

Md. Riaz Uddin
Hasan Mahmud

EXPLORING THE ROLE OF CLIMATE CHANGE AS A THREAT MULTIPLIER: BANGLADESH IN PERSPECTIVE

Abstract

It is agreed by the academia that climate change is happening and according to the Intergovernmental Panel on Climate Change (IPCC), the reason is primarily anthropogenic. The focus of this study is the role of climate change as a threat multiplier in the context of Bangladesh. A conceptual framework presented by the United Nations Environment Programme (UNEP) linking climate change and security in the Sahel region is used as the basis of this study. The cases of Darfur and Nigeria, where impacts of climate change are liable for accelerating instability in the respective areas, are analyzed in details to get hold of the threats associated with climate change and implications of such threats for vulnerable states. According to many indices, Bangladesh is highly susceptible to changes in climatic events due to its unique geographic location and socio-economic condition. This paper finds that impacts of climate change stir up different phenomena that can multiply instability in Bangladesh. Moreover, such impacts may turn out to be oblique threats to national security of the country in the long run. Based on the findings of the research, this paper presents a new framework linking climate change with national insecurity and proposes that further study can improve the precision and usability of components affiliated with this framework.

Keywords: Climate change; Security; Threat multiplier; Destabilization; Bangladesh

1. Introduction

“There is every reason to believe that as the 21st century unfolds, the security story will be bound together with climate change”.

— John Ashton.¹

Md. Riaz Uddin is Intern at Bangladesh Institute of International and Strategic Studies (BIISS). His email address is: Mdriazuddin563@gmail.com; **Hasan Mahmud** is MSS degree pursuer at Department of International Relations, University of Dhaka. His email address is: Hasandu1437@gmail.com

© Bangladesh Institute of International and Strategic Studies (BIISS), 2018.

¹James R. Lee, “Global Warming Is Just the Tip of the Iceberg”, *The Washington Post*, 04 January 2009.

The above quotation alludes to the potential nexus of climate change with the security paradigm. Climate change is already considered as a threat to the safety and wellbeing of people all around the world. Throughout the globe, sea level rise, rapid desertification, increased salinity and the growing frequency of natural disasters are turning out to be common phenomena. Exactly when climate change started to occur due to anthropogenic reasons is up to debate. According to a recent study published in the *Nature* journal, greenhouse gases began warming the world's oceans in the early 1800s.² Since 1901, earth's surface has warmed by 0.7–0.9°C, but the rate of warming has nearly doubled since 1975 to 1.5–1.8°C.³ By 2020, it is projected that global surface temperature will be more than 0.5°C (0.9°F) warmer than the 1986–2005 average.⁴ Thus, it is undeniable that climate is changing more rapidly now compared to the past.

Climate change can be linked with security concern of nation states in the modern era. For Bangladesh, climate change is already a vital issue because the country is in fear of losing more in the near future due to the changing climate. A research reveals that “a sea-level rise of 0.5 meters over the last 100 years has already eroded 65% landmass of 250 square kilometers of Kutubdia, 227 square kilometers of Bhola and 180 square kilometers of Sandwip islands.”⁵ According to the Intergovernmental Panel on Climate Change (IPCC), a 45 cm sea-level rise will inundate almost 10.9 per cent of the territory of Bangladesh.⁶ Moreover, the issue of climate change-induced cross-border migration has already created tension with India.⁷ Against this backdrop, the objective of this paper is to understand whether climate change can be considered as a significant threat multiplier for Bangladesh. With this objective, this study looks forward to answering some research questions: What are the prevailing impacts of climate change in Bangladesh? Among these impacts, which ones can potentially cause a significant level of insecurity in Bangladesh and how?

In order to address these research questions, there are six sections in this paper. Section two examines the prevailing literature on the climate change-security nexus. Section three highlights the analytical framework based on which this study progresses. Section four discusses the cases of Darfur and Nigeria where the impacts

² Roz Pidcock, “Scientists clarify starting point for human-caused climate change”, available at <https://www.carbonbrief.org/scientists-clarify-starting-point-for-human-caused-climate-change>, accessed on 31 October 2018.

³ Gail Hartfield, Jessica Blunden and Derek S. Arndt, “State of the Climate in 2017”, *Bulletin of the American Meteorological Society*, Vol. 99, No. 8, 2018.

⁴ Rebecca Lindsey and LuAnn Dahlman, “Climate Change: Global Temperature”, available at <https://www.climate.gov/news-features/understanding-climate/climate-change-global-temperature>, accessed on 31 October 2018.

⁵ Bangladesh Institute of International and Strategic Studies (BIISS) and Saferworld, *Climate Change and Security in Bangladesh: A Case Study*, Dhaka, 2009.

⁶ Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2007: Impacts, Adaptation and Vulnerability*, Cambridge: Cambridge University Press, 2007.

⁷ BIISS and Saferworld, op. cit.

of climate change have already led to crises resulting into instability and widespread insecurity. Section five explores the threats associated with changing climate which aggravate vulnerabilities of Bangladesh and can potentially challenge the security and survival of the country in the long run. Section six summarizes the findings of this study and concludes the paper.

2. Literature Review

The following discussion is the review of the existing literatures which directly or indirectly address climate change and security within their scope. The existing scholarly works on the role of climate change as a threat multiplier are insufficient, and they are more hypothetical rather than empirical in nature. Hence, the primary purpose of this discussion is to address the gaps in existing studies and to fill up the prevailing literary vacuity. At first, the concepts of climate change and national security are depicted and later, the climate change-security nexus in the existing literature is analyzed.

2.1 *Climate Change*

Climate change is a highly contested concept and there is no universal definition of it. For this reason, the term is subjectively defined in the academic arena. According to the National Aeronautics and Space Administration (NASA), "Climate change is a change in the usual weather found in a place. This could be a change in how much rain a place usually gets in a year. Or it could be a change in a place's usual temperature for a month or season."⁸ The United Nations Framework Convention on Climate Change (UNFCCC) uses the term 'climate change' to refer to "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods"⁹ In this study, the conceptualization of climate change by the IPCC is followed, which identifies climate change as "a change in the state of the climate that can be identified (e.g. using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. It refers to any change in climate over time, whether due to natural variability or as a result of human activity."¹⁰ This particular definition is adopted in this study because it takes both natural and human variables into consideration, which helps to get rid of any parochial view of climate change.

⁸ "What is Climate Change?", available at <https://www.nasa.gov/audience/forstudents/k-4/stories/nasa-knows/what-is-climate-change-k4.html>, accessed on 01 November 2018.

⁹ "United Nations Framework Convention on Climate Change (UNFCCC)", available at https://unfccc.int/files/essential_background/background_publications_htmlpdf/application/pdf/conveng.pdf, accessed on 01 November 2018.

¹⁰ IPCC, op. cit.

2.2 National Security

National security is another contested concept which is defined subjectively in different studies. Walter Lippmann defines national security saying that “a nation has security when it does not have to sacrifice its legitimate interests to avoid war, and is able, if challenged, to maintain them by war”.¹¹ This view can be considered as parochial because it considers only military threats. Harold Brown has enhanced the concept by including elements such as economic and environmental security. According to him, “National security then is the ability to preserve the nation’s physical integrity and territory; to maintain its economic relations with the rest of the world on reasonable terms; to preserve its nature, institution, and governance from disruption from outside; and to control its borders.”¹² This definition is not much inclusive in the sense that it only considers external threats. For this study, Mario Nobile’s view of national security is followed, who defines national security as “an intricate interaction between political, economic, military, ideological, legal, social and other internal and external social factors through which individual states attempt to ensure acceptable provisions to maintain their sovereignty, territorial integrity, the physical survival of its population, political independence and possibilities for a balanced and rapid social development on an equal footing”.¹³ As per this definition, national security can be jeopardized by both internal and external facets. Any threat to either one or multiple components of national security according to this view, namely, sovereignty, territorial integrity, survival of the population, political independence and social development, put national security at stake. It is worth noting that national security is something that needs to be ensured in a full-fledged manner. As General Jacob L. Devers puts it nicely, “National security is a condition which cannot be qualified. We shall either be secure, or we shall be insecure. We cannot have partial security. If we are only half secure, we are not secure at all”.¹⁴

2.3 Climate Change-Security Nexus in the Literature

The scientific basis for climate change is already well established and there is continuous progress in the amount of research being undertaken on the biophysical effects of climate change regarding the rising sea level, distorted rainfall patterns, more recurrent and violent storms and the likely corollaries of all these phenomena

¹¹ Walter Lippmann, *U.S. Foreign Policy: Shield of the Republic*, Boston: Little, 1943.

