 people died and economy of Pakistan faced a loss of 16 billion dollars. Natural disasters resulted as result of climate change will severely impact agriculture, industry, health, security and economic sectors of Pakistan. Government should take long term measures such as water management, improved energy consumption and conservation, use of renewable energy resources, controlling deforestations, building of dams and reservoirs and emergency plans for disaster prone areas. Water is not only for life----water is life. This statement was made by Secretary General of United Nations. It tells us the importance of water for socio-economic progress of any country. In case of Pakistan water has increased its importance manifolds because of climate change and India's water terrorism. Pakistan had tremendously failed in constructing any major water reservoir after 1970. This water shortage and climate change had affected backbone of economy of Pakistan which is agriculture. The productions are falling 4% to 5% annually. In year 2017 Pakistan has faced a loss of 1.44% of total G.D.P due to impacts of climate change. Effective governance and responsible climate diplomacy is the need of the hour. As 196 states have signed The Paris Agreement and Pakistan has been granted 6.5 billion dollars to mitigate the challenge of climate change. But only getting money would not be enough. But highlighting climate threat on all international forums is more important. China, United States of America and India are the major contributors in greenhouse gas emissions. Pakistan should design such diplomacy to convince these contributors to curb down greenhouse gases emissions. Pakistan needs to internationalise its research program focussing climate change. Pakistan is lagging behind in research in climatic effects and its mitigation and effective adaptation. It needs to produce best researchers who can make policies and suggest such effective strategies which can help in neutralizing the effects of climate change. In addition to it Pakistan needs to redesign its National Climate Change policy. Pakistan devised two national climate change policies which still need to be implemented yet. Legislation which can help transforming Pakistan into a green economy is also necessary to adapt the

challenges of climate change. We need to make strong laws related to climate effect. Governments should take serious steps to implement such laws. Moreover, Pakistan being the most calamity stricken country has not specified any curriculum related to climate change. We are lacking specialized research centres addressing climate change. We need to develop a curriculum which constitutes climate change as a major subject. We also need to develop advanced research centres which can conduct research related to climate change and help to mitigate its challenges. Public education campaigns should be launched to educate people. They should be educated through advertisements and publication campaigns. As climate change is not matter of one country it's the matter of millions of lives. It is matter of human survival. It is never too late to mend; we must not be ignorant otherwise we will suffer irreparably. The other side which would be impacted the most is the strategic environment in south Asia. "Water belongs to India that cannot be allowed to go to Pakistan" and "Water and blood cannot flow together" these are the statements made by Indian Prime Minister in recent times. In response to it Pakistan's foreign office responded as "Revocation of Indus Water Treaty by India can be taken as an act of war" furthered the narrative of a looming water war. In the presence of nuclear weapons, advanced ballistic missiles programmes and huge armies on both sides, a traditional war is highly unlikely between the two rivals. Instead a water war is in making, largely from Indian side. Growing agricultural needs, depleting water reservoirs and domestic energy woes can push Pakistan to take a hard-line, which could eventually unleash a war. If India were to annul the Indus Water Treaty, the consequences might well be humanitarian devastation in what is already one of the world's most water starved countries. An outcome far more harmful and far reaching than the effects of a limited war. India should preserve its decision to keep Indus Water Treaty in place. Rescinding it could have disastrous consequences for Pakistan and also damaging for India. With India Pakistan relations nearly on a war footing, threatening a course of action that risks humanitarian devastation could bring the sub continental powder keg closer to explode. Still there is a hope that both countries will engage in talks to take measures to avoid the serious threats climate change is posing to the respective sovereign state security and possibility of any war. If both countries will not take this issue on the water is much to fight over and fight for. Climate change being the most unpredictable and uncertain in nature made it more challenging for the

policy makers who make decisions on the basis of history of any event and known determinants. Most of the countries struggling with the challenge of climate change are short of resources. There will be increasing pressure on international environmental security. It would impact unstable, conflict prone and strategically significant regions. Climate change will become threat multiplier combined with water and food security for Middle East, North, East, central Africa and Central Asia. There would be conflicts over division, distribution and management of resources. For this purpose better integration of climate change and natural resources is needed. Cleaner technology and green economies will be pivotal in changing climate change into opportunity. As far as sustainable development in Pakistan is concerned, public-private partnership as well as civil society contribution will be effective in formulation of policies. These threat multipliers are tests for governments to adapt effective decision making policy that would prepare a nation to combat the climate change security challenges. As climate change is not matter of a single country. It is matter of millions of lives. It is matter of human survival. It is never too late to mend; we must not be ignorant otherwise we will suffer irreparably.

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