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FUTURE MELTING AWAY: WATER STRESS AS A THREAT TO HUMAN SECURITY IN BANGLADESH AND THE ROLE OF INTERNATIONAL COMMUNITY

FARZANA AFROZ CHOWDHURY

97 Pages

Bangladesh is considered as one of the frontline states in the global climate change; its policy agendas attempt to respond to the perceived security threats emanating from such changes. Water stress is one of the key problems the country is facing. Yet, links between glaciers in the Hindu Kush Himalaya, Bangladesh's climate, growing water stress, and its implications for human security have seldom been studied. Drawing on the concepts of climate change, human security and water stress, the thesis examines the causes of Bangladesh's freshwater crisis and its contribution to the human insecurity. Here in this study, the influence of water stress on human security has been explored. Notably how salinity intrusion and arsenic water contamination turned into a human security threat. Moreover, the study elaborates that indifference to human security threat may cause vulnerability, in this case, freshwater crisis for people in Bangladesh. In the long run, such vulnerability can turn into double vulnerability and here the rural women in Bangladesh are one of the core victims. Additionally, the thesis insists that there is a contradiction between the core values of the UNICEF and its actions in mitigating water stress in Bangladesh.

KEYWORDS: Climate Change, Bangladesh, Hindu Kush Himalaya, Human Security, Water Stress, UNICEF

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BANGLADESH AND THE ROLE OF INTERNATIONAL COMMUNITY

FARZANA AFROZ CHOWDHURY

A Thesis Submitted in Partial
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for the Degree of

MASTER OF ARTS

Department of Politics and Government

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2018

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BANGLADESH AND THE ROLE OF INTERNATIONAL COMMUNITY

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INTRODUCTION

Background

Freshwater is the most valuable resource for human health, prosperity, and security. Mountains are the most usual source of this freshwater and are called the water towers of the world. For regions nearby or connected to mountains, the timing, and volume of streamflow from glacial and snow melt are crucial. Whether it is hydropower generation, agricultural production or functioning ecosystem, or just for drinking, fresh water supply is essential.

Glaciers and snow packs are receding all around the world. In the recent past, glacier melting, and sublimation rates exceeded the rate of glacial formation and accretion (NAS, 2012). The Intergovernmental Panel on Climate Change (IPCC) confirmed in its Fourth Assessment Report that enhanced greenhouse gas emissions and human influence on the climate system contribute to the recently observed changes to global climate (2014:2). Although anthropogenically-induced climate change is not the only factor contributing to glacier melting, it is difficult to identify all the contributory factors that lead to melting, particularly when the rate of glacial retreat across regions, varies.

Bangladesh, a small South Asian country that depends on the water flow from the Hindu Kush Himalayas (HKH), the 6th longest mountain range on Earth, is being severely affected by changes in glacier formation, accretion, and melting in the HKH (NAS, 2012). Impacts of these changes are profound, far-reaching, and widely felt across the country. One of the significant effects is that the change poses a threat to human water security in Bangladesh. This study intends to examine the nature, scope, and extent of this threat, explore the measures adopted by Bangladesh and the international community to date, and consider potential steps to reduce the country's vulnerability.

The Hindu Kush Himalayas region (HKH) is responsible for water flow that serves about 1.5 billion people in South Asia and China. The region extends over 2,000 km from east to west across the Asian continent covering several countries: Afghanistan, Bangladesh, Bhutan, China, India, Nepal, and Pakistan (NAS, 2012; HICAP, 2015). The five most important river basins of HKH are Indus, Brahmaputra, Ganges, Salween, and Mekong, making the HKH region the freshwater towers of South Asia. The glaciers, snow, and rain of HKH are the sources of water that feed these basins. The rivers support irrigation, energy, sanitation needs and most importantly fresh drinking water for billions of people. It is anticipated that by 2050, temperatures across the mountainous Hindu Kush Himalayan region will increase by about 1–2°C (in places by up to 4–5°C) and precipitation will change by 5% on average and up to 25% (scientists suggest there can be mixed record of wetness and dryness in such changes) (HICAP, 2015; NAS,2012:128).

Among the countries within the HKH region, Bangladesh is the most vulnerable to these changes. The two of the main HKH river basins, Ganges and Brahmaputra, play a significant role in shaping Bangladesh's hydrological (water) cycle. The river basins of the HKH, the Ganges, and the Brahmaputra begin their flow from mountain ranges in China. The Brahmaputra river enters Bangladesh from the north and flows south for 270 km to join the Ganges river at Aricha, about 70 km west of Dhaka in central Bangladesh. The Ganges river flows east-southeast for 212 km from the Indian border to its confluence with the Brahmaputra and finally discharges its flow in the mouth of Bay of Bengal (FAO, 2016).

Figure 1. The Hindu-Kush Himalayan region. Source: National Academy of Sciences, (2012).

Figure 2. Flow of Ganges & Brahmaputra in Bangladesh. Source: CIA Fact Book, 2017

Bangladesh is the 8th most populous country in the world with 167 million (73 percent rural) people living in its 144,000 square kilometers. Its geographical location with extreme climate variability governed by monsoon, and flat deltaic topography with low elevation, have made the country vulnerable (Pervin, 2013; Agrawala, 2003).

Only seven percent of the country is located within the river catchment area. The country's population in the Ganges and Brahmaputra basins is 103 million and the share of the total population living in the basins 69.5% (NAS, 2012). The share of the basin population residing in the elevation zone where floodwater is anticipated to rise during the base flood is 100% (Agrawala, 2003). According to the World Bank, the country is one of twelve with the highest risk of being adversely affected by climate change (2015). In 2017, the Global Climate Index identified Bangladesh as the 6th most affected country by natural disasters between 1996 and 2015 (Kreft, 2017).

Bangladesh is highly dependent on its river flow for drinking water, crop irrigation, fisheries, transportation, conservation of biodiversity, and human consumption. On average, 1121.6 km³ of water crosses the borders of Bangladesh annually, 85 percent between June and October; around 48 percent (537.2 km³) is contributed by the Brahmaputra, 47 percent (525.0 km³) by the Ganges (FAO, 2016).

Statement of Problem

The HKH is warming about three times faster than the global average, which is 0.6 to 0.9 degrees since 1906 Celsius (Xu, 2009; Riebeek, 2010). Although glacier behavior may vary from region to region, most glaciers excluding those of the HKH region are retreating (Bajracharya, 2011), affecting the water availability throughout the area.

Initially, glacial wasting/ablation in the Hindu Kush Himalayas (HKH) increases the volume of glacial meltwater downstream and overflows into the basins like Brahmaputra and Ganges. The National Academy of Sciences (NAS) predicts that with the continued waste of glaciers, an optimum point will be reached when the volume of meltwater will begin to decline and eventually be reduced to zero as glaciers disappear (2012: 7). The NAS confirms that although precipitation falling on land area previously occupied by the glacier will continue to contribute to downstream flows, continuous glacier wasting will pose consequences for available water supplies. As almost ninety-five percent of Bangladesh's water comes from the Ganges and Brahmaputra, large population of Bangladesh continue to be highly dependent upon the HKH glacier melt for water and related activities (FAO, 2016).

The incessant glacier melts in the HKH region along with changes in precipitation (both rainfall and snow), the rise in temperature, the rise in sea level, and the anticipated increase in population growth are considered the main contributors to the negative impacts on the availability of water supply in the coming decades. Reduced availability of water makes the basin of the HKH region 'water stressed.' The Water Aid framework (2012:9) describes "*water stress as the outcome of water scarcity and may manifest itself as drinking water insecurity, poor access, poor health, conflict over water resources, crop failure, food insecurity and/or energy insecurity.*" According to the global map of water-stressed basins, Bangladesh is indicated to have "high" levels of water stress (Smakhtin, 2008).

Around eighty percent of the country is located in a floodplain, with about 26,000 km² (18%) of the country flooded each year, causing deaths to over 1,000 people and destroying more than a million homes (Sharma,2008; Smakhtin, 2016; HICAP, 2015; Sapir, 2015). Bangladeshi communities are struggling to cope with the negative impact on livelihoods due to

current climatic conditions and extreme climatic events (Thomalla, 2018). The country's flat low lying deltaic topography, its location in the tropics in the delta of three of the world's most significant rivers, has exposed the region to a multitude of adverse impacts of climate change including the crisis in water availability. Moreover, the threat of freshwater unavailability is enhanced by growing glacier wastage (HICAP,2015; NRC,2012). The economic and political instability has further lead the country to have the low adaptive capacity.

Water resource management, sanitation, and provision of clean water is already a challenge in areas of Bangladesh; in the near future, changes in seasonal streamflow may have significant impacts on water availability. There currently is no assurance of water supply for irrigation and industrial production and individual and household consumption. Such a severe water supply crisis poses threats to the lives of people who live in the vulnerable regions and reduces their capacity to live with dignity. This challenge the core ideas of human security, 'freedom from want,' 'freedom from fear,' and 'the freedom to live in dignity' (Gasper, 2005). With water stress, it becomes difficult for the people in the region to be employed and fulfill their daily needs, which leads to an uncertain life that causes fear and puts survival at risk. The population living nearby the Brahmaputra and Ganges are the most vulnerable and marginalized communities, and the threat of scarcity of fresh water undermines the population's livelihood and well-being, deepening their want and fear.

The Focus of the Thesis

This thesis explores the relationship between climate change in the Hindu Kush Himalaya(HKH), water stress and human security in Bangladesh. It is understood that climate change impacts human security (ELIAMEP, 2008; IPCC, 2014). However, the thesis assesses the threats and vulnerabilities influenced by climate change and finally, analyzes the climate change

policies in Bangladesh, and the international community's contribution to enhancing Bangladesh's capacity during water stress. The research is designed to understand water stress in Brahmaputra and Ganges and related human insecurities.

Research Questions

The research has been designed to examine the relationships between the Himalayan glacier, water stress, and human security. The study will address three questions. They are:

- a) How do the changes in the Hindu Kush Himalayan (HKH) glaciers impact Bangladesh's water supply and water availability?
- b) How do water supply and water availability stresses impact human security in Bangladesh?
- c) According to the framework of human security what should be the response of the international community to the water stress in Bangladesh?

Methodology

Deductive reasoning method, the qualitative method is used here to examine the phenomena of water stress in Bangladesh based upon secondary data. This qualitative method is useful when dealing with the specific case like the water crisis in Bangladesh due to anthropogenic climate change and control of dams by the powerful neighboring countries. Utilization of deductive reasoning enables to understand the existing definitions of human security, climate change and water stress, and how these three components are related to exploring the water crisis in Bangladesh. This method explains the general observation of climate changes and specific impacts on the HKH, and how such changes hamper the core ideas of human security. The human security is examined in two sections. In the first section, human security's approach towards threat and the vulnerability is explored and second human security's

application at the international institutions- United Nations (UN) is considered. Using this method, the study explains the cost of such threat and vulnerability in the context of Bangladesh, particularly for the rural women of the country. Along with that, the method furthermore helps to understand why UNICEF being a reputed international institution can share the responsibility to analyze water stress in Bangladesh following human security's core idea of the solidarist view. This method of the qualitative analysis results in rich data that gives an in-depth picture, and it is useful for exploring that both national and international institutions have a role to play in mitigating the devastating consequences of climate change.

The reason I have applied deductive method over other methods like inductive reasoning or the narrative because the inductive makes broad generalizations from specific observations. However, instead of overemphasizing the general pattern like inductive, deductive method tries to find and explains the particular situation using a theory. Here, the norms patterns of water stress are studied to explain the vulnerability of women and UNICEF's share of responsibility. On the other hand, the narrative method is complicated as it is idiosyncratic due to overuse of terminology and the concepts of the people being studied. Narrative method chronologically organizes the detail found by the previous researchers and allows little scope for the present researcher to explain. The advantage of using theory by the deductive method is that the notion of a broad application of an issue can be regarded, but at the same time it will not be abstract as the method works as guidelines.

The thesis uses a qualitative approach and applies deductive reasoning. Deductive reasoning. In this thesis, first, the anthropogenic climate change and human security are discussed and based on that, the research paves its way to find the physical impact on the HKH

region. The method will help to find the link between climate, water, and human security and how it is related to the vulnerability of Bangladesh.

However, by using the method of deductive reasoning, there is a possibility to make permanent logical fallacies. Moreover, by depending on a false premise, fallacy can be continued. There is a possibility that if the premise is based upon false statements, then it can provide wrong conclusions. Besides, the method can deal with multiple cases, but it cannot deal with multiple situations, that means it cannot accommodate heterogeneous data, i.e., data must cover similar topics or critical issues so that it is possible to categorize it. It is also hard to compare situations within this framework. It does not use extensive details like narrative which at times can make the method nonspecific.

Conceptual Framework

The dynamics of the Hindu Kush Himalayas (HKH) region is very different from any other area of mountains. Climate change is one key reason glaciers are melting. To understand the Himalayas glacier melting, the IPCC's definition helps to frame the possibilities that changes in climate can occur due to both natural internal processing and external forcing of anthropogenic changes that lead to changes in the composition of the atmosphere (2014:120).

Precipitation, temperature, as well as glacier and snowmelt impact the river flows that determine the water availability in the region. As the Ganges and the Brahmaputra flow directly into Bangladesh, the country bears consequences. Water Aid's framework highlights the fact that water stress is different from water scarcity. The relationship between demand for water and its availability is water scarcity, and the outcome is water stress; inadequate access to water ultimately leads to drinking water, health, food, and energy insecurity (2012:9). The physical

water stress arises when demand exceeds supply and socioeconomic water stress arises when there is insufficient investment, skills & political will that can lead to weak water governance.

This study mainly concentrates on the freshwater drinking crisis in Bangladesh. Thus, such a framework helps us understand that the excessive water in Bangladesh through floods and heavy rainfall does not reflect the problem of the available water suitable for human consumption.