¹² Harold Brown, *Thinking About National Security: Defense and Foreign Policy in a Dangerous World*, Boulder, CO: Westview, 1983.

¹³ Mario Nobile, “The Concept of Security in the Terminology of International Relations”, *Political Thought*, October-December, 1988, pp. 72-73.

¹⁴ Bernard Brodie, “National Security Policy and Economic Stability”, available at https://books.google.com.bd/books/about/National_Security_Policy_and_Economic_St.html?id=_borAAAAYAAJ&redir_esc=y, accessed on 02 November 2018.

for human well-being.¹⁵ The following table summarizes the existing works on the climate change-security nexus which will be discussed in details afterward:

Table 1: Selected Literature on Climate Change-Security Nexus		
Author(s)	Methodology	Findings
BIISS and Safer-world	A combination of desk and field research was adopted. Field research included key informant interviews and focus group discussions in case study locations.	Migrating away from the climate change-affected areas can have negative impacts on the economic and social situation of the destination areas, which may lead to increased tension, crime and violence and the risk of serious social disturbances – leading in the worst-case scenario to violent conflict.
Jon Barnett and W. Neil Adger	Secondary materials included books, journal papers and newspaper articles.	Climate change undermines human security by reducing people's access to natural resources that are important to sustain their livelihoods. Climate change is also likely to undermine the capacity of states to provide the opportunities and services that help people to sustain their livelihoods, and which help maintain and build peace. In certain circumstances, the direct and indirect impacts of climate change on human security and the state may in turn increase the risk of violent conflict.
UNEP	The study followed a unique mapping process analyzing climate trends over a 24 to 36-year period in the 17 countries included in its geographical scope.	Climatic change trends are observed over the last 40 years in the Sahel. Changes in climatic conditions exacerbated issues linked to the availability of natural resources essential to livelihoods in the region, as well as food insecurity. The impacts of changing climatic conditions on the availability of natural resources have led to increased competition over scarce natural resources and resulted in tensions and conflicts between communities and livelihood groups. Some adaptation policies in the region recognize the linkages between changing climatic conditions and behavioral responses, such as migration and conflict.

¹⁵ Oli Brown, Anne Hammill and Robert McLeman, "Climate Change as the 'New' Security Threat: Implications for Africa", *International Affairs*, Vol. 83, No. 6, 2007, p. 1146.

Mayowa J Fasona and AS Omojola	A geographic information system (GIS) approach that permits the analysis of multiple data layers was used.	The Sahel region recorded deficit rainfall over a period of six-decade (1940-2000). There is a clear indication of loss of prime arable lands resulting from climate change. This is correlated with the pattern of communal clashes and conflicts over land resources. The situation is a zero-sum game where each participant's gain is the others (and collective) loss. This is a situation where all will be losers at the end.
The Center for Strategic and International Studies (CSIS) and the Center for a New American Security (CNAS)	The study was focused on a collaboration which engaged climate scientists and national security specialists in a lengthy dialogue on the security implications of future climate change.	With climate change, a number of phenomena are likely to happen. Soft power and North-South tensions will increase. Migration and immigration will rise, producing a strong backlash. Public health problems will grow. Resource conflicts and vulnerabilities will intensify. Nuclear activity will increase, with attendant risks. Domestic political repercussions and state failure will occur. The balance of power will shift in unpredictable ways.
Jon Barnett	Secondary materials included books, journal papers and newspaper articles.	Climate change is a security problem for some states and people. National security has an internal dimension in that it is partly a function of state legitimacy. Governments in states where the material well-being of people is highly variable to external forces or where material wellbeing is declining, tend to be more prone to internal violent conflicts. The possibility of violent conflicts may lead to welfare and livelihoods less secure. On the basis of existing environment-conflict research there is simply insufficient evidence and too much uncertainty to make anything other than highly speculative claims about the effect of climate change on violent conflict.

Source: Authors' compilation.

Back in 2009, a study on climate change and human security in Bangladesh was conducted by BIISS and Saferworld.¹⁶ According to that study, "The relationship between climate change and security is not necessarily direct, but depends on a chain of consequences. For example, climate change causes environmental degradation. In areas where this phenomenon occurs, it undermines livelihoods, reducing basic human security and creating increased tension as competition for dwindling resources becomes more intense. This tension can lead to crime and violence, increasing social instability. The deteriorating economic and social situation also drives people to migrate from these areas to towns and cities in search of a better life. However, this migration away from affected areas can have

¹⁶ BIISS and Saferworld, op. cit.

negative effects on the economic and social situation in destination areas, which may again lead to increased tension, crime and violence and the risk of serious social disturbances – leading in the worst-case scenario to violent conflict”.¹⁷ Although this study mentions that climate change can reduce human security and possibly lead to violent conflict, it has not thoroughly assessed how such impacts may affect the national security of Bangladesh through its repercussions.

Barnett and Adger argue that climate change undermines human security and this may, in turn, increase the risk of violent conflict.¹⁸ They mention, “Climate change undermines human security in the present day and will increasingly do so in the future. It does this by reducing people’s access to natural resources that are important to sustain their livelihoods. Climate change is also likely to undermine the capacity of states to provide the opportunities and services that help people to sustain their livelihoods and help to maintain and build peace. In certain circumstances, these direct and indirect impacts of climate change on human security and the state may in turn increase the risk of violent conflict”.¹⁹ While this study argues that impacts of climate change on state and human security holds the potential for increasing conflicts, it does not provide ample evidence to support the view.

The UNEP conducted a study in 2011 to assess the impacts of climate change on the Sahel region.²⁰ This study analyzed historical climate trends across this region to explore the link between the impacts of climate change on livelihoods and behavioural responses such as migration and conflict. The findings of this study are as following:

- (i) Climatic change trends can be observed over the last 40 years in the Sahel in terms of temperature, rainfall and floods. In addition, the recurrence of drought and the potentially severe impacts of sea-level rise are increasing livelihood vulnerability.
- (ii) Alterations in climatic orders are aggravating issues related to the accessibility of natural resources crucial for livelihoods and food security in the area. Coupled with vital social, economic and political issues, this can result in migration and conflict.
- (iii) The way the accessibility to natural resources is hindered by fluctuating climatic conditions, coupled with phenomena, such as population

¹⁷ Ibid.

¹⁸ Jon Barnett and W. Neil Adger, “Climate Change, Human Security and Violent Conflict”, *Political Geography*, Vol. 26, No. 6, 2007.

¹⁹ Ibid, p. 651.

²⁰ UNEP, *Livelihood Security: Climate Change, Migration and Conflict in the Sahel*, Geneva: UNEP, 2011.

growth, weak governance and land tenure challenges, has led to greater competition over scant natural resources – most remarkably fertile land and drinking water – and resulted in tensions and clashes among different communities.

This study has found a strong link between the impacts of climate change on livelihoods and behavioural responses. Migration and conflict can be great security threats not only for individuals but also for the nation-states in the Sahel region. However, this study has only considered the vulnerability of individuals and ignored the vulnerability of the nation-states during the evaluation.

According to Fasona and Omojola, climate change is undermining human security in Nigeria which, in turn, might be fueling communal clashes.²¹ The researchers used a geographical information system approach to collect data and based on best available data, their study has found a very strong connection between climate change and the pattern of communal clashes in the country. According to the researchers, “The pattern of land cover changes between 1976 and 1995 strongly indicated loss of prime arable lands resulting from climate change, which is in turn leading to opening up of new virgin lands towards the south. This is correlated with the pattern of communal clashes and conflicts over land resources which are more common in the guinea savannah zone, rainforest belt and the mangrove ecology.”²² This study has excellently linked climate change with communal clashes in Nigeria. That being said, any analysis of climate change as a threat multiplier for the national security of Nigeria is absent in their work.

