

## Nexus between Climate Change and Human Insecurity: Implications for Pakistan

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### Abstract

*Climate Change (CC) is a critical issue for South Asia. To justify this assumption, this study first discusses the relationship between climate change and security. In most of this CC and security nexus work, however, primary efforts to find ways that connect CC and security especially non-traditional security have been made by scholars like Homer-Dixon and Myres. Generally, two assumptions have been made by most of these scholars. One, according to them, CC or environmental degradation could lead to instability by disrupting social and administrative relations and, therefore, could result in “civil turmoil and outright violence”. Second, CC-induced insecurities will evenly be engendered internally as well as externally. Fears are also there over the possibility of the emergence of “failed state” as a result of which CC could nurture extremist ideologies. Finally, CC could result in inter and intra state conflict whose “spill over” effect could result in divergent regional implication. It is in this context that the paper moves on to discuss the implications of CC in*

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*general and on South Asia in particular, discussing effects on Pakistan specifically. In the similar vein, it further endeavors to comprehend some particular CC induced effects together with the explanation of the effects of CC on Human Security (HS) in South Asia (SA). To ensure HS, the study concludes, tackling effects of CC is need of the hour.*

**Keywords:** Climate Change (CC), Human Security (HS), South Asia (SA), Conflict, United Nations (UN), United Nations General Assembly (UNGA), Intergovernmental Panel on Climate Change (IPCC)

## **Introduction**

Climate Change (CC) is a critical issue for South Asia (SA).<sup>1</sup> According to numerous publications of Intergovernmental Panel on Climate Change (IPCC), South Asian states are vulnerable to decline in crop yield; a hike in climate-induced diseases; food and water insecurity; floods especially because of higher intensity of glacier melting, loss of coastal ecosystems and dangers to fauna and flora. The international community, however, has been struggling to find a connection between CC and security. The question whether CC is a threat to national security, regional security and international security gave way to the development of CC as a non-traditional security threat<sup>2</sup> and shed light on the Human Security (HS) domain. That is why; CC is presented as a threat multiplier, in various

<sup>1</sup>Neil Bhatiya, "Why South Asia Is So Vulnerable to Climate Change," *Foreign Policy*, April 22, 2014, <https://foreignpolicy.com/2014/04/22/why-south-asia-is-so-vulnerable-to-climate-change/> (accessed January 12, 2018).

<sup>2</sup>Tariq Waseem Ghazi, A.N.M Muniruzzaman and A.K. Singh, "Climate Change & Security in South Asia: Cooperating for Peace," *Global Military Advisory Council on Climate Change* 4, no. 2 (May 2016), <http://gmacc.org/wp-content/2016/05/ClimateChangeandsecurityinSouthAsia> (accessed February 11, 2019).

instances, capable of diminishing societies' robustness against political instabilities and violence, by supposing, "climate change could create risk of major disruptions to economic and social activity, on a scale similar to those associated with great wars and economic depression of the first half of the twentieth century."<sup>3</sup> These disruptions could easily escalate sources of social tensions and unrest and other similar pressures.

To justify these assumptions, this paper first discusses the relationship between CC and security. The focal point of this section is to find out that whether any relation between CC and security exists or not. If yes then what is the type of relationship and in how many ways it affects HS. After this, the paper moves on to discuss the implications of CC on HS in SA in general and on Pakistan in particular. The paper concludes that it is need of the hour to step up against the effects of climate change to ensure human security in SA as well as in Pakistan.

### **Climate Change and Security Nexuses**

In the past, there have been clash of opinions among different academics and policy makers; whether climate change should be even considered as a security threat or not. Today, however, a number of reports, speeches and initiatives from the late 1980s and onwards are available on the table to argue that climate change is no doubt a security concern.

Though CC and security nexus is not present in the initial global discourse over CC but in June 1988 a conference held in Toronto, Canada on the topic titled, "The Changing Atmosphere: Implications for Global Security," pointed out CC-induced major

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<sup>3</sup>Stern N, *The economics of Climate Change: The Stern Review* (Cambridge: Cambridge university press, 2007), xv.

threats to international security.<sup>4</sup> The statement on the outcome of conference further added that “the potentially severe economic and social dislocation” as a result of changing climate “for present and future generations would worsen international tensions and increase risk of conflicts among and within nations.”<sup>5</sup> Later in 2000, former United Nations Secretary-General Kofi Annan referred “environmental disasters” such as more droughts and increased intensity of storms, as “one of the threats to human security.”<sup>6</sup> Moreover, according to a 2004 report of the UN titled, “High-level Panel on Threats, Challenges and Change,”<sup>7</sup> preventive actions are need of the hour to avoid and tackle environmental degradation and CC respectively. As a result, UN Security Council, for the first time, talked about security implications of climate change wherein UN members of international community shed light over possible security and survival dangers because of climate change.<sup>8</sup>