In time, the regions where runoff flooding has been occurring as a result of excessive glacial melt, when most of the glacial ice has melted away, the consumption crisis will further deteriorate. Whether it is the flooding or excessive glacier melting, the demand exceeds the supply of drinking freshwater. Climate change along with the control of dams by China and India can alter the terrestrial water cycle of Bangladesh in different dimensions and water stress. Building dams and barrages is one of the important sources of human-induced hydrologic alteration (Poff, 1997). The natural downstream flow of the Ganges basin altered due to the construction of the Farakka dam by India. Such hydrologic alterations include reduction of agriculture and fish diversity, destruction of breeding of Gangetic species, the increase salinity in the southwest coastal region of Bangladesh and crisis of drinking water (Gain, 2014). Moreover, Bangladesh is also concerned about China's attempt to build the most expensive hydel project on the Brahmaputra river. China has not initiated any multilateral or bilateral water agreement or treaties with the related countries. Bangladesh being downstream country has to depend on China and later India to fulfill the country's minimum water flow (TOI, 2018). Although China's first dam on Brahmaputra river was first built in 2010, three more dams are under construction to be completed by the year 2019. China's denial of hydrological data becomes grave concern for the downstream countries, particularly for Bangladesh as the artificial dam implies devastating result

in irrigation system due to reduced water flow. The existing climate change at the HKH disrupting the river flow, addition to that the control of dams by the powerful countries leads negative consequences for Bangladesh.

The relationship between river basins and the HKH glacier melting is both intricate and complicated. Such changes are disrupting the lives of people in Bangladesh. Lack of fresh water turns into a threat and disrupts the daily lives of individuals. UNDP's definition of human security not only accepts climate change as a threat but also helps us to understand how micro-level conditions of disruption can be examined to understand its national-level impact. *Human security aims at ensuring the survival, livelihood, and dignity of people in response to current and emerging widespread threats* (UN, General Assembly 2012: 5). Human security's concern regarding individual's existence makes it more suitable to address water stress crisis in Bangladesh because such crisis hampers beyond economic and environmental issues.

Finally, to develop this study, I have identified three framework wheels including climate change, human security, and water stress to understand the implications of these wheels interactions and their influence on Bangladesh's water crisis.

Summary of Chapters

Chapter I explores various dimensions of human security and its relationship to climate change. Chapter II describes the physical attributes of the HKH region and the geographical locations of the Ganges and Brahmaputra river basins within Bangladesh. Chapter III analyzes how the water stress resulting from climate change is turning into a human security concern for millions of Bangladeshis. Chapter IV critically examines policies of the Bangladesh government and international actors regarding water scarcity and water stress vulnerabilities and their roles in enhancing adaptability capacities. I focus on the policies and activities of the UNICEF, one of

the principal actors in climate change adaptation programs in Bangladesh. Finally, the conclusion summarizes the findings of the study and discusses the potential contributions of this project and the limitations of the study. It also provides some thoughts on future research directions.

CHAPTER I: HUMAN SECURITY PARADIGM

Comprehending the link between human security and climate change and the crisis of water stress requires an understanding of the concept of human security. Chapter I focuses on human security and its various interpretations. This chapter is divided into three sections: i) origin of the concept, and its differences with a traditional security approach, ii) elements of human security, particularly the ones relevant to the study's arguments in the following chapters, and iii) the connection between climate change and human security.

Theoretical Underpinnings of Human Security

Genesis of the Concept of Human Security

Security is a widespread pluralist notion described by international and governmental reports that it as an ‘elemental need’ because it is considered as a necessary system which sustains stability and allows progressive integration of individuals with communities, societies, and regions. The word is from the Latin word *securitas*, which refers to tranquility and stability. The Roman politicians termed it as the absence of anxiety upon which a fulfilled life depends (Liotta, 2014). The idea to fight for human survival goes back to the evolution of human beings, and the essence of the security concept remains at the core of human civilization. ‘Human security by its very nature implies a more open kind of society, where citizens must be able to voice out to the government their security concerns so that these can be given proper attention in the context of the societal good’ (Kraft, 2007). Ultimately, human security concentrates on the anthropological concern to understand individual existential security. It promotes a condition where individuals can live in peace and safety and participate in the process of governance.

Although human security is regarded as a 20th-century idea, its roots can be traced back to the 19th-century work of the International Committee of the Red Cross (ICRC), which has

protected people from unnamed threats and if required, provided assistance of the international community. The official recognition of the concept of human security came in 1994 through the UNDP's Human Development Report, which emphasized protection from chronic threats and sudden disruption in lifestyles. *"Human security has two main aspects. First, safety from chronic threats as hunger, disease, and repressions. And second, it means protection from sudden and hurtful disruptions in the patterns of daily life – whether in homes, in jobs or in communities. Such threats can exist at all levels of national income and development"* (UNDP, 1994: 23).

This definition, however, was inadequate to explain and address chronic threats. In 1998, in the wake of the Asian fiscal crisis, Japan's Prime Minister Keizo Ouchi introduced the aspect of 'dignity' and emphasized its importance in the human security definition. Since then the aspect has been included. The purpose of such an aspect is to elaborate human security's significance and strengthen security's evolution to reach the broader population of the world.

Difference Between Human Security and Traditional Security

Generally, stable society is defined as an absence of conflict (Faber, 2014). The Westphalian system of the sovereign state, where states are responsible for their own citizens' security is now under constant pressure as state-centered security is only concerned with protecting territorial integrity, neglecting the existential threats that do not fall under military threats. Thus, state-centered security fails to address insecurity comprehensively, and security for the state does not automatically trickle down to the people (Tadjbakhsh, 2014:44).

For long, state sovereignty (legitimacy and recognition) has been the core element of the concept of security. However, international organizations, governments, and world leaders have recognized the inadequacy of prioritizing territorial integrity and of ignoring the importance of values, norms, culture, and non-state actors. The absence of these elements in the

conceptualization of security made it ill-equipped to confront the 21st-century challenge of climate change. Human security threats include both objectives, physical elements such as dismal access to health care as well as subjective perceptions such as indignity (Tadjbakhsh, 2014:44). Without addressing such challenges, climate change can lead to the rise of threats that destroy the livelihood and existence of individuals. With such absence of security, the stability of the state would be hard to manage and would create potential for conflict.

The reason for redefining traditional security is to make the security concept consistent with the current universalistic paradigm. Human security, on the other hand, is the multi-dimensional avenue that highlights people-centered protection and most importantly assures a universalistic approach (Jolly, 2014). Richmond (2007) describes “*human security is focused upon emancipation from oppression, domination, and hegemony, as well as want*” (461). It is an illusion to think that citizens are secure only if one’s state border is protected. The struggle of daily existence is more complicated than border conflicts. The insecurity of citizens appears when there is an uncertain livelihood, health hazards and no consistency in the food supply, which are basics of human welfare. The state-centric paradigm can allow partial security that needs to be supported by human security because it reorients the security paradigm and allows moral obligations to be fulfilled regardless of the state borders, whereas traditional security fails to assess the threats entirely.

Elements of Human Security

Among numerous elements of the human security concept, here are few significant elements of human security that warrant our attention for the purposes of this study.

Broad Approach to Human Security & its Dimensions

The broad approach recognizes the interconnectivity among the threats and emphasizes the well-being and dignity of individuals (Owen, 2014). The broad approach is more useful to understand the various forms of threats and their relationships to the complex situations of climate change. Unlike the narrow approach, the broad approach does not solely depend on political actors for resources, mobility, and collection of information. The broad approach's networking capability and flexibility allow contemplating about physical to psychological needs of concern (Tadjbakhsh, 2014: 46).

Human security broadens as a concept as it involves the security of people and communities instead of solely focusing on states and institutions. Once the referent object and subject of security is moved down to individuals, the notion of 'safety' then broadens to a condition beyond mere existence (survival) to a life worth living, hence, well-being and dignity of human beings (Tadjbakhsh, 2014). Such an approach analyzes the non-traditional threats, inability to address the threats hampers states' existence (territorial integrity) and their functioning (whether they have the resources and capacity to function and develop as a state).

Under the broad approach to human security, it is required to address the chronic threats, because threats lead to violence and have linkage to unstable life, refraining individual's life from freedom from want and fear (Owen, 2006). Threats require immediate attention and at times intervention by the related agents so that actions can be taken under the security rubric. UNDP has categorized seven human security dimensions to understand the threat.

1. Economic security: poverty; insecurity increased by a global economic change
2. Food security: hunger and famine; affected due to extreme climate events and agricultural changes

3. Health security: disease and injury and infection
4. Environmental security: resource depletion; vulnerability to pollution and environmental degradation
5. Personal security, conflicts, natural hazards, and disasters
6. Community security: violations of the integrity of cultures; vulnerability to cultural globalization violence
7. Political security: political repression; vulnerability to conflicts and warfare.

All the above seven securities are either linked or related to each other. The removal of security hampers the ability of people to live in dignity, free from want and fear. For example, with the rise of political insecurity, like political repression enhances the vulnerability of the prevailing culture in a society, and with a degrading society, personal security gets breached as conflicts promotes fear, and in the long run such insecurity creates financial loss for the people removing people's freedom from want and indignity.

Understanding Threats and Vulnerabilities in Human Security

As discussions of security concepts regularly interchange the words "threat" and "vulnerability," the concept of human security draws a line between threats and vulnerabilities.

Threats are external causes of harm, with identifiable consequences that can be visible on the horizon, which requires an immediate or at least near-term, tangible response; on the other hand, vulnerabilities are a weakness or condition that might ultimately cause the kind of harm an unattended threat will cause (Loitta, 2014:113). A vulnerability can be both internal and external, which helps to locate regions and people at risk within the seven components identified in 1994 UNDP report. Vulnerability remains as an indicator, linked to related issues of threats but

unfortunately, it does not assure adequate and appropriate response that needs to be taken who/ which are at risk.

Unlike threat, vulnerability is not always clearly identified and perceived, which results in compounding the risk. For example, not realizing climate change as a threat and its impact on economic condition causes vulnerability like financial loss that compounds poverty, which is the ultimate risk or can be considered as double vulnerability. Thus, by not addressing the threat, it is impossible to respond to vulnerability, ultimately causing double vulnerability. With the broad understanding of double vulnerability in human security, the related stakeholders can respond to the emerging risks in a structured manner.

Freedom from Fear and Want & Freedom to Live in Dignity

The ultimate purpose of identifying and segregating threats and vulnerabilities in human security is to assure protection. For any state ensuring the physical protection of its citizens is a priority. Human development has incorporated the idea of protection since the mid-1990s (UNDP, 1996:56) and protection later became a core part of human security. Human security reintroduced the concept of physical security of citizens and highlighted that it should be given importance as much as sovereign (legitimacy and recognition) security (Gasper, 2014). In the meantime, the UN Commission on Human Security (CHS) highlighted the notion of ‘human freedom.’

By 2005, an elaborated definition of human security was adopted by the international community which included ‘freedom’ as a part of human security. Human security consists of three components which simultaneously outlines the scope to provide basic security needs in its broadest form: freedom from fear- conditions that allow individuals and communities protection from direct threats to maintain safety and ensure physical integrity, consists of various forms of

violence, intended or not; freedom from want- conditions that ensures basic needs, quality of life, protection of livelihoods and improved human welfare; and freedom from indignity- conditions that allow individuals and groups to benefit from fundamental human rights and choices without interruptions (Tadjbakhsh, 2014:44).

By concentrating on such components, human security maintains a systematic practice that fosters stability and increasing integration of individuals to exercise basic needs of security.

Human Security's Threshold and Core Views

Critical and pervasive are the two components of human security threat threshold. While the critical component refers to the degree of urgency on the potential threat, pervasive component indicates threat must be widespread (CHS, 2003). The purpose of threshold-based conceptualization is to provide clarity on the relevance and severity of a threat (and following vulnerabilities) that concerns human security. Once a threat passes the threshold it indicates that the risk is grave enough to be addressed. In fact, the intensity of the risk compels to perceive a threat as a need to be recognized. So that, actions can be taken to minimize the threat to safeguard the basic needs of people. A refined threshold-based result ultimately helps to examine the policies that reflect the existing condition and the relevance of a threat.

Because the state-centric security paradigm privileges the protection of sovereign territorial integrity, it is not adequate to guard the conditions of human welfare. Human security concept supports that government retains the primary role for ensuring livelihood, survival, and dignity of the citizens and the concept becomes a valuable tool to identify the pervasive and critical threats (Newman, 2014). Such threats to the welfare of people are necessary to address; otherwise, it tends to hamper the stability of the sovereignty. In the 2010 UN General Assembly, a panel discussion on “People-Centered Responses: The Added Value of Human Security” was

held. Although the discussion's report on human security (document A/64/701) puts emphasize on updating the concept, the focus was on human security's relationship with to state sovereignty. However, the relationship does not consider the necessity to identify threats beside military, in fact the assembly supports state sovereignty as a mainstream method to protect a nation and that sovereignty is the essential component for human security. Such notion of the UN produces conflicting approach towards the core concept of human security as the concept supports the responsibility to protect people from threats and vulnerabilities cannot be confined within borders.

The UN's biases towards state-centric security refrain the organization to adopt human security's solidarist and critical view. Though human security is fundamentally solidarist and critical, the structure of the UN (member states and UN programs) obstructs the organization to exercise such approach (Newman, 2014). One of the core reasons of the UN's refrainment of solidarist and critical view is its solicitude towards the pluralist view that supports the noninterference of the international system in the state affairs; whereas solidarist view emphasize that justice for individual people is above all by ensuring international relations must view the world as a cosmopolitan society of humans, not of states. Moreover, a solidarist view is supported by the critical view that intends to challenge the prevailing concepts that remain unquestioned decades after decades, such as state sovereignty, high politics or national interest. The critical view helps to rethink the concepts which are considered indisputable. As the world is rapidly changing with technology, climate change, and globalization and so on, the critical view raises questions to understand institutions actions and age-old concepts relevance in today's world. With the solidarist view this study analyzes the fundamental reason why the UN needs to incorporate such views to address borderless problem like climate change. Furthermore, the view

helps to understand the essence of human security that can help the related countries to mitigate crisis like water stress.