The CSIS and the CNAS jointly conducted a research on the foreign policy and national security implications of global climate change. The study found that, “the United States can expect that climate change will exacerbate already existing north-south tensions, dramatically increase global migration both inside and between nations (including into the United States), spur more serious public health problems, heighten interstate tension and possibly conflict over resources, challenge the institutions of global governance, cause potentially destabilizing domestic political and social repercussions, and stir unpredictable shifts in the global balance of power.”²³ The study also expressed in its concluding remarks that some of the challenges of climate change “have the potential to overwhelm national governments and international institutions. It is difficult to anticipate how that will ultimately

²¹ Mayowa J Fasona and AS Omojola, “Climate Change, Human Security and Communal Clashes in Nigeria”, paper presented in the International Workshop on Human Security and Climate Change, organized by Centre for the Study of Civil War, International Peace Research Institute, Oslo (PRIO), Oslo, on 21-23 June 2005.

²² Ibid, p. 20.

²³ “The Age of Consequences: The Foreign Policy and National Security Implications of Global Climate Change”, available at https://csis-prod.s3.amazonaws.com/s3fs-public/legacy_files/files/media/csis/pubs/071105_ageofconsequences.pdf, accessed on 01 November 2018.

unfold, but the prospects for destabilizing global effects are clearly on the horizon”²⁴ This research puts national security in perspective while exploring the implications of climate change worldwide. Nevertheless, the study still remains an anticipatory work rather than an exploratory one.

Some scholars hypothetically argue that sea-level rise, ice-free Arctic region and climate change-induced migration may pose a significant threat to the survival of nation-states. Barnett states, “Because sovereignty over delineated territory is the material substrata of national security, then physical processes such as sea-level rise may undermine national security in serious ways”²⁵ He also argues that climate change may create legitimacy crisis for the government and destabilize the internal harmony and thus undermine national security.²⁶ Though he portrays climate change as a national security issue in his study, he offers little evidence in this regard.

The literature review indicates that only a few scholars have considered the impacts of climate change on national security so far. Nonetheless, their arguments are not based on empirical data. Most scholars in the academic arena still put emphasis on human security while discussing impacts of climate change and thus ignore the insecurity of nation-states. The present and predicted climate trends, as illustrated in the scientific reports, such as Fourth Assessment Report (AR4) and Fifth Assessment Report (AR5) by IPCC, project that it is time for us to think out of the box. The scarcity of theoretical and empirical studies in this issue, coupled with the alarming reports on the tentative grim impacts of climate change on Bangladesh, infers new questions and research areas to be explored. In this regard, this study proceeds with a determination to unfold security implications of climate change in the context of Bangladesh.

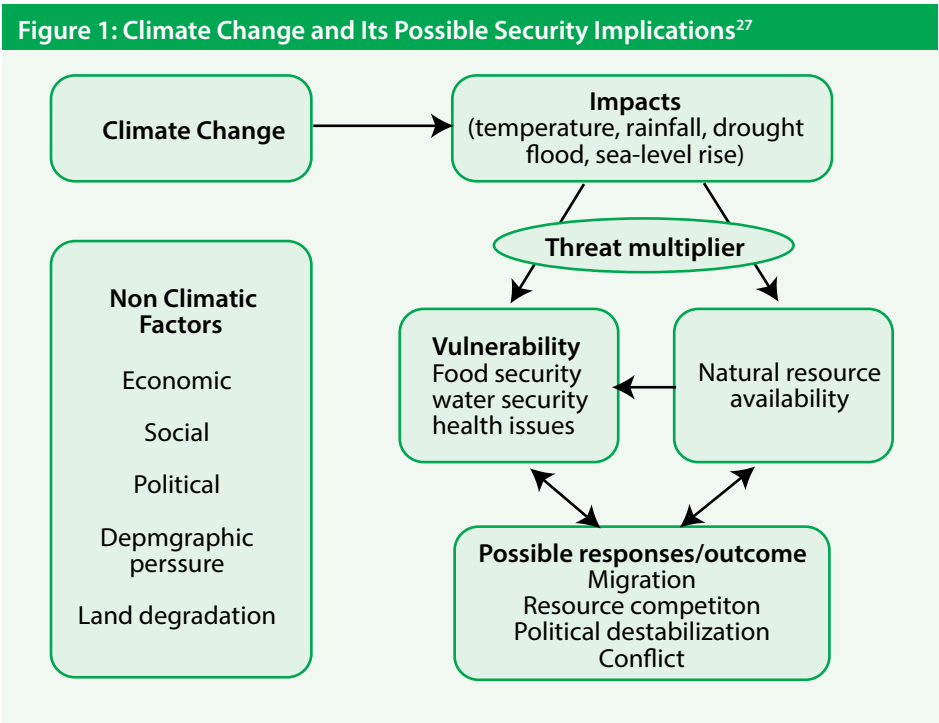
3. Analytical Framework

In 2011, a conceptual framework was presented by UNEP in a report titled “Livelihood Security: Climate Change, Migration and Conflict in the Sahel” where an assessment of the linkage between climate change and security in the Sahel region was conducted.

²⁴ Ibid.

²⁵ Jon Barnett, “Security and Climate Change”, *Global Environmental Change*, Vol. 1, No. 1, 2003, p. 9.

²⁶ Ibid.



Source: UNEP, 2011.

This conceptual framework is based on the report of the UN Secretary-General on climate change and its possible security implications. This framework identifies five channels through which climate change could affect security. Those channels are as below:

Vulnerability: Climate change jeopardizes food security and human health, and upsurges human exposure to extreme events.

Development: If climate change decelerates the development process, the subsequent vulnerability may weaken the aptitude of states to preserve stability.

Coping and Security: Migration, resource competition and other coping responses of households and communities faced with climate-related risks could upsurge the danger of national conflict and have international consequences.

Statelessness: There are repercussions for rights, security and sovereignty with the loss of statehood due to disappearance of territory.

²⁷ UNEP, op. cit., p. 14.

International conflict: The effect of climate change on shared or un-delineated international resources may disturb international cooperation.²⁸

According to this framework, climate change can exacerbate political, economic and social instabilities which may, in turn, lead to conflict and political unrest. This framework has been used throughout the research to assess the role of climate change as a threat multiplier for national security. The strength of this framework is that whereas most theoretical frameworks of climate change and security only highlight the climatic factors and overlook non-climatic ones, this framework takes both of them into consideration. Therefore, this is an inclusive model unlike the other ones and is better able to explain the linkage between climate change and security more effectively compared to other frameworks.

4. Climate Change as a Threat Multiplier – Two Contemporary Cases

This section aims to analyze two contemporary international cases where climate change has already played the role as a threat multiplier. The cases of Darfur and Nigeria are analyzed in this respect. The reason behind selecting African cases is that, according to the AR5, Africa's climate is changing more rapidly compared to the rest of the world and the impacts of climate change on both human and national security are already felt here.²⁹

4.1 The Case of Darfur

The Darfur crisis is an unfortunate legacy of fierce competition over land rights and limited resources. The competition originated from the Darfurians' demand for land and water.³⁰

Increased tribal friction, deriving from clashes over resource control, led to intertribal disputes.³¹

The disputes resulted in clashes among settled tribes, mostly African, and nomadic tribes, mostly Arab, who were competing for resources for a long time after a prolonged drought in 1983.³²

²⁸ Ibid, p. 14.

²⁹ IPCC, *Climate Change 2014: Synthesis Report*, Geneva: Intergovernmental Panel on Climate Change, 2015.

³⁰ Hamdy A Hassan, "Dimensions of the Darfur crisis and its consequences: An Arab perspective", *African Security Review*, Vol. 19, No. 1, 2010, p. 21.

³¹ Ibid.

³² Carin Zississ, "Darfur: Crisis Continues", available at <https://www.cfr.org/background/darfur-crisis-continues>, accessed on 03 November 2018.

In the meantime, the Muslim government of the north was busy with a civil war with insurgents in the Christian and animist dominated south.³³ The government of Sudan backed Darfur's Arab paramilitaries to keep the rebels cornered. This deteriorated Arab-African friction even more and eventually, President Omar al-Bashir transformed a competition over scarce resources into a far-reaching violent conflict shaded with grave racial and ethnic connotations.³⁴

According to former UN Secretary-General Ban Ki-moon, "Almost invariably, we discuss Darfur in a convenient military and political shorthand - an ethnic conflict pitting Arab militias against black rebels and farmers. Look to its roots, though, and you discover a more complex dynamic. Amid the diverse social and political causes, the Darfur conflict began as an ecological crisis, arising in part from climate change."³⁵ In other words, he considers climate change as one of the significant factors behind the emergence of the Darfur crisis. The following discussion will assess the validity of his statement based on empirical data.

4.1.1 *The Impacts of Climate Change*

A June 2007 report by UNEP suggests that the climate of Darfur has been changing drastically since 1970s.³⁶ Recurrent droughts and floods, desertification and scarcity of rainfall have borne the testimony of the changing climate in this region. According to the report of UNEP, the following events occurred as direct impacts of climate change:

Drought: During the period of 1980-2006, Darfur experienced several droughts which adversely affected the populace of this area.³⁷ The frequency and intensity of droughts have increased due to climate change. The droughts of 1980-1984, 1987, 1989, 1990, 1991, 1993 and 2000 indicate that the frequency of droughts has been quite high in the recent decades.³⁸

Desertification: Desertification is considered as the greatest environmental problem of Sudan because of the fact that 29 per cent of Sudan is already desert.³⁹ The UNEP report says, "An estimated 50 to 200 km southward shift of the boundary between semi-desert and desert has occurred since rainfall and vegetation records were first held in 1930s. This boundary is expected to continue to move southwards due to declining precipitation."⁴⁰ This report also indicates that the

³³ Ibid.

³⁴ Ibid.

³⁵ Ban Ki Moon, "A Climate Culprit in Darfur", *The Washington Post*, 16 June 2007.

³⁶ UNEP, *Sudan: Post-conflict Environmental Assessment*, Nairobi: UNEP, 2007.

³⁷ Ibid.

³⁸ Ibid.

³⁹ Ibid.

⁴⁰ Ibid, p. 9.

rate of desertification has been increasing since 1980s due to the rapidly changing climate in Sudan.

Flood: Though there is a serious water shortage in Darfur and in its adjacent areas, flood is a common phenomenon around here. During the period of 1980-2006, several floods took place in the region. The frequency of flood during this period was quite high. The UNEP report says, "The sequence of severe Nile floods – which were recorded in 1878, 1946, 1988, 1994, 1998 and 2006 – clearly shows that the frequency of flooding has increased dramatically over the last twenty years".⁴¹

The Scarcity of Rainfall: The average annual rainfall during the period of 1946-1975 was 564.20mm which significantly reduced during the period of 1976-2005 to only 427.70mm.⁴² In other words, rainfall decreased in Darfur by 24 per cent during the period of 1976-2005 compared to the period of 1946-1975.⁴³

4.1.2 *Impacts of Non-Climatic Factors*

In the case of Darfur, climate change did not act as a single factor which led to food insecurity, water insecurity or scarcity of natural resources. Rather there have been several other political, social and economic factors. Non-climatic factors which contributed to this crisis were:

Population Growth: Population growth has led to food shortage, water scarcity and scarcity of other natural resources to a great extent. A census in 1973 counted 1.4 million people in Darfur; in 2003, it was almost 6.5 million, a nearly fivefold increase.⁴⁴ This rapidly rising population has acted as a significant factor in this crisis.

Rainfed Agriculture: 75 per cent of the agriculture in this area is rain-fed.⁴⁵ So, the shortage of rainfall during the period of 1976-2005 has greatly contributed to the demise in agricultural activities in Darfur and that ultimately led to food insecurity.

Bad Governance: Bad governance is another non-climatic factor that contributed heavily in creating the crisis situation in Darfur. The government did not take any step to adapt to the changing climate or to address the problems of water, food and natural resource shortages.

⁴¹ Ibid, p. 66.

⁴² Ibid.

⁴³ Ibid.

⁴⁴ Schuyler Null and Lauren Herzer Risi, "Navigating Complexity: Climate, Migration, and Conflict in a Changing World", available at https://www.wilsoncenter.org/sites/default/files/ecsp_navigating_complexity_web_0.pdf, accessed on 11 October 2018.

⁴⁵ Global Military Advisory Council on Climate Change, *Climate Change & Security in Africa: Clear Risks, Nuanced Impacts*, Hague: Institute for Environmental Security, 2014.

The Fault Line Between Farmers and Herdsmen: There are broadly two groups in Darfur – the African settled farmers and the Arabian nomadic herdsmen. These two groups have been fighting against each other for more than seventy years, but the severity of conflict increased after 1980s due to the impacts of climate change like soil erosion, desertification, shortage of rainfall, floods and droughts.

4.1.3 **Outcomes**

Greater water and food insecurity coupled with shortage of natural resources have ultimately led to the following outcomes in Darfur:

Resource Competition: Climate change has made natural resources much more scarce which led to competition over water, agricultural land and other resources. A strong link between resource competition and climate change is found by the UNEP report.

Conflict: Resource competition between local groups, especially between Arabian nomadic herdsmen and African settled farmers, has transformed into at first local, then national conflict. This conflict has spilled into neighbouring Chad and the Central African Republic in the aftermath.

Migration: Food and water shortage, natural resource scarcity, local level conflicts and several other economic, social and political factors have motivated the people of Darfur to migrate to the adjacent places and in many cases, to the neighbouring Chad and the Central African Republic.

Political Destabilization: Drought, desertification and deficient rainfall created food and water insecurity that eventually destabilized Darfur at first and then the rest of Sudan.

4.1.4 **The Role of Climate Change as a Threat Multiplier**

Climate change impacts, such as droughts, desertification, scarcity of rainfall and floods have exacerbated the pre-existing problems of Darfur that eventually created food and water insecurity and natural resource shortage which, in turn, led to local level conflicts and political destabilization. Afterwards, local conflicts have transformed into national crisis of Sudan and that crisis has spilled into neighboring countries. Thus, climate change along with several other social, political and economic factors has created a security problem not only for the individuals but also for the state in the case of Darfur. Therefore, Ban Ki-moon's argument which linked Darfur crisis with climate change is valid in the light of this discussion.

4.2 The Case of Nigeria

Nigeria, where more than 150 million people reside within an area twice the size of California, suffers from grave ethnic divisions, challenges towards development and an incapable leadership.⁴⁶ The state faces numerous impediments in fulfilling its resource demand. Most of the violent conflicts that arise from failure to share limited resources characterize the country's social landscape — neighbour fighting neighbour, Muslims fighting against Christians, patrons fighting against clients, citizens fighting the state.⁴⁷

The rising temperature and declining rainfall due to the changing climate have led to frequent drought and desertification in Nigeria. The Sahara Desert is annually expanding 1-10 km to all directions and trying to engulf the Sahelian region of Africa.⁴⁸ The shifting sand dunes have buried vast arable lands, thus reducing crop production. This has instigated large-scale migration and relocation of people to areas less vulnerable to desertification. Such migration has social effects like reduction of social values and dignity. The most common outcome is communal clashes among herdsmen and farmers and such conflicts resulted in the mortality of 186 people in 6 northern states of Nigeria between 1998 and 2006.⁴⁹ Against this backdrop, the security implications of climate change in the case of Nigeria are analyzed below.

4.2.1 The Impacts of Climate Change

The climate of Nigeria is changing rapidly and the following impacts are vivid in the country:

Reduction in Rainfall: Parts of the country, especially the arid north, are experiencing an intense combination of more heat and less rain. Some parts of the northern Sahel region have witnessed less than 10 inches of rainfall on average in a year in the past decade, 25 per cent less than that of thirty years back.⁵⁰

Desertification: Due to less rainfall in the northern part of Nigeria, desertification has been increasing rapidly. Since 1900, the Sahara has moved to north and south a total of about 150 miles and now covers an additional 3,750 square miles. Nigeria loses thousands of acres of grazing and agricultural land to the growing desert every year.⁵¹

⁴⁶ United States Institute of Peace (USIP), *Climate Change Adaptation and Conflict in Nigeria*, Washington, DC: USIP, 2011.

⁴⁷ Ibid.