Human Security and Climate Change

The Linkage Between Human Security and Climate Change

Climate change endangers human security through undermining livelihoods and increasing migration, and thus compromising cultural identity (IPCC, 2014). Such threats deteriorate the living conditions of the citizens. Agriculture and its related activities like irrigation are one of the primary victims of climate change representing the day-to-day insecurity (Bailey, 2014).

In 2007, at the Climate Change: The Global Security Impact conference, John Ashton, the UK Foreign Secretary's Special Representative for Climate Change, said: “There is every reason to believe that as the 21st century unfolds, the security story will be bound together with climate change...Climate change is a security issue because if we do not deal with it, people will die, and states will fail” (Vogel, 2007). Such concerns question the efficacy of the existing core element of the concept of security to address the climate change crisis. Thus, ‘freedom from want and fear’ and ‘instilling dignity’ have been made parts of the fundamental concept of security and add to the basic idea of security to understand and protect people from threats like climate change.

There is an uncertainty about the exact magnitude, rate, and geographical impact of climate change. However, it is certain that climate change is expected to increase risks of large-scale disasters as well as contribute to more gradual systemic changes (ELIMEP, 2008). The IPCC Fourth Assessment Report (AR4) from 2007 confirmed the science of anthropogenic climate change and its implications on humankind. Citizens and states are both faced with

unavoidable challenges of climate change that put human security at stake. Ultimately, the changes in climate threaten both the survival and dignity of people. As the human consequences of climate change can be multiple, it is crucial to adopt an integrated approach to understand the political, social, and environmental implications.

Effectiveness of Human Security Elements to Evaluate Water Stress

Almost all the above mentioned human security dimensions are affected by climate change. However, environmental security gets affected the most, as the study mainly concentrates on water stress, the depletion of water resource impacts the food and health security, and as a whole, these insecurities aggravate the community and ultimately personal security. Here, the crisis concentrates on freshwater inadequacy, and as water supply is constrained, it does not provide sufficient water to drink and cook. As a result, health is compromised because a healthy body requires ample amount of water. In addition, communities get exposed to contaminated water which enhances the health hazard. Inconvenience in accessing freshwater reduces individuals' standard of living because they are deprived of the basic right to consume water. This undermines the people's well-being. That is why the broad conceptualization of human security is pragmatic than the traditional security, as state-centric security does not concentrate on citizen's ability and emphasize the human right to access to freshwater and its repercussions from a humanitarian perspective.

In 2010, in the 64th General Assembly of the UN, Bangladesh along with 120 other countries voted in favor of the resolution on the human right to water and sanitation (document A/64/L.63/Rev.1). Such agreement symbolizes Bangladesh's commitment to addressing the water crisis with the rest of the world. The resolution expresses grave concern that 884 million people are without access to safe drinking water; and alone in Bangladesh, about 30 million

people are unable to collect potable drinking water due to a lack of available safe water sources (Hoque, 2009).

Here, human rights created the framework for understanding the water crisis; then, it becomes human security's responsibility to identify the rights of citizens at stake. The "*human rights framework is the prerequisite and platform for human security, while human security is a condition for human rights to be fulfilled*" (Tadjbakhsh, 2014). Through the General Assembly, the right to water and sanitation is established as an obligatory framework as the GA adopts resolution recognizing access to clean water, sanitation as human right (UN, 2010). That means human rights influence a resolution to be implemented, whereas human security promotes awareness of the absence of the human rights; here human security raises alarm regarding water stress threats and its potential impacts. As without understanding the potential threats, human rights cannot be established in long run, especially to minimize unpredictable impacts of climate change.

Furthermore, to mitigate the impacts of climate change, it is crucial to address and separate threats and vulnerabilities. If not attended to with efficiency, vulnerabilities can turn conditions into a crisis. That is why human security identifies threats only as a target but considers attention to vulnerability as an absolute essential to address regions and people at risk (Loitta, 2014:113). In chapter III of this study, the threat like glacier melt is examined, whether it passes the threshold to understand the severity of water crisis, then threats are separated from vulnerabilities to determine the actual risks related to water stress in Bangladesh. Finally, the chapter extends by stating that rural women in Bangladesh endure double vulnerabilities because the water stress puts an extra burden on them concerning productive and reproductive labor and the existing socio-culture norms, along with the water challenges, obstruct women's right to

possess freedom from want, fear, and indignity. In chapter IV, the study focus on the UN's difference with human security in terms of views and approaches, notably UN's inclusion of the pluralist view, it's approach of non-interference and its less significant contribution to observe and eradicate water stress in Bangladesh. Along that view, the chapter explains the need of critical approach to understand the questionable integrity of the water management system in Bangladesh and how the country can improve the water stress condition by implementing solidarist view.

By focusing attention on the combined risks of climate-related threats, the human security approach highlights the interconnectedness and the cross-sectoral consequences of climate change and its impact on the different domains of human security (UN: GA, 2012). By considering both the aspects of climate change and human security, the information level expands to understand multiple objectives for threat reduction at different social-ecological scales. First, human security improves information by identifying the threats of climate change to calculate the risks associated with these threats. Second, the needs and vulnerabilities extent are assessed to understand the capacities of the communities at both the national and sub-national levels. The purpose of understanding such vulnerabilities is to enhance the protection and empowerment strategies to address the specific needs to produce resilient coping mechanisms. The mechanisms are tailored adaption strategies to reduce the human, social, economic cost that is related to climate disasters.

The general understanding of human security in this chapter helps to understand the impact of Bangladesh's climate change discussed in the following chapters.

CHAPTER II: PHYSICAL GEOGRAPHY OF BANGLADESH IN RELATION TO THE HINDU KUSH HIMALAYA (HKH)

This chapter reviews the physical geography of Bangladesh including its changing climate and discusses the ways by which the Ganges and the Brahmaputra rivers are linked with the HKH. The purpose is to assess the impact of the melting glaciers due to the recent and anticipated climate changes on Bangladesh's water sources to understand its link to water insufficiency.

Current Climate & Geography of Bangladesh

Bangladesh is located in the northern hemisphere, bordered by the Himalayas to the north and the Bay of Bengal to the south, to the northeast by India and southeast by Myanmar (Figures 1, 2). The country is a low-lying land located in the Ganges, Brahmaputra, and Meghna (GBM) basins (Figure 2). The Tropic of Cancer passes through it, reflecting its tropical climate (Brammer, 2012). The presence of the monsoon has significant contribution in shaping the wet and dry seasons of Bangladesh. Its influence makes the climate of Bangladesh a tropical monsoon climate. Monsoons are a pattern of strong winds and heavy rain that enter the continent from the Indian Ocean bringing copious rainfall to South Asia in the summer months (NAT GEO, 2018).

The country experiences four prominent seasons: winter (December to February), pre-monsoon (March to May), monsoon (June to early-October), and post-monsoon (late-October to November). Pre-monsoon and winter months are considered as dry and the demand for water rises notably (Hoelscher, 2013). The average temperature in the winter and post-monsoon seasons averages at 12.8-degrees C. The mean pre-monsoon temperature rises and April is the hottest month of the year with an average of 30-degrees C (Brammer, 2012). The mean annual

rainfall is about 2300mm; more than 75% of falls during the monsoon season. During the winter the average rainfall falls to between 20 and 40 mm (Rahman, 2017; Agrawala, 2003; Smith et al., 1998).

Water supply faces severe constraints during the dry season as the river flow volume plummets due to lack of rainfall as well as upstream water diversion and larger shifts in climate (Brammer, 2012). Excess water is available during the monsoon season in the summer and often causes flooding. Given that the country lacks an efficient water management system to store the excess water, freshwater becomes a scarce resource during monsoon and pre-monsoon seasons (Qureshi, 2014). Determination of seasonal variations of precipitation is important as the monsoon and rainfall play a pivotal role in Bangladesh's economy, communications, culture, and lifestyles of the people.

Different Water Sources in Bangladesh

In order to understand water stress in Bangladesh it is important to appreciate the role of the HKH region in defining the country's hydrology and hydro climatology and the medium through which people have access to the water.

The HKH is the third most glaciated place on Earth after the Arctic and Antarctic; it is known as the 'Third Pole' (HICAP, 2015). The Ganges and the Brahmaputra basins cover about 60 percent of Bangladesh and serve as home to 108 million of Bangladesh's 167 million residents (HICAP, 2015; NAS, 2012). Ninety-five percent of Bangladesh's water comes from these two basins (FAO, 2016), so any changes in precipitation, temperature, and glacier retreat in the HKH regions can have a ripple effect on the river flows of these basins and on the people, who live in the basins. The Ganges is one of the largest river basins in the HKH, the river's main branch is known as the Padma, with 50 million people on Bangladesh river basin. The Ganges runs into

the Brahmaputra and serves much of the capital, Dhaka division (Hoelscher, 2013). The Brahmaputra serves as the crucial water system for Bangladesh (Figure 4, from HICAP 2015). About 58 million people live in the Brahmaputra region, and 1,772 million cubic meters per year are used for domestic purposes. In January, the water demand hits the highest for both the rivers as the weather remains dry and there is little or no rain in Bangladesh at that time of the year. These rivers support irrigation, energy, sanitation needs, and most importantly fresh drinking water for people in the HKH region (Xu, 2009; Bajracharya, 2011).

Glaciers, precipitation, and snowfall of the HKH are the natural sources of water that feed these river basins. The Ganges and the Brahmaputra are fed by the HKH's unique water reservoir formed by the 16,000 Himalayan glaciers (ICIMOD, 2007). The contribution of glacial meltwater is significant and varies by river basin. Glacier retreat occurs in part when rising temperatures lead to permanent reductions in glacier mass and volume (NRA, 2012). Glacial melt can impact total streamflow, as water is stored as snow accumulation in the glacier system (NAS, 2012). Records show that glacier melt and snowfall contribute 11 percent and 9 percent, respectively, to the flow of the Ganges river basin (see Figure 3, from HICAP, 2015). For the Brahmaputra river basin, these values are respectively 16 percent and 9 percent.

Groundwater is also another a reliable source of drinking water in Bangladesh. Nearly, 73% of the rural population use groundwater (tube wells) as the primary sources of drinking water (WHO and UNICEF 2010). Tube wells are vertically drilled wells, bored into an underground aquifer in the earth's surface, to extract groundwater. The country lies on a large aquifer system with both deep and shallow groundwater resources separated by an impermeable clay aquitard with very low permeability that prevents the adequate water infiltration (Ismail,

Figure 3. Hydrological characteristics of the Ganges and the Brahmaputra. Source: Lutz, AF; Immerzeel, WW, 2013; HICAP, 2015.

Figure 4. Brahmaputra water use in the HKH region. Source: Institute of Water Modelling, 2013; HICAP, 2015

2016) that leads to high surface runoff, significant fluctuations in river flows, and ultimately lack of a steady supply of fresh water.

In spite of the vast demand for groundwater, it is not always safe to drink groundwater. In 1990, arsenic was found in Bangladesh's groundwater. The toxic element contaminates the freshwater, depleting the water supply system for the people of Bangladesh. It is usually the shallow aquifers that contain the arsenic (Qureshi, 2014). The rural poor rely on as many as 10 million shallow tube wells for drinking water and an estimated hundreds of people die each year from arsenic-related illness in the country (Funkhouser, 2016). The natural arsenic in the groundwater causes people to use sand filters or ponds, known as *mitha pukur*, to obtain safe drinking water.

Salinization (salinity inundation) is the condition in which the sea salt accumulates in soils and in streams; it is a progressive soil and water degradation process affecting water aquifers and streams and impacting irrigated agro-ecosystems in arid and semi-arid regions, including Bangladesh (2011). Bangladesh has about 2.8 million hectares (total arable land approximately 7 million hectares; 36% of the land) of coastal soil that has already become salinized due to a continued withdrawal of surface water and groundwater for irrigation and drinking (Hoque, 2009).

Climate Change in Bangladesh

Recent Climatic Trends

Availability of fresh drinking water in Bangladesh has been exacerbated by an increase in air temperatures indicative of climate change. The HKH region has been warming about three times faster than the global average since 1906, which is 0.6 to 0.9 degrees Celsius (Xu, 2009; Riebeek, 2010). Minimum temperatures have been increasing since 1985 at a rate of 0.5-degree

C during the winter season (Agrawala, 2003). This temperature rise may decrease river flows through evaporation and water supply.

Rainfall has been decreasing in recent years in Bangladesh; mean annual, pre-monsoon and winter rainfall has decreased; monsoon rainfall has remained unchanged from 1975 to 2014, which indicate lesser precipitation in future over Bangladesh (Rahman, 2017). Changes in rainfall amounts and timing to wet and dry season also play a crucial role in determining Bangladesh's vulnerability to climate change and its impact on fresh-water availability. Excessive heat during the pre-monsoon, more extreme rainfall during the monsoon, or a shortage of rainfall in the post-monsoon and winter seasons may influence river flows and water availability (Rahman, 2017). Increasing temperatures during the dry pre-monsoon and winter seasons, for instance, have escalated water stress in the mitha pukur due to increased heat and decreasing rainfall; these conditions have worsened the recurrent droughts that dry up the ponds and constrain long-term water availability (Abedin, 2014).

Anticipated Future Climate Trends

General Circulation Models (GCMs) forecast a significant increase in temperature across Bangladesh by 2100 with the greatest warming predicted during the winter season (Agrawala, 2003). The IPCC predicts that by 2050, Bangladesh will experience warming of 1 to 3 °C in the Ganges- Brahmaputra- Megna (GBM) basin (2007). Scientists estimate that the air over land will warm more than the air over oceans in the summer, increasing the summer monsoon (Agrawala, 2003). In the winter, however, increasing temperatures and decreasing rainfall will likely lead to drought, reducing water availability from rainfall even further.