⁴⁸ Peter AO Odjugo, "General Overview of Climate Change Impacts in Nigeria", *Journal of Human Ecology*, Vol. 29, No. 1, 2010, p. 50.

⁴⁹ Ibid.

⁵⁰ USIP, op. cit.

⁵¹ John Campbell, "National Security Implications of Climate Change", available at <https://www.cfr.org/blog/national-security-implications-climate-change>, accessed on 15 October 2018.

For this very reason, desertification was identified as one of the significant security threats to the 11 northern states of Nigeria by the Federal government in 2002.

Flood: Though there is a scarcity of rainfall in the northern part of Nigeria, the southern part has been experiencing much rainfall since 1970s. According to a study conducted by Odjugo, in the past forty years, recorded volumes of torrential rains increased 20 per cent across various southern states, some of which already witness up to 160 inches of rainfall a year, with wet seasons persisting eight to ten months.⁵² For the increased rainfall, the southern part has experienced several numbers of floods over the past forty years.

Salinity Intrusion: According to the Federal Ministry of Environment, the sea level along the southern coastline has increased by about 30cm in the last fifty years.⁵³ For the increased sea level, the low-lying 800 Km coastline of Nigeria faces the problem of salinity intrusion.

4.2.2 *The Impacts of Non-Climatic Factors*

Climate change, along with several other social, political and economic factors, has created food and water insecurity and scarcity of other natural resources in Nigeria. The following non-climatic factors have contributed significantly in creating an unstable scenario there:

Population Growth: Nigeria is populated with more than 200 million people and it is already greater than that of the Russian Federation. This population is fastly growing and it has augmented by 17.35 per cent over the last five years.⁵⁴

Rain-fed Agriculture: Some 85 per cent of all Nigerian agriculture is rain-fed and many crops are sensitive to even tiny shifts in rainfall and temperature.⁵⁵ This very fact makes Nigeria highly vulnerable to climatic changes.

Societal Fault Lines: There are more than 260 ethnic groups in Nigeria and there are many differences among them which feed ethnic tension and strengthen societal fault lines across the country. Moreover, the Nigerian government has hardly taken any step to resolve this issue.

⁵² Peter AO Odjugo, "An Analysis of Rainfall Pattern in Nigeria", *Global Journal of Environmental Science*, Vol. 4, No. 2, 2005, pp. 139–145.

⁵³ Ibid

⁵⁴ Campbell, op. cit.

⁵⁵ USIP, op. cit.

4.2.3 Outcomes

Food and water insecurity, land loss and natural resource scarcity in Nigeria have ultimately led to:

Competition: Due to desertification and other climate change impacts, arable land has been reducing in Nigeria for a long time which instigates competition over such land.

Conflict: Arable land loss due to climate change has been generating most of the communal clashes since 1990s. According to Fasona and Omojola, 19 of the 37 cases during the period of 1991-2005 were basically crises/clashes triggered by competition over land resources.⁵⁶

Migration: In the northern part of the country, expanding desertification—referring to the degradation of land productivity in dryland areas—has caused 200 villages to disappear.⁵⁷ Thus, desertification has pushed people to become involuntary migrants.

4.2.4 The Role of Climate Change as a Threat Multiplier

Desertification, recurrent floods, droughts, acid rain, sea level rise, salinity intrusion and reduction of rainfall along with various social, economic and political factors have created food and water shortage, shortage of arable land and other natural resources in Nigeria. Moreover, food and water insecurity and natural resource scarcity have triggered communal clashes in the country. For such clashes, more than 10,000 people were killed within less than a decade.⁵⁸ So, the outcomes of climate change have had intense adverse effects on the security and stability of Nigeria.

Climate change has acted as a threat multiplier in the cases of Darfur and Nigeria, and it has exacerbated the pre-existing vulnerabilities in those regions. The analysis of these two cases will be helpful to understand the impacts of climate change on security and stability of Bangladesh in the following discussion.

5. Climate Change as a Threat Multiplier – The Case of Bangladesh

The following subsections analyze the impacts and role of climate change as a threat multiplier in Bangladesh. The outcomes are evaluated in details later with

⁵⁶ Fasona and Omojola, op. cit.

⁵⁷ Center for American Progress, *Climate Change, Migration, and Conflict in Northwest Africa: Rising Dangers and Policy Options Across the Arc of Tension*, Washington, DC: Center for American Progress, 2012.

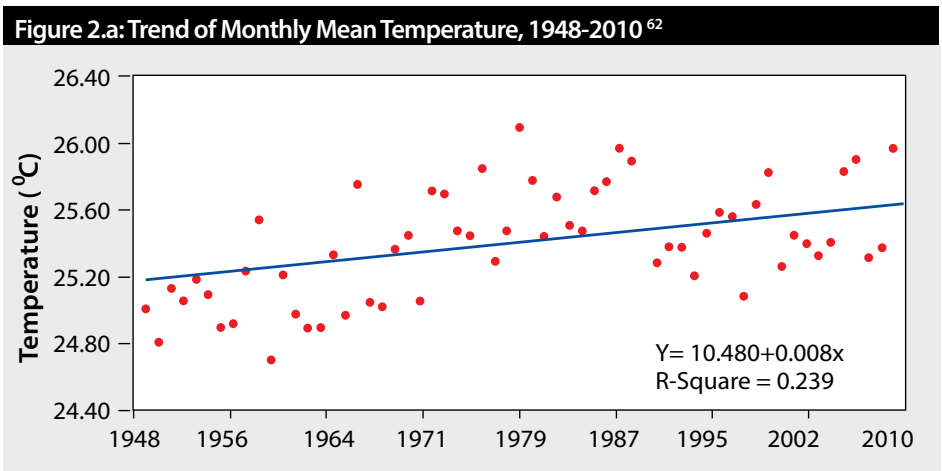
⁵⁸ Vivan Ezra Lekwot, Ali Andesikuteb Yakubu, Okafor Christian I. and Micheal Kingsley Balasom, "Climate Change and Its Effect on National Security in Nigeria", *International Journal of Interdisciplinary Research and Innovations*, Vol. 2, No. 4, 2014, pp. 6-10.

relevant empirical data. Finally, the climate change-security nexus in the context of Bangladesh is examined thoroughly.

5.1 *The Impacts of Climate Change on Bangladesh*

Climate change impacts such as temperature rise, sea level rise, recurrent droughts and cyclones, salinity intrusion, erratic rainfall, etc are already visible in Bangladesh.

Temperature Rise: According to IPCC’s Fifth Assessment Report, the earth surface is now 0.8°C warmer than the pre-industrial era.⁵⁹ Along with the rest of the world, the temperature of Bangladesh is increasing rapidly. According to Hasan and Rahman, monthly mean temperature shows a positive trend of increase at a rate of 0.8°C per 100 years.⁶⁰ Their study also confirms that the temperature of Bangladesh has increased significantly over the last 21 years (1990-2010) than last 63 years (1948-2010).⁶¹



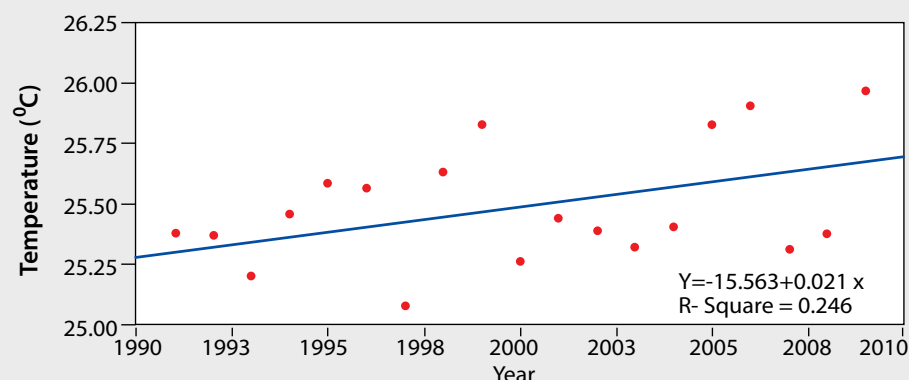
⁵⁹ IPCC, op. cit.

⁶⁰ A. B. M. Shamim Ul Hasan and M. Zillurr Rahman, “Change in Temperature over Bangladesh Associated with Degrees of Global Warming”, *Asian Journal of Applied Science and Engineering*, Vol. 2, No. 2, 2013, p. 162.