Mirza and Dixit (1997) estimate that a 2-degree C warming, combined with a 10-percent increase in monsoon precipitation could increase surface runoff by 19 percent for the Ganges and

13 percent for the Brahmaputra. In a preliminary analysis, the authors found that climate change in the Ganges and Brahmaputra basins is likely to change river flows, which in turn will affect low flows, drought, flooding, and sedimentation processes in Bangladesh.

The HKH glaciers have been receding faster than in any other part of the world. By 2030, water availability on a m³/per capita/year basis in the Himalayan River Basins is likely to decline from 7,320 to 5,700 across Bangladesh (Hermes, 2011). At the current receding rate, the likelihood of glacier disappearing by the year 2035 or sooner, is high (WWF, 2005).

By the year 2050, climate change is predicted reduce river flow that will likely enhance river salinity during the dry season and lead to shortages of drinking and irrigation water (FAO, 2014; WB, 2015).

Sea level rise is another factor that contributes to Bangladesh's vulnerability to climate change through the salinization of fresh water. Frihy (2003) reported a 1.0 cm/year sea-level rise in Bangladesh per year in the coming years. While the IPCC Third Assessment estimates the global average range for sea level rise at 9 to 88 cm (IPCC, 2001) by the end of the 21st century, the anticipated sea level rise for Bangladesh has been estimated at about 40 cm higher than today (IPCC, 2007).

CHAPTER III: WATER STRESS AND HUMAN SECURITY CRISIS

This chapter analyzes the ways by which water stress may turn into human security concern in Bangladesh. The objectives are to: 1) explain the how glacier melt may influence water stress; 2) discuss the differences between threat and vulnerability; and 3) examine the rise of a double vulnerability and its repercussion on human insecurity that may result from water stress.

Glacier Melt of the HKH in the Ganges and the Brahmaputra as Water Stress Threat in Bangladesh

Glacier Retreat Influence on the Ganges and the Brahmaputra

Water stress is a human security concern because it relates to the depletion and deterioration of available water resources (Water Aid, 2012). To be acknowledged as such, water stress needs to comply with the two components of two human security threat thresholds: critical and pervasive. These thresholds have the potential to be reflected in the context of the Bangladesh water supply crisis in part due to the retreat of the Himalayan glaciers. While the pervasive component indicates that the threat must be widespread, the critical component refers to the degree of urgency on a potential threat (CHS, 2003).

The water availability reduction has the potential to create stress in the region. The current trends of glacial melts suggest that the Ganga, and the Brahmaputra which crisscross the northern Indian plain, can turn the rivers into seasonal rivers in the near future as a consequence of climate change, which could likely affect the economies in the region (IPCC, 2007). Almost 70% of the population lives near the basin of the Ganges and Brahmaputra and the current warming and glacial melting trends depict an uncertain future for the population that depends on these rivers of Bangladesh, (NRC, 2012). The water supply from the basins, directly and

indirectly, supports the rural and urban water system in the country including freshwater for drinking water, sanitation, and irrigation.

It is predicted that the glaciers of the HKH would dwindle in size until the usual glacier melt can no longer contribute to the region's water supply each year (NRC, 2012). As indicated in Table 1., the peak discharges are 100,000 m³/s in the Brahmaputra and 75,000 m³/s in the Ganges in Bangladesh (FAO, 2016). The contribution of the HKH glacier melt to the water supply is highly seasonal and varies across the region, and with climate change, the shifts in the intensity of snow and rain affect the rate of glacial retreat (NRC, 2012). That means that the discharges of the Ganges and the Brahmaputra partially decrease and is in turn unstable.

Table 1

Basic Parameters of the Ganges and the Brahmaputra Basins

Basin	Total No. of Glaciers in the HKH	Total Glaciated Area (Km ²)	Meltwater Generated from Glaciers M ³ /S	Glacial Melt Contribution in Bangladesh
Ganges	6,237	18,392.9	75,000	20%
Brahmaputra	10,106	20,542.75	100,000	25%

*Note.*Sources: Eriksson et al., 2009; Immerzeel et al., 2010; FAO, 2011; HICAP, 2015

Climate change may lead to water scarcity in the river basins, and, at the same time, there is the rise in the sea level; both restrain the use of water resources in Bangladesh. As a result of accelerated glacier melting, the Brahmaputra is one of the rivers to experience the most significant loss in water availability because of the increased water discharge and decline (Xu, 2009). Besides, the Ganges in Bangladesh is extremely vulnerable to droughts; the principal

cause of drought is attributed to the erratic behavior of the southwest monsoon (Wahid, 2014). The erratic rainfall with a decline in river water due to glacial retreat would ultimately intensify the impact of droughts, causing the water shortage in the region.

Monthly flow trends in the Ganges were 2,220 m³/per capita for March 1940 and 640 m³/per capita in March 2000 (Hoque et al. 2006). A country is considered water-stressed when <1,700 m³person-1yr-1 and goes through chronic scarcity when <1,000 m³person-1yr-1, (Falkenmark et al., 1989; Falkenmark and Lindh, 1974; Falkenmark et al., 1989; Falkenmark and Widstrand, 1992). For Bangladesh, the Ganges water deficit is almost 360 m³/per capita, and the flow does not reach near the minimum boundary of the renewable water resource. The change in the monthly flow is vast over the time and has turned into a water stress condition.

Added to that, Brahmaputra's minimum flow in Bangladesh is 157,000 cusecs, whereas the national flow requirements are 200,000 cusecs (Limaye, 2016). The national flow is the environmental flow of rivers or the provision of water within rivers to conserve freshwater biodiversity, while meeting the water demand of human society is needed for most riverine systems (Brown and King, 2003). The deficiency creates inconsistency in river flow, and the fluctuations in the flow of the rivers expose the dependent population to uncertainty. This excess shortage of water supply makes the individuals and their communities insecure, as there is no insurance or organized water management system to protect them against such challenging period.

As the majority of the population in Bangladesh suffers from a volatile water supply due to inconsistent river flows, the water stress condition remains pervasive. In addition, there are no rigorous water management practices, and the government is failing to meet the primary demand of the nation by not fulfilling the minimum water flow from the rivers. Without consistent

actions, water stress has every possibility to become a national crisis for an indefinite period. The water availability reduction has the potential to create scarcity. In the long run, the melting of the HKH glaciers due to climate change disrupts the Ganges and Brahmaputra river flow which contributes to a difficult water condition that ultimately poses a threat to the social context of Bangladesh.

The Disrupted Flow of the Ganges and the Brahmaputra Engendering Social Instability

Rivers have been considered as both a blessing and a curse. Flooding and droughts contribute to riverbank erosion, agricultural disruption, and migration (Limaye, 2016). Glacial melting is disrupting the stream flow rates of or water volume in the rivers. The rise in river levels during the rainy season and the shortage of water flow in dry season strains the water supply. The rapid retreat of glaciers impacting the population and region related to the Ganges and the Brahmaputra has the potential to impact water stress. Ultimately, glacier retreat may lead to lower river flows and hence have the potential to influence water stress and livelihoods (Orlove et al., 2008).

The monsoon period from June to October is the most risk-prone period for floods, but in these months the excess water is also essential for removing salinity from water on land. Rural populations of Bangladesh are acquainted with the natural disasters- droughts, cyclones, river bank erosion in their region. Even though they are not adequately prepared to confront these disasters, they ultimately sacrifice their living conditions in these particular months. Human security aims at ensuring the survival, livelihood, and dignity of people in response to current and emerging threats (UN General Assembly, 2012: 5). The irregular water supplies from the Ganges and the Brahmaputra due to climate change has the potential to directly endanger the

stability of the people living near the river basin and indirectly threaten the people who depend on the flow of the water for freshwater consumption.

With increasing climate variability, salinization of drinking water is becoming a major problem for the people of Bangladesh during the dry season (ELIAMEP, 2008). Such changes in the water supply disrupt the day-to-day lives of the people. The employment systems, especially those related to agriculture and energy, become volatile because there is no guarantee that the water supply would be constant throughout the years.

Seasonal employment is already a crucial concern in parts of Bangladesh, but with increasing water stress it becomes even more of a concern. For example, the number of fishes for commercial production depends upon water flow. The unemployment rate is already high in parts of rural areas in Bangladesh, and with climate variability, the people in the river basins go through tough times to save their jobs whether it is permanent or temporary. Such uncertainty produces human insecurity putting individuals lives at risk. Floods, droughts, and related natural disasters not only turn individuals jobless but by damaging their houses, individuals become homeless for the short term or even the long term.

According to official FAO estimates, on July 2017 floods in Bangladesh affected about 1.6 million people (some 338 500 households), damaged over 100 000 houses and destroyed schools, roads, bridges, and embankments (FAO, 2017), taking away shelter for the members of these families. Migration to urban and other areas becomes the only option for some people. For others, despite their houses being destroyed, living in a risk-prone area is the only place to live, as they have no other means to shift somewhere else, physically or financially. Such hurdles created by climate change reduce individuals' ability to live life with security and creates uncertainty.

Health crises start increasing as there is no quality control of the available water. Fundamental crises during floods in Bangladesh include death, disease, and injuries that occur from waterborne diseases, snake bites, drowning, slipping, large trees and structures falling on individuals, lack of medical facilities, malnutrition, lack of uncontaminated drinking water, and lack of proper sanitation facilities (ELIAMEP, 2008). The prevention of such crises is difficult, as there is a financial constraint, increased physical distance of health care, lack of hospitals, doctors, and nurses, and a lack of technology to purify the water. Overall, the water crisis intensifies and degrades the health conditions of the people. The vulnerabilities caused by such retreat has different dimensions that can be resolved by realizing the nature of the threat such change possess.

Drawing a Line Between the Threat of Salinity Intrusion and the Vulnerability of Depleting Freshwater Conditions to Understand Glacier Retreat Impact

Glacial melt has a significant potential to impact river flows and create water stress. Given the recent melting rates of the glaciers of the HKH and further melting anticipated due to future changes in the global climate, it is essential to understand the social threats and vulnerabilities that may ensue from the anticipated low river flows.

The glacier retreats intensify the rate of such hazards by influencing water stress and restricting freshwater supply in the Ganges and the Brahmaputra. By comprehending the differences between threats and vulnerabilities, the level of crisis can be identified. Although water stress has several impacts on livelihood, it is crucial to recognize how the freshwater is threatened by climate variability and how it can become a significant cause of vulnerability in Bangladesh.

According to the Coastal Zone Policy, 76 upazilas (subdistricts) of 19 coastal districts in Bangladesh are likely to be severely affected by a rise in sea level (2005). In Bangladesh, drinking water in coastal regions has become extremely saline, such that people in the region get on average 50% to 100% of their recommended daily salt intake just from drinking water (Grantham, 2018). The addition of dietary sodium has a negative effect on the health of the people living in the coastal region as there is no other alternative source for extracting freshwater.

In Bangladesh, floods do not have only negative consequences; in fact, flooding provides much-needed replenishment of the soil, which is a process that benefits from accumulating freshwater (Limaye, 2016). That means that floods cannot be considered only as the threat to the region; rather, there is a demand for river flows to remove toxic salinity which allows the region to gain freshwater. The Ganges and the Brahmaputra are the largest sources of water not only to fulfill water requirements of irrigation but also to flush out salinity (Limaye, 2016). It is essential to understand that the flow of water is crucial for the removal of salinity from the region; otherwise, the salinity of water contaminates the drinking water and reduces the availability of fresh water.

A critical requirement of the Ganges and the Brahmaputra in Bangladesh is to push back salinity that arises from the Bay of Bengal coastline. Unlike the Brahmaputra, recently Ganges water flow is not sufficient to repel saltwater intrusion in the southwest of Bangladesh (Limaye, 2016). Here, the recognition of saltwater hazardous for consumption must be admitted as a threat. Also, excessive water is required to recharge groundwater and remove the possibility to procure shallow water that contains arsenic, otherwise it can simply turn as a threat. Failure to address such threats, because of a belief that the increased flow of the Brahmaputra is necessarily

harmful, can create a vulnerability because the flow of river water from the Brahmaputra is important to remove salinity; otherwise, the stress of fresh and safe drinking water would only lead to vulnerability.

The southwestern coastal region is facing extreme difficulties in accessing safe drinking water (Quazi, 2006). The inability to accurately forecast heavy floods in advance becomes a threat. With a lack of technology and capability to predict, the flooding situation exacerbates, it turns into a threat. Given that there is no awareness regarding floods in advance, there is no adaptation capacity that is exercised and no preparation to cope with the adversity of flooding. As a result, there is a lack of water storage capacity. The unattended threat of prediction incapacity turns the situation into a vulnerable condition. The sea level rise and unmanaged flood end up stressing the freshwater availability besides destroying houses, livelihoods, and properties in the region.

Different Sources Leading to Water Scarcity

Incessant glacier and snowmelt decrease in the average rainfall and increase in the average temperature are slowing up the river flow of the Ganges and the Brahmaputra. The monsoon is not adequate to remove salinity because to inundate the entire country, there is a need of constant and steady river flow. This allows salinity intrusion in surface water, groundwater, and even in ponds like mittha pukur (Abedin, 2014). The lack of water management system does not channel flood water sufficiently in the surface and ground water, which increases the risk to access safe drinking water for the people, as there is a rise of the salt water which enters the freshwater ponds and pockets of safe groundwater.

Although the government of Bangladesh is putting effort to diminish water shortages, the progress is really slow and some places none, which makes the water stress visible in the daily

lives of the country's people. Industrial boom, rapid urbanization, and extensive agrochemical use push government and other large organizations to concentrate on the industrial sector (Kibria, 2014). Water stress in the household and small organizations is more or less neglected by the government. The shortage of water supply is suffered by both urban and rural areas in Bangladesh.

Demand for water in the capital Dhaka is 2.2 billion liters a day, but the production is only 1.9 billion liters a day, while in Chittagong, the second largest city, demand is for 500 million liters but only 210 million liters are supplied each day (Kibria, 2014). In the southwestern part of Bangladesh, more than 5 million people have been suffering from a safe drinking water crisis (Swapan, 2006). Conventional sources of fresh water are becoming limited. The poor management and insufficient investment in water system create the socio-economic water scarcity; such mismanagement prevents the population from accessing the water resource easily (Abedin, 2014).

Drinking safe water and use of fresh water are not a 'want' for the people in any corner of the world; rather, it is a primary 'need' that cannot be neglected. The adverse effect of climate change and the inadequate water system has faltered the water sources and given rise to water stress in Bangladesh. Without access to safe drinking water, the country would ultimately stagger to serve its people.

Water Scarcity as a Double Vulnerability for Rural Women in Bangladesh

Women's Responsibility of Water Collection and Breach of the Freedom From Fear

There are innumerable effects of water scarcity such as loss of property, degradation of agricultural land, and increase in diseases. However, the impact of such changes falls on some groups more than others. Even though climate change impacts regardless of nationality, race,

class, and so on, in particular regions, climate change has a more negative effect on women than on men. Women are more vulnerable to disasters than men through their socially constructed roles and responsibilities, and because they are poorer (PAHO, 1998; Mitchell et al., 2007).

Similarly, like a violent conflict that is rarely induced by a single factor, climate change-caused human insecurities are also the result of myriad factors, either due to a rise of new insecurities and/or exacerbation of existing insecurities. That is why climate change is also regarded as a “threat multiplier” (Dabelko, 2007) or at times the “double vulnerability” (Barnett, 2010). As the adverse impact on the population is undeniable, it is only matter of time to find all the related socio-political consequences and the economic dilemmas of climate change.

In developing rural areas, women are one of the most vulnerable groups as women have less access to resources that are essential in disaster preparedness, mitigation, and rehabilitation (ELIAMEP, 2008). Besides being victims of climate change, the rural Bangladeshi women bear the added discrimination of being women in their society. Social stigmas do not allow them to recover from such hazards. The stereotyped responsibilities, financial constraints, and lack of authority of women in the household and society prolong the recovery of women's position in climate change disruptions.

In rural societies, women are the primary caregiver; however, they are not the decision maker of their family and are only expected to collect resources for household activities. When water sources are contaminated due to increased salinization and flooding, it becomes the responsibility of the women to provide fresh water and food. The severe and moderate water scarcity has a substantial impact on the daily activities of women. In Bangladesh, women in some villages walk 6 to 12 km to fulfill the daily requirement of 3 jars of water per household

(Abedin, 2014). In fact, in highly salinized areas, women often make several trips to fetch water from distant sources. It adds a new vulnerability to these marginalized groups:

“Male members do not go to bring non-saline water. I walked around 2 kilometers to fetch water even before the day I gave birth to my daughter. Just two days after her birth, I had to start fetching water again, and now I am suffering from physical problems.” Laily Begum, Shathkhira (ELIAMEP, 2008).

The surface water remains odorous, and ground water usually consists of arsenic, and the water is contaminated until it is boiled. In order to fetch water, these women constantly handle the toxic water which exposes them to water-borne diseases and poses a serious health risk in the long run. The skin of young women is reported to have roughened because of their skins exposure to the water that has an increased salinity (Kibria, 2014).

Another horrendous impact women experience due to water scarcity caused by climate change is sexual harassment and physical violence. Reasons given for this abuse range from women not being able to manage water resources properly, to not serving food on time, to not being able to procure relief materials (ELIAMEP, 2008). For procuring water for the family, the women need to walk long distances, and after natural hazards they have to travel and stand in queues for hours after hours to get access to fresh water, and sexual harassment is repeatedly reported in these situations. Sexual assault has far-reaching implications for individuals, their families, and the local community, and in addition to the physical abuse of the victim it increases fear in the general population (BISS, 2009). Often it takes the extreme form of harassment of rape and permanently leaves psychological stress in the victims' lives.

Nasima from Madartake says that, although her husband has been violent since their marriage began:

“it has increased after the flood of 2007. Whenever he is angry, he hits me in the head, waist, and legs. My fault is that I was not able to get relief...” (Mitchell, ActionAid Bangladesh, 2007).

Here, human security's freedom from fear is breached through climate change and water scarcity. Such scarcity is seen as a primary factor contributing to crime and violence against women. The physical insecurity causes frustration for the women and their families. The harassment and domestic violence have already been there in the region. However, with conditions like water scarcity, the situation intensifies and becomes grave. As there is no legal action associated with such changes, the negative impacts on women remain neglected.

Enhancing Existing Gender Inequality and Violation of the Freedom from Want and Indignity

Climate change magnifies existing inequalities, reinforcing the disparity between women and men in their vulnerability to and capability to cope with climate change (UNDP, 2007; Mitchell et al., 2007). The inequalities have always been there, but with the advent of climate change and water scarcity, the difference of gender in power structure increases. With extreme events like flooding and glacier retreat, there is a higher probability that people in vulnerable regions lose their livelihoods and enter the vicious cycle of poverty. Poor women are more likely to become direct victims (mortalities and injuries) of climate change disasters, such as hurricanes and flooding (Neumayer, 2007). During floods, often more women die than men because they are not warned, cannot swim, or cannot leave the house alone (UNFCCC COP, 2005). Unlike men, who are equipped since childhood to cope with the negative aspects of outdoor difficulties and trained to learn practical skills for survival, women are taught to be home and learn cooking and sewing without any outdoor skills like fishing, swimming, making boats, and so on.

Due to social norms and traditional factors, rural women of this region have fewer assets, and they do not own land. So at times of natural disaster emergencies such as flooding, they cannot sell off the properties like their male counterparts do and have a secure income. Such inadequacy in resources pushes women to be financially insecure. Among other problems women identify when having to adapt to climate change are lack of safe land and shelter, lack of other assets and resources, limited access to material and financial resources, lack of relevant skills and knowledge, high prices of agricultural inputs and other materials, and cultural barriers limiting women's access to services (Mitchell et al., 2007). Young girls' future is obscured by water stress because, in the rural areas, the patriarchal society demands that young girls prioritize household work over their education. Procuring and carrying freshwater from miles away can be both exhausting and time-consuming, leading to no time for education.

“I go to a neighboring village every morning to collect water after I wake up. The water supply stops after half an hour, so I go early to be the first in the queue...My mother goes in the afternoon to collect water for our meal, but I have to go again at night. I get tired, and do not feel like concentrating on my studies afterward.” (11-year-old from Tanore, Bangladesh, quoted in The Guardian, 2016).

The financial insecurity, the constant exposure to health risk due to contaminated and salinized water, and traveling long distances to access freshwater do not allow women to live independently. The source of their income is limited or none as they invest all their time to fulfill the responsibilities of the family, and the extra burden of procuring water leaves them more vulnerable. The freedom from want becomes unreachable with the existing and added threats of climate change and water scarcity.

Water, sanitation, and health challenges put an extra burden on women, adding to the double burden of productive and reproductive labor when there are disasters and a collapse of livelihood (Patt et al., 2007). In these areas, there is already a lack of sanitation and proper lavatory systems, and, with flooding and water stress, it becomes more difficult to find a lavatory. While men have the privilege to use any part of the area to use a lavatory, women are not allowed to do that. Added to that, women and girls' menstrual cycles, when they require more water to clean them becomes massively burdensome as there is fresh water scarcity in these areas due to climate change.

Rural women also suffer from a gynecological disorder (lowering of the uterus) caused by carrying big jars of water on their hip when fetching drinking water from a long distance (Abedin, 2014). Women's health is threatened when they are in pregnancy and labor, and there is a natural scarcity of resources of food and freshwater and with climate change hazards of flooding and cyclones, many hospitals in those areas are destroyed. In such vulnerable areas, the socio-cultural norms and these caregiving responsibilities at times restrain women from migrating during climate change crisis periods. The stereotypical idea that women need to self-sacrifice often hampers their rescue in any disaster endangering their life and their infant's' life. In fact, women's lack of access to information regarding potential hazards and their confined mobility arise from their deprived role in decision making, causing no development in coping with climate change. Ultimately, with poverty, physical insecurity, and risks to health, rural women in Bangladesh lose to live life with a full capacity and with dignity.

Conclusion

The rapid melting of the HKH glaciers jeopardizes the future source of the rivers, potentially reducing the river flow. The average increase in temperature and decrease in rainfall

in the region of Bangladesh contributes to the reduced river flow. With low flow, the Ganges and the Brahmaputra will fail to fulfill their primary operation to remove salinity that arises due to a rise in the sea level. The intrusion of salinity is a threat, and the depleting freshwater condition turns into vulnerability as the population suffers from a scarcity of drinking water. Although everyone encounters such a crisis of water, in reality, the lion's share of the burden is on women, particularly the rural women who endure the misery of collecting freshwater because it is assumed to be their responsibility towards their family. Their socio-economic condition weakens and forces them to experience a double vulnerability because of climate change. It can be recognized as a double vulnerability because the rural women suffer from the scarcity of water in addition to their lower status and economic condition.

National efforts and policies to mitigate climate change consequences such as water scarcity have remained incomplete and inadequate due to the crisis of water management and related systems. The following chapter discusses the emergence of international cooperation to respond to the threats caused by climate change.

CHAPTER IV: ANALYSIS OF BANGLADESH'S CLIMATE CHANGE POLICIES & THE ROLE OF THE INTERNATIONAL COMMUNITY

This chapter identifies the principal actors in water management in Bangladesh and critically examines their policies to mitigate climate change in the country. Among these actors, the UNICEF acts as the primary organization in various water supply projects, and consequently, it shoulders the responsibility to remove water scarcity in various parts of the country. Therefore, I focus on the activities of the UNICEF and explore whether in the long run there are discrepancies between the core values of the UNICEF and human security, particularly its projects to remove water stress and scarcity.

Water Management Actors & Policies in Bangladesh

Current Rural & Urban Water Management Actors

The primary actors in the urban water sector are City Corporations (CC) and municipalities in large metropolitan areas, and councils in small towns. Water Supply and Sewerage Authorities (WASA) and the Department of Public Health Engineering (DPHE) are responsible for larger infrastructure projects management and operation (ADB, 2009; SACOSAN, 2011). Water management in the rural areas takes place at the level of Union Parishads (UPs), the lowest tier of local government involving groups of villages. The UPs bear the responsibility of water hygiene education and environmental sanitation, as well as the distribution of tube wells (vertically drilled wells, bored into an underground aquifer in the earth's surface, to extract groundwater) and latrines through Union Water Supply and Sanitation Committees (ADB, 2009; Willetts, 2011). The fundamental job of these actors is to integrate the national policy of water supply and sanitation at different administrative levels and ensure community participation.

The fundamental problem within the CCs and municipalities in the water supply sector in Bangladesh is the inadequacy of human resources and experts on water management (Water Aid, 2010). This results in lack of capacity to efficiently deliver the services. The large population requires coordinated services, but the untrained management in this sector cannot ensure uninterrupted water supply. These organizations comprised of various sections: fee collection, tariff setting, and, most importantly, providing fresh water to people for all parts of the urban areas. Often coordination among these sections is lacking. In the sub-district level governments, the difficulties are nothing different. Compliance issues compound these problems: existing laws and regulations are frequently flouted. Therefore, weak regulatory compliance and poor delivery services remain the core factors in freshwater service in the country (Willetts, 2011). Such deficiencies in both rural and urban areas have created a need for community-based organizations.

Usually, community-based organizations (CBOs) are set up by NGOs with the representation of poor and marginalized groups. Local NGOs play a prominent role in creating links between community-based organizations and WASA to provide services to urban poor. Though WASA has initiated and institutionalized a Low-Income Communities section to support mechanisms for service delivery for the urban poor (Willetts, 2011), it is yet to fulfill its role and responsibilities successfully. Therefore, it has a long way to go to resolve the persistent water crisis.

Existing Water Plans & Policies

After Bangladesh's independence in 1971, the Bangladesh Water Board (BWB) was created to manage the country's water resources and control flood and drainage. More than 47 years later, despite the presence of the BWB, ample NGOs and aid organizations in the water

management sector not to mention the government ministries, problems persist, thanks to the lack of coordination among these entities and the fragmented nature of their initiatives. This had been the situation well before the problems of climate change hit the country. The actions, whether of state entities or NGOs, to mitigate the water crisis resulting from climate change, are not always practical and lack transparency.

It is against this background several plans and strategies have been formulated since 2004 to identify the weaknesses of the government and chart courses to address these inadequacies, particularly in the context of climate change. One of the important policies is the National Sustainable Development Strategy formulated in the year 2008 for 2010-2021, which identifies the variability due to flood and drought in Bangladesh (Chan, 2016). The aim has been to improve decision making quality by engaging communities and incorporating indigenous and local knowledge to achieve sustainable water management. Unfortunately, the Strategy does not provide guidelines for how the major consumers of water such as agricultural and energy sectors can be integrated and coordinated to enhance co-benefits of sustainable water management. The National Water Management Plan (NWMP), formulated in 2004, only stated the baseline water problems while insignificantly mentioning problems related to climate change. Due to the Plan's weak reporting system, knowledge gaps on climate change remain unknown, and problems associated with the climate change were insignificantly presented.

Building on the NWMP, the National Adaptation Plan 2005 was formulated to respond to five challenges of climate change facing Bangladesh: scarcity of fresh water; drainage congestion; riverbank erosion; frequent floods; and widespread drought and wider salinity (MOEF, 2005). However, the plan does not emphasize water management except "land-water zoning" (CapNet, 2016). The purpose of zoning would be to formulate fisheries or aquaculture

strategies suitable for each of the zones, zoning of the coastal belt based on the predicted extent and intensity of salinity intrusion (MoEF,2005).

Although previous water policies have often integrated water with environmental issues such as sanitation and agriculture, its relationship with climate change issues has not been prioritized, and specific measures have not been proposed (Chan, 2016). The Water Act 2013 supports robust systems of water distribution and protection, particularly surface groundwater development (GOB, 2013). The Act undermines the power of citizens and NGOs by stating that no individual or organization will be allowed to file a lawsuit against other individuals, organizations, or government authority for violating the provisions of the Act (Chan, 2016). The authority of implementation of various provisions of the ACT has been delegated to the Executive Committee under the Ministry of Water Resources (GOB, 2013). This inherently discourages the active involvement of NGOs and citizens in the implementation.