⁶¹ Ibid.

⁶² Hasan and Rahman, 2013, op. cit.

Figure 2.b: Trend of Monthly Mean Temperature, 1990-2010⁶³



The above mentioned figures clearly illustrate that the overall temperature in Bangladesh has increased more rapidly in the recent years compared to the past.

Sea Level Rise: The AR5 of the IPCC confirms that Bangladesh is highly vulnerable to rising sea level.⁶⁴ A report of the Climate Change Cell reveals that the range of sea level rise on Bangladesh's coast over the past 30 years is 6-21mm/year.⁶⁵ The rate of sea level rise in Bangladesh is much higher than the global average. Moreover, about 10 per cent of its territory is below 1 meter sea level. The rapidly rising sea level and the low elevation of its land make Bangladesh more vulnerable compared to other countries.

Salinity Intrusion: Several studies have confirmed that climate change is one of the main reasons behind salinity intrusion in the coastal area of Bangladesh. The rate of soil and water salinity is increasing rapidly here. Out of about 1.689 million hectares (30 per cent of the total cultivable land of Bangladesh) of coastal land, 1.056 million hectares are affected by soil salinity of varied degrees. In fact, during the period of 1973-2009, about 0.223 million hectares of land (26.7 per cent of total land in Bangladesh) was affected by varied degrees of salinity.⁶⁶

Intense and Frequent Cyclones: Due to temperature rise and several other factors, intensity and frequency of cyclones have increased significantly. 26 major cyclones hit Bangladesh in the period of 1970-2015, with 18 of them occurring in the

⁶³ Ibid.

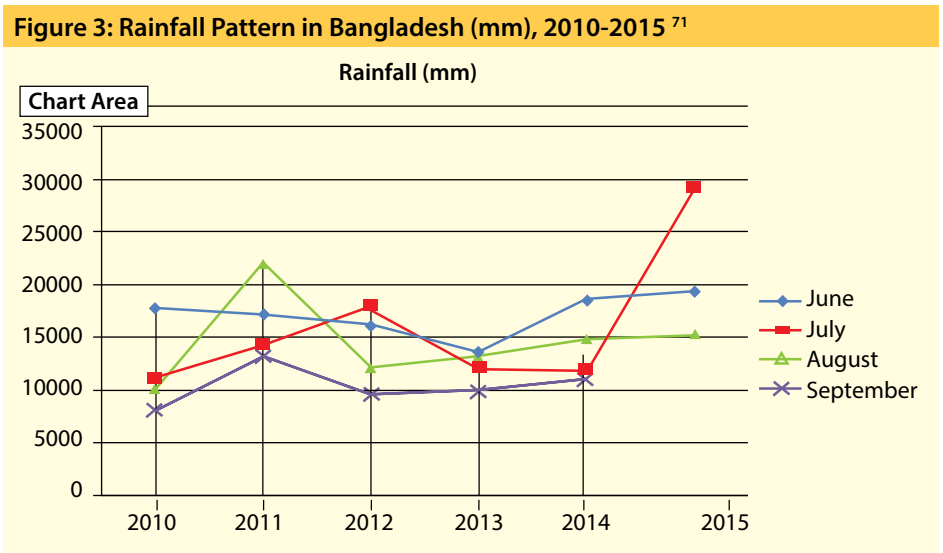
⁶⁴ IPCC, op. cit.

⁶⁵ Ministry of Environment and Forests, *Assessment of Sea Level Rise on Bangladesh Coast through Trend Analysis*, Dhaka: Ministry of Environment and Forests, 2016, p.53.

⁶⁶ Soil Resource Development Institute (SRDI), *Saline Soils of Bangladesh*, Dhaka: SRDI, 2010, pp. 4-5.

last 20 years.⁶⁷ Increased number of cyclones indicates that frequency has increased rapidly. At the same time, intensity is also on the rise. The devastating cyclones of 1985, 1991, 1997, 2007 and 2009 indicate the validity of the previous statement.

Erratic Rainfall: In recent years, Bangladesh has experienced erratic rainfall patterns and climate change is regarded as the main catalyst behind this. As per the data of Bangladesh Meteorological Department (BMD), from 2010 to 2014, the country experienced about 44,000mm of rainfall on average during the months of June, July and August.⁶⁸ But in 2015, BMD recorded 19,475mm of rain in June, 29,281mm in July and 15,231mm in August.⁶⁹ That was 63,987mm of rain in total over those three months. In 2017, in the first three weeks of April, nearly 8,904mm of rain was recorded against the April average of 4,053mm, which is 119.7 per cent higher.⁷⁰



Recurrent Floods: Bangladesh is a flood prone country. According to the government’s Climate Change Strategy and Action Plan, in an ‘average’ year, approximately one quarter of the country is inundated. Every four to five years, there

⁶⁷ Md. Selim Reza, “Climate Change Induced Migration: Future Challenges and Opportunities for Bangladesh”, available at <http://fairbd.net/climate-change-induced-migration-future-challenges-and-opportunities-for-bangladesh/>, accessed on 15 October 2018.

⁶⁸ Sujit Sarker, “Unusual Rain: Climate Change to Blame”, available at <https://www.thedailystar.net/country/unusual-rain-climate-change-blame-136609>, accessed on 15 October 2018.

⁶⁹ Ibid.

⁷⁰ Moinul Hoque Chowdhury, “Bangladesh Sees Highest Rainfall for 35 Years Recorded in April”, available at <https://bdnews24.com/bangladesh/2017/04/25/bangladesh-sees-highest-rainfall-for-35-years-recorded-in-april>, accessed on 15 October 2018.

⁷¹ Sarker, op. cit.

is a severe flood that may cover over 60 per cent of the country.⁷² The extent and frequency of floods are likely to increase in the upcoming days due to sea level rise, erratic rainfall and melting of Himalayan glaciers.⁷³

Droughts: Northern Bangladesh is a drought-prone area and due to temperature rise, prolonged summer and changing rainfall pattern, the livelihood of the common people in this area is now at stake to a great extent.⁷⁴

5.2 The Role of Climate Change as a Threat Multiplier

Like the Darfur and Nigerian crises, impacts of climate change multiply food shortage, water scarcity, health insecurity and natural resource scarcity in Bangladesh. Although non-climatic factors, such as overpopulation, poverty and rain-fed agriculture play a significant role in these regards as well, climate change plays the most prominent part.

Food Insecurity: Erratic rainfall, recurrent floods, droughts, frequent cyclones, sea level rise and salinity intrusion have already affected food production in Bangladesh due to the fact that the agricultural sector here is heavily climate sensitive. Crop production has declined significantly in many parts of Bangladesh due to the changing climate. For instance, soil salinity decreases crop production about 0.13 million tons every year. In future, increased frequency of extreme weather events, water scarcity, sea level rise and salinity intrusion will certainly create greater food insecurity.⁷⁵

Water Scarcity: In the southern and northern regions of Bangladesh, a good number of people already suffer from water shortage. For instance, in the southwestern coastal region, around 2.5 million of the poorest people already suffer from scarcity of water.⁷⁶ The water shortage will be acute in future due to droughts and salinity intrusion. Moreover, the glacier of the Himalayas is melting more rapidly compared to the past. The Indian Space Research Organisation (ISRO) have found that this glacier had receded 4,340 meters since 1965 and had split into multiple

⁷² Robert Glennon, "The Unfolding Tragedy of Climate Change in Bangladesh", available at <https://blogs.scientificamerican.com/guest-blog/the-unfolding-tragedy-of-climate-change-in-bangladesh/>, accessed on 02 November 2018.

⁷³ Ahsan Uddin Ahmed, *Bangladesh Climate Change Impacts and Vulnerability: A Synthesis*, Dhaka: Climate Change Cell, 2006.

⁷⁴ Abu Reza Md. Towfiqul Islam, Anjum Tasnuva, Subaran Chandra Sarker, Md. Masudar Rahman, Md. Sanaul Haque Mondal and Md. Mujahid UI Islam, "Drought in Northern Bangladesh: Social, Agroecological Impact and Local Perception", *International Journal of Ecosystem*, Vol. 4, No. 3, 2014, pp. 150-158.

⁷⁵ Md. Mizanur Rahman and Amartya Kumar Bhattacharya, "Saline Water Intrusion in Coastal Aquifers: A Case Study from Bangladesh", *IOSR Journal of Engineering (IOSRJEN)*, Vol. 4, No. 1, 2014, pp. 7-12.

⁷⁶ Lia Sieghart and David Rogers, "Why Climate Change is an Existential Threat to the Bangladesh Delta", available at <http://blogs.worldbank.org/endpovertyinsouthasia/why-climate-change-existential-threat-bangladesh-delta>, accessed on 15 October 2018.

valley glaciers resulting in the total loss of 10 per cent of glacier area.⁷⁷ For the rapidly melting glaciers, number of floods will increase in short-term, but it will ultimately create greater water insecurity in Bangladesh in long run.

Land Loss: Land is one of the most important strategic resources for Bangladesh. It is already scarce in this overpopulated country. Moreover, salinity intrusion, sea level rise, coastal erosion and river erosion make land much more insufficient. Due to sea level rise, more than half of Kutubdia, Bhola and Sandwip islands have already submerged under water.⁷⁸ On top of that, agricultural lands in the coastal area of Bangladesh suffer from high salinity intrusion which prevents crop production in the dry season and thus, reduces the usability of these lands.⁷⁹

Health Issue: Climate change impacts like erratic rainfall, recurrent floods, droughts, frequent cyclones, sea level rise and most importantly, salinity intrusion create health insecurity for a number of individuals in Bangladesh. According to IPCC's AR5, Bangladesh is very vulnerable to climate-sensitive diseases like cholera, dengue, diarrhea, hypertension, etc.⁸⁰

5.3 Outcomes

Climate change is a significant factor to create health insecurity, greater water and food shortage and resource scarcity in Bangladesh. Such problems, in turn, lead to:

Migration: There were approximately 25 million environmental refugees in the world back in 1995 but this number is estimated to rise to 200 million by 2050, many of them as a result of climate change.⁸¹ Bangladesh is one of those countries which are severely affected by climate-induced migration. Such migration has increased in this country since 2006 because of the frequent disasters in the coastal belt.⁸² Thirty five million people reside in the coastal area in Bangladesh and they are primary victims of climate change.⁸³ With one-meter sea level rise, 15 million people are potentially

⁷⁷ "Recession of Himalayan Glaciers Alarming: ISRO", available at <https://indianexpress.com/article/technology/science/recession-of-himalayan-glaciers-alarming-isro-scientists-4747260/>, accessed on 15 October 2018.

⁷⁸ BISS and Saferworld, op. cit.

⁷⁹ Mohammed Abdul Baten, Lubna Seal and Kazi Sunzida Lisa, "Salinity Intrusion in Interior Coast of Bangladesh: Challenges to Agriculture in South-Central Coastal Zone", *American Journal of Climate Change*, Vol. 4, No. 3, 2015, p. 249.

⁸⁰ IPCC, op. cit.

⁸¹ Reazul Ahsan, Jon Kellett and Sadasivam Karuppannan, "Climate Induced Migration: Lessons from Bangladesh", available at https://www.researchgate.net/profile/Dr_S_M_Reazul_Ahsan/publication/281549970_Climate_Induced_Migration_Lessons_from_Bangladesh/links/55ed527a08ae3e121847ff82/Climate-Induced-Migration-Lessons-from-Bangladesh.pdf, accessed on 04 November 2018.

⁸² Ibid, p. 7.

⁸³ Ibid.

affected.⁸⁴ Moreover, 8000 km of roads, 13 per cent of the total agricultural land and 2 major cities could be impacted.⁸⁵ Most of the populace in these vulnerable coastal districts will have no choice but to migrate to other parts of the country and find alternative livelihood.⁸⁶ It is obvious that seasonal migration has been a recognized trend in Bangladesh for decades. But this seasonal migration is gradually turning into permanent migration.⁸⁷

Resource Competition: Water shortage, land loss and other resource scarcity lead to resource competition in Bangladesh. Competition over arable land and water is already seen in the coastal region. For example, although livestock do not suffer death during droughts in Bangladesh, lack of drinking water multiplies their susceptibility to diseases.⁸⁸ The density of livestock in the coastal area is significantly lower than other parts of the country due to high level of saline water.⁸⁹ Rise in salinity has increased competition for freshwater resources remarkably over time in the region.⁹⁰ On top of that, shrimp farming became an adaptation policy in the face of salinity intrusion in the coastal southwest.⁹¹ No matter how economically sound such farming may look, the benefits are not shared among all members of the local community equally.⁹² Majority of profits is earned by a small percentage of large absentee landholders and by urban-based processing factory owners. The salinization of agricultural lands via the intrusion of saline water used in shrimp ponds compromises the fertility of the soil for current and future agricultural cultivation.⁹³ Besides, the extremely low amount of labour required for shrimp production relative to rice farming causes a labor surplus. It leads to displacement from agricultural livelihoods, forcing many landless labourers to shift to cities in search of work. As a result, there is significant opposition to shrimp farming among local residents who perceive it as a threat to their continued habitation in this region.⁹⁴ Competition over land usage now continues without any viable solution in the near future. Any possibility that competition over resources, freshwater and land for example, will fade out seems unrealistic in the face of increasing climate change impacts.

⁸⁴ Ibid.

⁸⁵ Ibid.

⁸⁶ Authors' interview with Mohammad Rashed Alam Bhuiyan, Assistant Professor, Department of Political Science, University of Dhaka, 2017.

⁸⁷ Bahauddin K.M, Marianne Joan Dutkiewicz and Mrinal K Nath, "Climate Change-induced Migration in Bangladesh: Realizing the Migration Process, Human Security and Sustainable Development", available at https://sustainabledevelopment.un.org/content/documents/1014764_Bahauddin_Climate_Change-induced_Migration_in_Bangladesh_Realizing_the_Migration_Process_Human_Security_and_Sustainable_Development.pdf, accessed on 15 October 2018.

⁸⁸ Ahmed, op. cit.

⁸⁹ Ibid.

⁹⁰ Ibid.

⁹¹ Kasia Paprocki and Saleemul Huq, "Shrimp and Coastal Adaptation: on the Politics of Climate Justice", *Climate and Development*, Vol. 10, No. 1, 2017, p. 2.

⁹² Ibid.

⁹³ Ibid.

⁹⁴ Ibid.

Political Destabilization: Climate change-induced migration may turn out to be a great threat to political stability of Bangladesh. Internal harmony can be hampered in a serious way. In September 2010, the Prime Minister of Bangladesh stated that the mass movement of up to one billion climate change migrants, including 30 million in Bangladesh, “would cause social disorders, political instability, cross-border conflicts, and upheavals”.⁹⁵ In an interview conducted by the authors, an expert on climate change opined: “Economic development is one of the most prioritized issues for Bangladesh and climate change poses a great challenge to such development by undermining the main drivers behind it - natural resources and human resources. Economic underdevelopment may exacerbate the existing vulnerability of Bangladesh by aggravating the poverty situation and that may, in turn, hamper the internal harmony of this country which can ultimately lead to social and political destabilization”.⁹⁶ It is evident from these two statements that the changing climate may very well be responsible for political destabilization in Bangladesh in the days to come.

Economic Underdevelopment: Climate change and its associated impacts increasingly pose a significant threat to economic development of Bangladesh. During the period of 1994-2013, Bangladesh was affected by 228 weather-related hazards, resulting in losses of US\$3,128.8 million.⁹⁷ During the past 35 years, the government of US has invested more than US\$10 billion to make the country less prone to natural disasters.⁹⁸ In spite of these efforts, the direct annual cost of natural disasters over the last 10 years is projected to be between 0.5 and 1 per cent of Bangladesh’s GDP.⁹⁹ The economic ramifications of the impacts of climate change in the future are predicted to be higher and could even reverse recent gains in areas of economic development. It is predicted that climate change will have disturbing impact on agriculture which is a key economic driver in Bangladesh, accounting for nearly 20 per cent of the GDP and 65 per cent of the labour force.¹⁰⁰ Crop yields are estimated to fall by up to 30 per cent as a result of the changing climate.¹⁰¹ It is undeniable from these statistics that economic development in Bangladesh can be highly jeopardized by climate change in the near future.