The national plans and policies regarding climate change and the water crisis, as the preceding discussion demonstrated, have major loopholes and often lack the focus. Also, there is lack of political will and administrative initiatives to implement them, both at national and local levels, in the short and long terms.

The Emergence of the International Community

As is the case in most developing countries, Bangladesh's water supply sector has significant deficiencies. The advent of climate change has multiplied the limitations of the organizations involved in this sector. These weaknesses, along with the extent of the water stress, necessitated the involvement of the international community, i.e., donors, multilateral organizations, international NGOs, etc. In fact, their participation became essential to save the population of Bangladesh from water scarcity.

A visible and known problem which is taking place for more than 20 years but Bangladesh government has failed to solve the problem completely from the core. As close to 20 million people still drinks water with unacceptably high levels of arsenic (Murphy, 2016). In southern Bangladesh, groundwater levels are slowly rising, a consequence of seawater intrusion and tidal movement creating waterlogged conditions (Brammer, 2014). Consequently, the salinity affects the shallow groundwater aquifers and contaminates the water in the long run (Mainuddin 2013).

Due to the extreme water stress, the country requires and has a strong local presence in the international community. International community involvement became necessary as the policies and plans are inadequate to implement; at the same time without the help of these international donors, it is challenging for the country to resolve the freshwater scarcity.

It is worth mentioning here that the water stress in Bangladesh is not limited to any specific part of the country. Instead, there are various regions within the state which face water stress for different reasons. For example, the decline of water flow in the Ganges has caused increased salinity in the southwest region (Limaye, 2016).

In Bangladesh, UNICEF and the World Bank are the leading international organizations that help the government to run the water supply projects (HRW, 2016). They are responsible for installing water points with the help of the government. UNICEF works with the UK Department for International Development (DFID), OXFAM, and WaterAid for implementation of water supply projects while World Bank programs are in collaborations with the Government of Bangladesh's Department of Public Health and Environment (DPHE) (ADB, 2009, 2010).

Both the World Bank and UNICEF work with the government of Bangladesh to improve the water system. However, the World Bank mostly concentrates on the financial investment,

while UNICEF focuses more on the implementation of the water supply projects. Given the nature of their work producing direct impacts, I will critically discuss the UNICEF's activities and their implications.

UNICEF Following the Core Values of the United Nations and Linkage with Human Security

Since 1994, the core ideas of human security proposed by the United Nations (UN) and through the UN report have gained momentum as an evolved 'security' concept. In the 21st century, the UN acts as a collective actor and fosters a human protection agenda. UNICEF shares the core values of the UN.

As the United Nations Charter predominantly concentrates on humanitarian programs, it appeals to a people-centered worldview. Following in the footsteps of the UN, UNICEF stands for social progress and justice to reflect freedom in the broader context, although the context of freedom is not clearly defined by the UN (Owen, 2014). Nonetheless, UNICEF supports human security's positive rights of 'freedom from want' and 'freedom from fear' that relate to fundamental individual needs.

UNICEF is working with the Bangladesh government and other sector partners to distribute equitable utilization of improved water to communities, households, and districts across Bangladesh. The fundamental guidelines of the UNICEF in Bangladesh ensure safe water where traditional water points are not feasible and promote innovative technologies to solve low water levels, flooding and arsenic contamination problems (UNICEF, 2018). The ultimate objective is to liberate deprived people of water scarcity. Sanitation and hygiene promotion adds to the freedom of individuals to lead a dignified life.

The policy-oriented nature of the UN combines with the ‘radical,’ ‘emancipatory’ nature of human security to initiate positive impact within (Owen, 2014). UNICEF supports a range of interventions at the local, district, and national levels, to strengthen the sector, with the development of tools and strategies to improve monitoring including the development of policies, strategies, and guidelines. As human security is inextricably linked with the UN’s paradigm, practitioners push human security to be more policy-oriented, to improve alignment with the UN, and to improve the welfare of the people.

UNICEF Activities and its Deficiencies in Bangladesh

To fulfill goal 6 of the Sustainable Development Goals (SDGs) by 2030, Bangladesh has the responsibility to achieve ‘safely managed’ drinking water for all. In 2015, UNICEF declared that 98% of the population had met the ‘improved access’ to water to meet the Millennium Development Goal (WHO, 2017). This 98 percentage primarily describes that people have access to water in terms of mobility, unfortunately, this does not mean it has access to quality drinking water free of arsenic and salinity which can be considered safe and reliable.

In 2015, an estimated 10% of the Bangladesh population was connected to piped water systems through 136 formal, public and regulated piped water infrastructure schemes (DPHE, 2016; WHO/UNICEF 2017). UNICEF and DPHE found there was a 230% increase in the number of predominantly private tube wells installed since 2008 (Fischer, 2018). Bangladesh's Bureau of Statistics estimated that 11 million tube wells are installed across the country: 1 million provided by the government and 10 million installed by private owners (BBS, 2011). The number is rising each year significantly. The growth rate raises questions about how these unregulated private water systems can be managed to provide safe drinking water.

The source for drinking water is changing rapidly. Consumers prefer electric pumps with deep wells rather than hand pumps. However, the different source does not assure constant safe water flow. Besides, water quality, specifically from arsenic contaminated tubewells, remains a serious risk in villages of Bangladesh (HRW, 2016). A study shows that less than 5% of the tube wells were tested for safe water when first installed and 80% have no red/green marking for arsenic safety (Fischer, 2016). The red tubewells indicate arsenic-contaminated water. The increase in number in water sources is an important step towards Goal 6 (to ensure availability and sustainable management of water and sanitation for all). The Government and UNICEF's preoccupation with 'access to water' neglect the risk factors such as reliable drinking water for everyone. These two institutions are more driven by the target numbers of SDG 6 than the affordability and safety of the water. Human Rights Watch's analysis of government water points installed between 2006 and 2012 shows that government water points are not targeting areas where existing coverage by safe water points is low (HRW, 2016).

From 2007 to 2012, UNICEF helped the government to install 20,597 wells, and the follow-up testing showed that arsenic above the national standard contaminated 1,733 wells. UNICEF subsequently rehabilitated or replaced the 1,733 contaminated wells (HRW, 2016). The World Bank and UNICEF ensure the arsenic wells are painted red, but in the following years, there was no indication that government has identified all the contaminated wells and replaced all of them.

In the southern part of Bangladesh, the rivers in the coastal region become full of seawater, and the salinity in groundwater has increased, making it difficult to use the tubewells (UNICEF, 2013). The saline water is unsuitable for drinking, using for other purposes, and irrigating crops. UNICEF with a Dutch Company named Acacia Water and the University of

Dhaka devised a system to collect rainwater during monsoon. The purpose is to displace the saline groundwater. In fact, to stop saltwater infiltration in ponds, UNICEF helped to install the pond-sand filter, which removes progressively smaller particles to ensure safer drinking water. With this method, UNICEF aims to direct freshwater underground into the aquifer which could be used as natural storage space and can be accessed through tubewells (McNamara, 2010).

However, this innovative technology is still in the R&D stage and has limited capacity to store monsoon rain. The filters that are used in these tanks are expensive and at times out of reach for the poor rural communities in Bangladesh. Each filter costs about US\$ 610 to install (McNamara, 2010). Even though the filters are helpful to provide water to hundreds of families, that may be too expensive for those who earn less than less \$2 per day, which is almost 14.8% of the total population in 2016 (World Bank, 2018). The affordability factor plays a crucial role regarding embracing innovative technology. UNICEF installs these filters with the help of Oxfam, and to continue using these tanks for freshwater, filters need to be changed, and families with minimal income cannot always afford to pay the price of such filters. With serious lack of monitoring and quality control in water projects by the national government (HRW, 2016), it is not realistic to expect the help of local governments in regularly replacing these filters. The absence of timely and proper replacement defeats the purpose of the installation.

Conflict of the UN Core Concepts with Human Security and its Implication on Bangladesh's Water Stress

UNICEF's Oversight of Water Management in Bangladesh

The UN Charter sanctifies 'We the people' (Owen, 2014), which evidently shows that the UN put extensive effort to ensure fundamental human rights. UNICEF carries the responsibility to install the fundamental human rights by allocating freshwater among the communities in

Bangladesh. It emphasizes the importance of reducing the number of people without sustainable access to clean water and sanitation.

Although the UN helps to reaffirm faith on equal rights, it is quite conservative and does not adopt a ‘critical approach’ that questions how institutions emerged and are maintained and accept the existing, legal, political, and normative structure (Owen, 2014). UNICEF only installs water points, but it does not merge or question the authorities responsible for the distribution of water supply at various levels of government. The Union Parishad Act (2009) establishes that parishads (councils) are responsible for the management and maintenance of water points while the municipal government is responsible for providing or ensuring “sufficient wholesome water for public and private purposes” (HRW, 2016).

However, there is no reliable and consolidated report regarding the efficiency of the water management actors. Furthermore, there are no steps taken by municipal authorities and local councils to maintain the water points installed by UNICEF and other international organizations as there is no consistency in submitting records of such reports to monitor the actors’ actions. The measurement of success cannot only be building water points, rather assessing water supply projects in terms of safety and functionality of the water points reflects the condition of the water system. The follow-up tests of contamination-free tube wells set up by UNICEF cannot be considered as a transparent and honest process (HRW, 2016).

Despite the knowledge of the lack of accountability in the core water management actors in Bangladesh, UNICEF does not raise questions about the structure of the councils and municipalities. Being the carrier of equal rights, UNICEF can contribute in the process with which citizens can exercise their legal rights and obligations to articulate their interests and needs related to water by engaging with the primary actors, but in reality, it refrains from adopting such

process. This is, to a great extent is contrary to the principle of participation of stakeholders. This may lead us to tentatively conclude that UNICEF's actions contradict the idea of human security because human security questions the existing institutions of power, and their influence on the economic and political organizations, which clearly is not reflected here.

UNICEF's Attempt to Understand the Core Reason of Water Stress

The UN's reluctance to include critical approach results in concentrating only on problem-solving approach (Tadjbakhsh, 2014). By using a problem-solving approach, UNICEF analyzes and develops an optimal solution. In this instance, as we have seen, UNICEF installs water points and tanks without underscoring, let alone addressing, the core cause of water stress.

UNICEF's actions are determined by the guidelines of UNFCCC to integrate climate change adaptations (CCA) (UNISDR, 2010). CCA is defined by the United Nations Framework Convention on Climate Change (UNFCCC), the conventions adjustments in human and natural system include: *“(a) adapting development to gradual changes in average temperature, sea level, and precipitation; and (b) reducing and managing the risks associated with more frequent, severe and unpredictable extreme weather events.”*

Actions like Water Sanitation Hygiene (WASH) by UNICEF in rural and urban areas reflect their effort to decrease the water crisis but are not adequate to address the water stress. When water stresses turn into water scarcity in a country due to climate change, UNICEF has an extensive responsibility to address the scarcity of freshwater. Regardless of the number of tube wells UNICEF installs, the arsenic will remain as water is extracted faster than it is recharged. The tube wells do not receive deep groundwater. The shallow groundwater contains arsenic. The core reason remains because there is no strong river flow from the Ganges and Brahmaputra.

On the other hand, the innovative tank introduced by UNICEF to filter saline water allows hope for the deprived population to receive freshwater for drinking. The new system usually depends on the monsoon water to displace saline groundwater, however, with a decrease in rainfall it is not prudent to depend on rainfall. The trends of mean rainfall in Bangladesh of annual, pre-monsoon and winter have decreased, whereas rainfall remained unchanged in monsoon and accurate prediction of rainfall is still a massive challenge to the climatologists (Rahman, 2017). During the monsoon, the amount of rain it will be able to store cannot be predicted or planned. The uncertainty of steady supply of freshwater in pre-monsoon and winter precludes solving the water scarcity crisis. Flood water is essential to clear out the salinity in these areas, which requires constant river flow to flush out the salinity from freshwater.

River flow plays the fundamental role in removing water stress. The glacier melt, rise in temperature, decline in rainfall along with lack of international cooperation create a deficiency in the water flow, which contributes to the water scarcity. In order to address the root cause of such crisis, UNICEF should focus on the reason for weak river flow.

UNICEF's Effort in the Global Arena to Remove Water Stress in Bangladesh

UNFCCC (Article 4) include that there is the need to cooperate and implement adaptation actions to address the impacts of climate change, with a particular focus on the needs of developing countries. Article 4, paragraph 1(e), of the Convention, commits Parties to “*develop and elaborate appropriate and integrated plans for coastal zone management, water resources, and agriculture, and for the protection and rehabilitation of areas, affected by drought and desertification, as well as floods*” (2011). The international climate change is widely scrutinized through the UNFCCC. The Convention, ratified by 192 countries, requires signatory countries to adapt to anticipated impacts of climate change and to cooperate in preparing for this adaption

(UNFCCC, 2007a). That means the states have a responsibility to cooperate with each other to respond to the crises that climate change influences.

UNICEF's inclusion of pluralist view. Although the UNICEF follows the UNFCC guidelines for climate change, the core values of the UNICEF are influenced by the UN. The UN, with its pluralist view that emphasizes the sanctity of the sovereign states and mutual recognition in order to sustain the international order, is based on non-interference and emphasizes peace and international order but not justice within states (Newman, 2014:231). Reflecting this pluralist view, the UN has not been interested in intervening and focussing on the internal challenges of the states. However, the elongated disinterest can produce spillover effect as challenges like water stress does not remain within the confined area, in fact such stress affects humans transcending the borders. The primary responsibility of states is to serve the interests of their citizens, but outside their borders, the interests of the citizens become the responsibility of the UN and its related organizations like the UNICEF.

In previous chapters, the extent of water scarcity in Bangladesh was described, indicating that national policies and international engagement are not sufficient to resolve the water scarcity. As an example of this insufficient national action, the treaties among the countries who share the water source from the Hindu Kush Himalaya are not often applied rigorously. Usually, the countries with an upper hand in economic and geographical position impose their ruling in sharing water with the less powerful countries. The water sharing dispute between India and Bangladesh started when Bangladesh was part of Pakistan. For the first time, in 1970, India acknowledged the Ganges as an international river, and a bilateral discussion between India and Bangladesh resulted in the signing of a temporary water-sharing agreement in 1977, but the agreement lasted only for five years. Article 2, a significant feature of the agreement, provided a

'guarantee clause' for Bangladesh by assuring it a minimum of 80 percent of its shares during the lean period and further reinforces in Article 12 that Bangladesh's share of water cannot be reduced under any circumstances during the duration of the treaty (Islam, 2016).

Finally, in 1996, a long-term Ganges water treaty was signed and implemented, but the treaty did not contain the 'guarantee clause.' Article II of the existing treaty simply states that: *“In the event flow at Ganges through Farakka dam falls below 50,000 cusecs in any 10-day period, the two governments will enter into immediate consultations to make adjustments on an emergency basis, in accordance with the principles of equity, fair play and no harm to either party”* (Islam, 2016). Although there is a formal treaty to ensure Bangladesh does not face water scarcity, there are serious concerns that India, the upper riparian country, does not fulfill its commitment. A Flood Action Plan (FAP) study in Bangladesh on southwest water resources management (FAP 4) revealed that the flow agreed to under the agreement is insufficient to redress the problems of the high levels of salinity in surface and groundwater and the issues for navigability, fisheries, and the general deterioration of river ecosystems (Chadwick, 2011).

Another bilateral agreement between India- Bangladesh that failed to ensure an equal share of water is Teesta River Water Sharing Agreement. The river Teesta mouthed to the Brahmaputra remained a contested river because of India's fragmented governance within the nation, which resulted in incapability to present the agreement as India's national interest that fosters human security in both sides of the border. In 2011, the Prime Minister of India agreed to sign the proposed water-sharing agreement but ultimately was unable to because he failed to gather support from the West Bengal Chief Minister (Limaye, 2016). The water sharing has remained a contentious political issue, and failure of diplomacy between the countries has continued to create water stress for millions in Bangladesh.

National actions might also not be able to solve future problems such as the exacerbation of the water stress situation due to proposals from upper riparian countries such as China to divert water of both the Ganges and Brahmaputra for its own use, which can further worsen the existing dispute between countries over water (Islam, 2016). This emphasizes the need to hold both multilateral negotiations along with a discussion on water sharing among the related countries.

The non-interference of UNICEF in such treaties reflects a pluralist view that has failed to provide certainty and justice to the people of Bangladesh, where millions of people are deprived of water because of climate change, which has further aggravated the problem due to the political agendas of the powerful countries. National boundaries that intersect river basin and aquifer systems separate sovereign nations with distinct interests, management policies, legal frameworks, and political practices, creating potential barriers to the coherent regulation and management of the water resources as a whole (Kistin, 2008). It is not possible for UNICEF to alter the legal, political sector of each of these countries; however, its presence in these countries allows it to have a rare and exclusive position regarding each of the country's water supply system.

UNICEF with its pluralist view has a strong bias towards tolerance of different forms of justice, but its focus on non-interference creates tension between justice and human security. With its presence and activities in these countries, UNICEF has higher ability to work towards resolving the water sharing crisis among countries and can encourage each country to develop knowledge, relationships, and capacity for cooperation. The non-interference of UNICEF can be regarded as respecting the sovereignty, but in the long run it is harming humanity. Although fully

aware of the citizens' plight due to water scarcity in Bangladesh, the organization has not raised awareness in the global arena.

The position of UNICEF could have been utilized to ensure justice. Justice that assures human rights, in this instance by providing deprived citizens accesses to freshwater by creating awareness and promoting dialogues among the countries to persuade the countries to make an appropriate allocation of water.

Reasons for UNICEF to adopt a solidarist view. The UN is the major promoter of human security, and the UN and its related organizations have addressed the life-threatening water stress in Bangladesh with a pluralist view and not with a 'people-centered' approach of the unconventional (human) security system. The failure of the bilateral agreements and excessive concentration on pluralist view turned to be detrimental in mitigating water stress in Bangladesh.

Over the last century, the riparian countries in the Ganges river basin have established a variety of institutional mechanisms for managing shared waters; however, the level of collaboration and implementation has been low (Bharati, 2009). With its existing resources, UNICEF can improve the nature and outcomes of cooperation between all three riparian countries: India, China, and Bangladesh. After failing in attempts to resolve this issue bilaterally, Bangladesh raised the issue of Ganges water sharing in the UN General Assembly session in 1976, and an ad hoc five-year agreement on Gange's water sharing was agreed to in 1977 (Chadwick, 2011). However, the UN halted its action after the attempt to resolve the water sharing crisis. UNICEF, understanding the water scarcity throughout the country and water stress particularly in the rural areas, could have intervened to try to maintain constant water supply in Bangladesh by promoting dialogue among the countries. By ignoring the critical approach to question the existing condition, UNICEF instead focused on the prevailing structure of power,

which had only policies that cannot help to mitigate the impacts of climate change and learn to deal with the water scarcity crisis.

This study suggests that to exercise people-centered approach, UNICEF can adopt the solidarist view. The concept of human security views international relations as a solidarist society of humans, not of states. That means that universal justice can transcend borders. As according to Newman (2014:233), the solidarist view suggests that states that commit serious human rights violations forfeit their right to be treated as a legitimate sovereign and further argues that state sovereignty is a social construction, which means that it is not a natural or inevitable phenomenon and therefore can be challenged.

According to the UNFCCC, adjustments in both natural and human systems are required to respond to the expected climatic stimuli (UNISDR, 2010). That means the actions and the responses have to be tailored according to the environmental crisis need. Climate change due of its nature and form cannot be handled with conventional techniques and be considered as a concern of states only; as excessive emphasis on sovereignty and statehood would divert the main focus which should be ensuring basic human rights that are breached by the crisis like water stress.

UNICEF following UNFCCC guidelines can take into account that the existing methods to mitigate water stress are not adequate, and the water stress requires to adjust the way it is studied. By being part of the UN and adopting solidarist view, UNICEF can take the responsibility to govern and advise on internationally shared water resources, with which countries can address these differences by developing principles, rules, and decision-making procedures to govern and regulate the management of internationally shared waters jointly. Thus,

it is suggested that UNICEF can apply solidarist view by promoting multilateral treaties for Ganges and Brahmaputra and act as a mediator in such treaties.

Multilateral agreements have proven to be successful for many parts of the world for eradicating water stress. The 1995 Mekong River Basin Treaty is an agreement between Cambodia, Laos, Thailand, and Vietnam; China and Myanmar are the upper riparian states that are not partners, but they are the official dialogue partners. The 1966 Helsinki water rules, the customary international law provided the groundwork for the legal foundation of the treaty. The constant interactions of the participant nations, sense of commitment and the desire to reap benefits from shared data and information made “one nation basin” possible. One of the major mediator to keep alive the “Mekong Spirit” is UNDP. The organization has not only agreed to provide technical and financial support in formulating the agreement but also acted as a consultant that helped to facilitate the negotiations when the respective member state delegations were in disagreements. Another water treaty which has been successful for almost 60 years is 1960 Indus Water Treaty(IWT). Despite the contested relationship between India and Pakistan, the IWT is “regarded as one of the most successful settlements of a transboundary water basin conflict” (McKinney, 2011: 97). World Bank plays an exemplary role to provide a framework for irrigation and hydropower development for the IWT treaty. World Bank facilitates the treaty’s mechanism for information exchange and cooperation between the two countries (WB, 2017). The treaty has set distinct procedures to handle disagreement; the questions are handled by both country’s Indus Commission and their differences are resolved by a neutral expert. All these years World Bank has been vigilant and continued with amicable resolutions to resolve discourses within the treaty.

Both Mekong and Indus rivers are also important rivers of the HKH region. Regardless of their border and resources conflict, countries related to these rivers have come to agreeable negotiations regarding water allocation. In both treaties, mediators have been present, for the Mekong, it is UNDP, and for Indus, it is World Bank. The question remains, without the intervention of the mediators would these negotiations have been ever possible or to what extent these treaties would have been successful. The advantage of multilateral agreement over bilateral agreement is that power imbalances reduces due to the presence of several participants and promotes power parity. Even after that power imbalances remains because upstream and downstream relative distribution of power exists only multilateral agreement can not fully diminish that. That is why the presence of a mediator promotes fair water allocation and reduces the fragmented governance by understanding the contradictory advice of hydrologists, environmentalists, and engineers of different countries. Besides advice, they come up with an optimal and sustainable approach to manage an international river and, besides, mediators have a strong grasp of international laws, which serves as a vital starting point for negotiations.

UNICEF's intervention regarding the treaties and other water allocation systems would not violate the sovereignty of China, India, or Bangladesh under the solidarity view because it is advocating and ensuring basic human rights and access to freshwater. In order to progress and confront the challenges of 21st-century climate change, UNICEF has to stop promoting conventional security that promotes pluralist view only and focus on empirical changes that can help to eradicate water scarcity. UNICEF can treat the agreements as an integral unit and monitor the participation of the related counties and their understanding of ecological interdependence within the ecosystem of the rivers.

For an example of an intervention that better reflects the solidarist view and can be successful in promoting human security, consider how UNICEF has helped deal with the arsenic present in the groundwaters of both India and China. UNICEF put effort to identify such contaminated water sources. In China, it works with the Ministry of Health and the Ministry of Water Resources; in India, it supports the national and state governments in developing and implementing a range of replicable intervention models for sanitation, hygiene, and water supply (UNICEF China, 2018; India, 2018). UNICEF collected data on a geographic information system for mapping and analyzing data about contaminated water with the national organizations, along with that they support training local related professionals across these countries to develop management of the freshwater system. The system is producing continuous data that informs government policies and regulations relating to clean water provision planning and keeps them updated (UNICEF China, 2018; India, 2018).

Moreover, the colossal amount of time women spend in carrying freshwater is not only a difficulty in Bangladesh only, but Indian rural girls and women also share similar water collection hazard that hampers health, has a risk of sexual assault while fetching water and takes away their educational opportunity. Even in China, the scarcity of freshwater and sanitation strikes girls the most resulting in illness and missed schools (UNICEF USA, 2018). UNICEF in Bangladesh is already working with the Convention on the Elimination of Discrimination against Women (CEDAW), the Millennium Development Goals (MDGs) and the Millennium Declaration to improve the low socioeconomic status of women (UNICEF, 2009). As a mediator, UNICEF can share the knowledge of such similar socio-economic crisis due to the scarcity of water and can improve the water collection sources and can initiate to mitigate the core cause, climate change, which is causing gender inequality partially.

As UNICEF helps to address the contaminated water sources and finds alternative sources of safe drinking water for affected communities, the organization has enough information to collaborate with the countries and emphasize the shared water threats. This information can contribute to help research and influence government decision making about water-supply management. Such intervention to shape water management policies by UNICEF can be considered as reinstallation of human rights. Citizens suffering from freshwater are deprived of fundamental human rights, and UNICEF's contribution to mitigating the water scarcity during climate change can be considered as not breaching legitimate sovereignty, according to the solidarist view. Through the adoption of the solidarist view, UNICEF can help to increase communication among countries and alert the world regarding water stress, so that water sharing treaties do not remain only on papers but must be implemented in reality.

Moreover, solidarists emphasize that the government of a state has a responsibility not only to protect its citizens but to extend its support to the citizens of other countries whose human rights are violated (Newman, 2014; Wheeler, 2000). Here, both India and China being superpowers of Asia and the world, have the responsibility to secure the Bangladesh citizens' right of drinking freshwater. Understanding the solidarist view, UNICEF must encourage normative changes within governments and persuade countries to participate in resolving water stress conditions through multilateral agreements. Therefore, UNICEF directly sending the world the message that it is ensuring the right of every citizen and that access to freshwater cannot be limited by political concerns and cannot be restricted by the legal shield of sovereignty.

Controlling climate change is difficult. However, it is possible to ensure human rights of drinking freshwater through international cooperation among the related countries. The glacier melts of the HKH, the decline in rainfall, and the rise in temperature produce water stress for the

people who are dependent on the HKH river flow. UNICEF can step forward to ensure the constant river flow that should not be interrupted by unnecessary agreements, should promote adaptations to combat climate change, and should better promote human security.

CHAPTER V: CONCLUSIONS AND RECOMMENDATIONS

The climate of the Hindu Kush Himalayan (HKH) region is experiencing remarkable changes. It is impacting the glaciers in the HKH and glacial retreat is one of the factors that contribute to the changes in the hydrological cycle in the Himalayan region. Glacier melt contributes to the river flow of the Ganges and Brahmaputra. Depending on locations, the effect of glacier retreat varies. However, the effect of the retreat is most evident in the dry season. In addition to the retreat, shifts in the variability of temperature, and precipitation intensity determines the constant flow of the rivers. The consistent melt of glacial ice plays a fundamental role in maintaining water supply in the countries.

Bangladesh, a country in the downstream of water flow from the HKH, is dependent on the upstream countries, particularly India and China for its water needs. The availability of water during the dry season (November–May) has always been scarce, now climate change in the HKH region adds pressure on the water supply of Bangladesh to be obtained from Ganges and Brahmaputra. These two major rivers, in conjunction with Meghna, are the principal sources to meet the demands for freshwater in Bangladesh. The changes in climate and absence of a long-term multilateral water resources management in the region, thanks to strained diplomatic relationships with the neighboring countries, resulting in water stress for Bangladesh.