⁹⁵ “Hasina Highlights Unfortunate Plight of Climate Migrants”, *The New Nation*, 25 September 2010.

⁹⁶ Authors’ interview with Ms. Monzima Haque, Lecturer, Department of International Relations, University of Dhaka, 2017.

⁹⁷ Sieghart and Rogers, op. cit.

⁹⁸ “Bangladesh: Economics of Adaptation to Climate Change Study – Bangladesh”, available at <https://reliefweb.int/report/bangladesh/bangladesh-economics-adaptation-climate-change-study>, accessed on 04 November 2018.

⁹⁹ Ibid.

¹⁰⁰ Md. Nurul Islam, “Climate Change and its impact on Bangladesh”, available at <http://www.bmet.org.bd/BMET/resources/Static%20PDF%20and%20DOC/publication/Brief%20on%20Climate%20Change-%20Impact%20on%20Bangladesh.pdf>, accessed on 04 November 2018.

¹⁰¹ Ibid.

Climate change, along with socio-economic and political factors, has the potential to play a significant role in migration, resource competition, political destabilization and economic underdevelopment in Bangladesh.

5.4 *The Climate Change-Security Nexus in the Context of Bangladesh*

The above discussion reveals that climate change and national security can be closely linked with each other in the case of Bangladesh. The possible linkages between them are as following:

- (i) Sea level rise already submerged more than half of three islands in Bangladesh. As sea level is rising rapidly (6-21mm/year) compared to the rest of the world, it is in fear of losing vast territory in future. According to IPCC, a 45cm sea level rise will submerge 10.9 per cent of its territory and force about 20 million people to relocate. Sea level rise has the potential to adversely affect national security of Bangladesh.
- (ii) Climate change impacts, such as temperature rise, sea level rise, recurrent droughts and cyclones, salinity intrusion, erratic rainfall, etc act as threat multipliers to create food and water shortage and resource scarcity.¹⁰² Human security is undermined by all of them significantly. Ensuring human security through providing sufficient food, water and other resources to its ever growing population is one of the biggest challenges for the state apparatus of Bangladesh.¹⁰³
- (iii) A leading scholar on climate change in the context of Bangladesh mentioned that, "Bangladesh has 118,813 square kilometers area in the Bay of Bengal. But, it does not have effective control over the vast area and climate change may make it difficult for Bangladesh to establish effective control over there. The Bay of Bengal is gradually becoming stormy and violent and for this very reason, Bangladesh needs robust naval infrastructure. But, it is very difficult for a poor country like Bangladesh to fulfil this requirement".¹⁰⁴ It is clear from the statement that impact of changing climate is making it difficult for Bangladesh to control and secure its territory.

¹⁰² Food and Agriculture Organization (FAO) of the United Nations, Climate Change, Water and Food Security, Rome: FAO, 2011; "Climate change and resource scarcity", available at <https://www.pwc.co.uk/issues/megatrends/climate-change-and-resource-scarcity.html>, accessed on 31 October 2018.

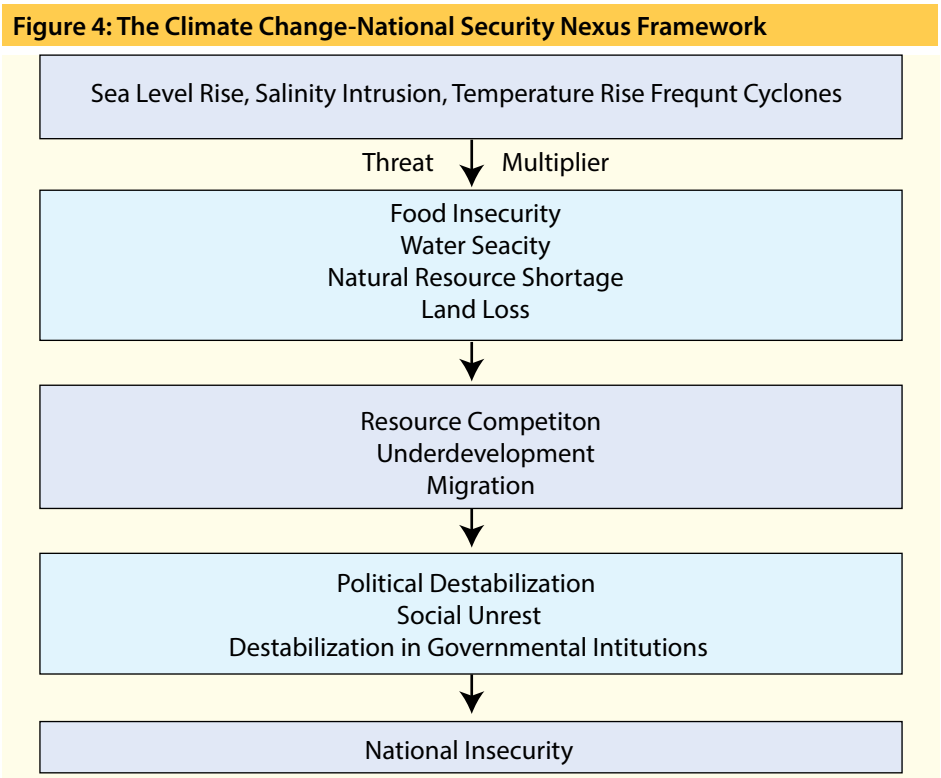
¹⁰³ James Michel, "Human Security and Social Development Comparative Research in Four Asian Countries", available at <http://siteresources.worldbank.org/INTRANETSOCIALDEVELOPMENT/Resources/Michel.rev.pdf>, accessed on 31 October 2018.

¹⁰⁴ Authors' interview with Dr. Niaz Ahmed Khan, Professor, Department of Development Studies, University of Dhaka, 2017.

Based on all the issues discussed so far, it is evident that several components of national security are at stake to varying extents due to climate change in Bangladesh. Sovereignty and territorial integrity of Bangladesh are likely to be jeopardized in the cases of Kutubdia, Bhola, Sandwip and the Bay of Bengal. The safe and sound livelihood of the population is challenged by competition over resources like freshwater and arable lands. Political stability is estimated to get disturbed through climate change-induced migration and economic underdevelopment. Last but not the least, social development in Bangladesh can suffer from extreme-weather events.

The research questions put forward at the very beginning of this paper have been answered throughout the study. To sum it up, unregulated migration, resource competition, political instability and economic underdevelopment are the prevailing impacts of climate change in Bangladesh, all of which can obliquely threaten the country's national security by instigating social tensions, local clashes, and adverse consequences to GDP.

The authors of this paper would like to propose a climate change-national security nexus framework based on the findings of this study. The framework is as follows:



Source: Authors.

The proposed framework outlines that climate change acts as a threat multiplier and creates food insecurity, water scarcity, natural resource shortage and land loss, and these phenomena lead to migration, resource competition and economic underdevelopment. These factors, in turn, can lead to political destabilization, social unrest and destabilization in governmental institutions which will ultimately result in national insecurity. Since this framework is solely based on available data and expert opinions in Bangladesh, the accuracy and practicability of its components can be advanced through further studies, specially through quantitative research.

6. Concluding Remarks

Climate change creates different realities for different countries based on their political, social, geographical and economic conditions. It is a question of adaptation for the developed countries but a question of survival for developing and underdeveloped ones. This has already posed a serious threat to the security and stability of Nigeria and Sudan. In these countries, climate change has acted as a threat multiplier, exacerbated pre-existing vulnerabilities and ultimately created national security problems. Like Nigeria and Sudan, climate change may pose a great challenge to the envisaged development of Bangladesh in the long run because of the country's unique social, economic, political and geographical features. Bangladesh has already lost some of its territory due to sea level rise and is in fear of losing more in coming days. The research undertaken for this paper is an initiative to understand climate change as a threat multiplier in the context of Bangladesh. This study is not a comprehensive one, rather an initial step to advance the existing literature on the linkages between climate change and security. It recommends further inquiries and scientific assessments for the advancement of the proposed framework. Future studies may employ the framework in order to explore the climate change-security nexus more flexibly and rigorously.