In this study, I have argued that the existing water stress due to climate change has the potential to exacerbate in the future, and ultimately is a human security threat to the millions of Bangladeshis. The framework of human security has been essential to assess the influence of water stress. It is known that the water stress is prevalent in Bangladesh, however, the sources and chain reactions are still unknown to the fullest. Human security tries to understand and links the chain reactions of such crisis, here it is the contribution of the glacier in respect to the

changes in rainfall and temperature with the effects on the disadvantageous groups, particularly poor rural women. Such links are possible as human security separates the water stress threats from the vulnerabilities, which helps to understand that assumption such as flood is not always detrimental, is not true for all context. I have also explored the roles the Bangladeshi government and the international community, which are helping to address the crisis, specifically their contradictions with the human security concept, and how the adoption of solidarist view of human security can create room for multilateral agreements and encourage to act as mediators. Drawing on the limitations and the inadequacies of the current strategies, I will make a few recommendations to the principal actors in this concluding chapter. Before making these specific recommendations, I will briefly summarize the central points that emerged in this study.

Increased salinity due to the sea- level rise is the proximate cause of acute safe drinking water scarcity in Bangladesh. The other significant cause of the crisis is the growing arsenic contamination. Both of these trends pose threats to a large number of Bangladeshis, as there is not sufficient water supply from rivers in the groundwater to flush out salinity and no strong water flows in the deep groundwater that can help people to have access to arsenic-free water. A failure to address threats of such magnitude and consequences contributes to the vulnerability of the citizens. Inefficient water management systems, the absence of consultations with the stakeholders in the affected areas, lack of technology and particularly failure to link climate change of the HKH with the river flow of Bangladesh result in excessive demand for freshwater without any substantial supply, thus creating water scarcity. Lack of access to freshwater is nothing short of a denial of fundamental human rights which exacerbates vulnerability. Out of 160 million, nearly 40 million people are directly affected by water, and soil salinity and another 20 million are at risk in coastal Bangladesh (Abedin, 2014).

People from the most disadvantaged area suffer the most from such vulnerability as there are no security and laws to protect them. Women and young girls in the rural areas of Bangladesh continuously suffer due to the water scarcity as they are responsible for acquiring water for the household. As such meeting, their basic water needs undermines their health and ability to pursue their education. Human security is blatantly infringed as this particular segment of the population does not have freedom from want and fear. Often, these women and girls are sacrificing their dignity to meet the demand for freshwater for their household.

The inefficient water management actors are highly responsible for the continuation of water scarcity. Geographical location notwithstanding, the lack of initiative to monitor and address water concerns in the operation of water projects throughout the country puts Bangladesh at a disadvantaged position. Both national and international actors are responsible for lack of initiatives to find the core reasons of such water crisis. The abject failure of the Bangladeshi authorities to ensure transparency and address the widespread inefficiency in water management and include water management in climate change adaptation strategies paved the way for the involvement of the international community.

UNICEF, a prominent actor to lead the water management system in Bangladesh, focuses on removing salinity and arsenic contamination and tries to create better policies to improve the water crisis in the country. UNICEF's predisposition towards the UN concepts- pluralist view creates indifference towards a problem-solving approach, as their approach does not allow the state to eradicate the root causes of water scarcity.

In the existing condition, the water scarcity problem is viewed through the lens of lack of tube wells only, while the core problem is far more profound than that. The threat of climate change and the vulnerability created by water scarcity cannot be removed by only installing tube

wells all over the country. UNICEF supports better technology to improve water sources in Bangladesh- tube wells and tanks to remove arsenic and salinity which allows it to have a position in water management in the country. However, that is not adequate to address the actual threat. UNICEF's notion of non-interference to other countries puts the country in a vulnerable situation because water sharing is an issue which transcends national boundaries. Its lack of initiative to communicate with the other countries such as India and China regarding the shared water problems of arsenic and water stress puts the organization among non-active actors. UNICEF does not promote dialogue among the countries benefitting from the shared water resources of the HKH. Moreover, in spite of having adequate information regarding Bangladesh's water scarcity, UNICEF has not raised awareness in the global arena.

Collaborative initiatives, such as proposing multilateral agreements among the affected nations of Ganges and Brahmaputra and UNICEF conducting as a mediator, are few of the responsible acts that can support to improve water management in the country and address climate change in the HKH and its impacts on the river flows. Finally, such initiatives can help to reduce the human security crisis emanating from the water stress, in Bangladesh and perhaps the region and can mitigate in the long run.

Policy Recommendations For

National Community: Bangladesh

Bangladesh has accepted and recognized the human rights to safe drinking water and sanitation at both the national and international levels on various occasions, however, lack of constructive action has only led to a crisis like water stress. The first and foremost role of national authorities needs to communicate with the local authority who are severely affected by water stress and understand the financial and practical support needed by them. Although this is

a short-term solution to avoid the water scarcity, Bangladesh must have permanent political will at three levels- local, regional, international to make the water arrangements successful as a long-term solution. In order to negotiate with the other countries for a feasible water treaty, Bangladesh must create a foundation that has no space for mismanagement, non-transparency, bureaucracy, and nepotism. In fact, Bangladesh has to focus on the vulnerable groups like the rural poor women, until and unless there are active gender mainstreaming practices, the vulnerabilities and threats of water stress will remain unknown, and an incomplete view cannot pursue cost-effective and efficient transboundary negotiations.

For negotiation processes, the epistemic communities need to be prioritized. As scientists and scholars can provide facts, additionally, they are known for fresh approaches that can help to strengthen the diplomatic relationship with the world. Undoubtedly, a skilled multidisciplinary team of expert, hydraulic engineers, jurists, technical and international relation experts are required to engage for their requisite knowledge and expertise to implement legally binding documents between the different countries government.

With all the experts alone, the negotiation for water treaties cannot be successful, for that adopting a pragmatic and practical approach enables to build long-term water cooperation. For that, human security's problem-solving approach tends to recognize the legitimacy of the interest of the different states and organizations related to the water treaties. Though the parties must be interested in the same goal, the reasons are usually different. Bangladesh needs to accept and publicly recognize such differences in the river basins. Moreover, Bangladesh has to critically assess the arguments of both upper riparian countries, being the lower riparian country. No longer Bangladesh can evade difficult issues and postpone the negotiations as that will not be prudent for the country's future. A mediator or third party can engage all the stakeholders,

however experts in Bangladesh needs to satisfy and find common ground with the related countries. Only powerful interests can help to congregate the parties and change the perception of transboundary water negotiation, and Bangladesh with its unique geographical position can offer more than information to reach to the other countries and bargain its way to a successful water treaty negotiation.

Regional Community: China-India-Bangladesh

The HKH countries which notably shares Ganges and Brahmaputra need to create a shared vision regionally that helps to build a pertinent understanding of the importance of preserving the water resources. Here, it can be among Bangladesh- India-China. A shared vision paves the way for an active process of allocating water because the vision helps to clarify each country's capacity in preserving water resources and their capability to allocate freshwater. The constant water supply from the rivers through water reserves and dams can mitigate the harsh impacts of climate change on water supply. Thus, the regional community can maintain an environment that ensures proper functioning of the water that keeps intact the human rights of accessing freshwater for all the citizens of the region.

The countries that share the rivers need to create a sustainable watershed management regime that transcends national boundaries. In order to increase the effectiveness of water management, countries have to integrate planning and management that prevents the effect of climate change. The stakeholder countries for each river have to communicate regarding their water and ecosystem sectors. In that way, regional coordination and sharing of data can take place which can contribute to climate monitoring. The vision is ultimately for the development of the marginalized communities of these countries, and the accurate and efficient data can help to prevent water stress and avoid communities' migration, a health hazard, and food scarcity

because of climate change. The related parties have to realize that for fruitful cooperation, acceptance and commitment are required on the discussed water issues. Ultimately sharing data and exchange of ideas generates trust among the parties, that creates scope to discuss problems, inform, learn and sensitize the participants to solve the conflicts that are more or less likely to occur.

The critical view of human security questions the existing condition that causes regional discrepancies, and the credibility of the institutions (for example- River/ Treaty Commissions) that deal with the water-related agreements, to understand the efficiency level of such institutions. The legitimacy and efficiency of such institutions mostly depend upon the level of exchanging experiences and their effort to strive for win-win agreement. The negotiators must pursue to accommodate all relevant issues regarding water stress by all the parties. Until and unless the agreements are win-win agreement, there is always the risk that the party's whose expectations are not satisfied will not put effort to implement the agreement.

The differences in culture, working methods, language barriers and different worldviews are the few key challenges that can create hindrance in the countries alliance learning process. The use of shared vocabulary and similar standardized documentation process are valuable tools to communicate and harness collaboration on particular water stress issues. Moreover, the exchange of local knowledge and resources with one another can contribute to pursue successful cooperation schemes to achieve collective learning about a crisis like water stress and form precise and ambitious water allocation agreements that can be implemented as a shared vision. The regional political or economic conflict seems to pose a threat to such agreements; however, the questioning approach of human security challenges the relevance and benefits of the disputes.

Finally, human security approach bargains on water agreements risk and helps to perceive the transition from risk to opportunities.

International Community: UNICEF

UNICEF can play the key facilitator role to create a conducive environment to accomplish regional cooperation and multilateral water treaty. The credibility it holds in the three countries allows the organization to be considered as a skilled mediator. Its role can go beyond organizing meetings and can engage stakeholders to put effort to push and pull information and coordinate the responsibilities among the related parties regarding water allocation in the Ganges and the Brahmaputra.

UNICEF and water governing bodies in Bangladesh can integrate inclusive and open decision-making processes for stakeholders nationally to create scope peoples' participation who are directly suffering from water scarcity. The international community with the help of water management actors can assist and help to supply security for those who are in vulnerable situations. Allowing multi-stakeholders can build collective representation from the government, civil society, research institutions and private sectors of the countries involved, together it is possible to create a platform to address the threat of water stress directly.

The related parties and UNICEF can pursue international multilateral framework instruments such as the 1997 Convention on the Law of the Non-navigational Uses of International Watercourses and 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention). These conventions can help to lay the groundwork for a legal framework that can create cooperation on the transboundary water of Ganges and Brahmaputra and can strengthen the platform of stakeholders. An ad hoc approach denies consistent technical and data which is essential to form institutional cooperative efforts.

So, the ultimate purpose of the establishment of a Secretariat and a permanent framework in both legal and administrative aspect can enable the stakeholders and the co-riparian countries to address the water-related issues in the formal and organized way.

With the human security approach to the legal framework, it develops a concrete foundation for negotiation because the approach allows the humanitarian concern to be the priority, not the politics of the states only. The humanitarian concern dictates that for a country's sustainable economic development it is important to protect human rights such as access to freshwater. Moreover, human security act as an incentive to the international community to change traditional courses of actions and imply that water stress crisis in one country does not remain as an isolated crisis rather it spreads to the neighboring states too, which makes it more pragmatic for the community to support transboundary water cooperation. In order to share such data and communicate it effectively, the open and assertive environment needs to be promoted by UNICEF so that regardless of the country's size, democratic participation and process for expressing an opinion can be exercised.

Regardless of cooperation agreements and processes, the power asymmetries among the countries are present creating imbalances in negotiation positions. Although the riparian countries have equality of rights in accessing water, in reality, the benefits are not distributed equitably. The presence of UNICEF can bring more accountability of the powerful countries on the global platform and can ensure that each state, where the river water flows, is entitled to benefit from the transboundary waters which enable the minimum flow of river water. Thus, assuring equality of rights of citizens. The upstream and downstream differences in negotiations will be there. However, UNICEF as a neutral stakeholder can intervene to suggest and monitor the cooperation allowing more certainty for the treaties to be successful. Understanding the

magnitude of the water stress in Bangladesh and the related hazards in the river sharing countries, UNICEF's prompt action can save millions of people's lives and can remain as an example for the rest of the world.

Limitations and Future Overview

Scope to Analyze Hydrological Politics

The geopolitical and political relations among the Asian countries sharing the Ganges and Brahmaputra, India, China, and Bangladesh, has not been focused, for example, China's vote against the 1997 United Nations Watercourse Convention that supported the regular exchange of hydrological and other data between co-basin states. The hydrological politics among China-India- Bangladesh is not observed in this study, that way the study restricts to witness the role of China as hydro hegemon and how it exploits its status as a superpower to gain strategic leverage over its neighbors on the allocation of the water resources of the HKH. The reason there is lack of multilateral agreements- presently among India, China, and Bangladesh, which do not have a joint treaty for the management of Brahmaputra or Ganges, except the international norms that states being an upper riparian the state must be cognizant of the water sharing, is not elaborated. Moreover, the role of Nepal and Bhutan who are sharing Ganges and Brahmaputra is not discussed or how their inclusion can contribute to the water treaties has not been elaborated. The historical background of all the countries related is not mentioned in the chapters of this study.

The Financial Aspect of Such Agreements is not Included in This Study

The possible multiple sources of finance for such water treaties are not explored here. In order to maintain cooperation, adequate sources of financing must be taken into account. Due to lack of information and concentrated time, such effort was not out to find the obstacles and feasibility of financing such process. The financing process in the local, regional and

international level is not emphasized or the kind of financial support these levels require to remove conflicts and deal with water collection in the long run.

Maintaining the cooperation requires multiple sources of financing, including agreed member's quotas that provide the necessary funding to continue the cooperative management of water resources. Such multiple sources for funding have not been discussed that deals with conflicts on water use and water allocation.

Explore Other Vulnerable Groups Who are Affected by the Water Stress Floods and Constrained River Flows

Besides women, children in the rural areas are highly affected by climate change and water scarcity. Healths, educational opportunity, living conditions of children are immensely affected. This study focused on rural poor women and gender-related problems. However, the similar concern for children is not referred here. The threats and vulnerabilities caused by climate impacting children are not referred. That keeps the view of the effects of climate change incomplete in the study.

Lack of Scientific Evidence to Conclude the Geographical Condition of the HKH

The role of precipitation (snow and rain), temperature and glacier retreat need to be examined to understand the overall impact on Bangladesh's part of Ganges and Brahmaputra. Deficiency in regional data to study climate change is not pointed out. In future studies, such limitations can be considered to comprehend both water stress and scarcity impacts and their related vulnerabilities.

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