In the wake of IPCC’s fourth assessment report, later on, the United Nations General Assembly (UNGA) organized a debate captioned, “Climate Change as a Global Challenge.” The conference was very important as it followed by the adoption of a resolution focusing on “to intensify their (UN agencies) efforts in considering and addressing climate change, including its possible security

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<sup>4</sup> Peter Usher, “World Conference on the Changing Atmosphere: Implications for Global Security,” *Journal Environment: Science and Policy for Sustainable Development* 31, no.1 (1989): 292-295.

<sup>5</sup>Ibid.

<sup>6</sup>Kofi A. Annan, *Reports of the Secretary-General on the Work of the Organization, General Assembly Official Record Fifty-fifth session Supplement No. 1-A/55/1* (New York: United Nations, 2000), 4.

<sup>7</sup>“A more secure world: Our shared responsibility, Reports of the High-level Panel on Threats, Challenges and Change,” *UN 2004*, vii-x, <http://www.un.org/enpeacebuilding/> (accessed January 12, 2018).

<sup>8</sup>“Security Council Holds First-Ever Debate on Impact of Climate Change on Peace, Security, Hearing over 50 Speakers,” *United Nations*, April 17, 2017, <https://www.un.org/press/en/2007/sc9000.doc.htm> (accessed January 15, 2018).

implications.”<sup>9</sup> Secretary General also submitted a report on the ‘climate change and its possible security implications’ as requested in the resolution adopted by the member states and sponsored by the Pacific Island countries at the 64<sup>th</sup> session of the General Assembly (64/350).<sup>10</sup>

The report was basically an amalgamation of IPCC’s assessment report and concerns and inputs by member states, mainly focusing over climate change and security nexuses. More importantly, the report pointed out five threats to human, regional and international security due to changing climate. However, prior to mentioning those five CC-induced security threats, it is pertinent to mention that though the report regarded CC as a “threat multiplier” but it also enlisted numerous “threat minimizers” that could reduce climate-induced insecurity. Threat multipliers, on the one hand, are: one, extreme events, such as floods and droughts, usually result in decreasing agriculture production and severely affecting human health, thereby, directly resulting and increasing human insecurity simultaneously. Two, CC could also diminish socio-economic gains of a state. As a result, states become ineffective in properly managing internal stability owing to deteriorated law and order situation. Three, CC-induced population displacement, migration, resource, such as land and water, competition could heighten the risk of domestic conflict by instigating violence. Four, small island developing countries may even suffer from loss of territory or arable land because of rise in sea-level as a result of CC; therefore, threatening state security and

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<sup>9</sup>“Climate Change: the Science, the Impact and the Adaptation Imperatives & Mitigation Strategies in the context of sustainable Development,” *UN*, August 1, 2007, <http://www.un.org/ga/president/61/follow-up/thematic-climate.shtml> (accessed 15 January, 2018).

<sup>10</sup>“Climate Change and its possible security implications,” *United Nations General Assembly*, September 11, 2009, <http://www.refworld.org/pdfid/4ad5e6380.pdf> (accessed January 20, 2018).

sovereignty. Five, trans-boundary conflicts, hence, become inevitable between states, sharing water and other resources. On the other hand, timely initiatives on “climate change mitigation and adaptation, economic development, democratic governance, strong local and national institutions, international cooperation, preventive diplomacy and mediation, timely availability of information and increased support for research and analysis to improve understanding of climate change-security inter-linkages” could mitigate the climate change effects. Furthermore, the report also recognized the need for “a comprehensive, fair and effective global agreement (to) help stabilize our climate, protect development gains, assist vulnerable nations adapt to climate change and build a more secure, sustainable and equitable society.”<sup>11</sup>

United Nations Secretary-General Ban Ki-moon has also repeatedly divulged his concerns vis-à-vis CC and its dangers. For example, at a meeting of youth delegates at United Nations (UN) headquarters in New York in March 2007, the Secretary-General was of the opinion that “in coming decades (climate related) changes in our environment and the resulting upheavals-from droughts to inundated coastal areas to loss of arable lands-are likely to become a major driver of war and conflict.”<sup>12</sup> Similarly, two years later in August 2009 at global environment forum in South Korea, the former Secretary-General Ban Ki-moon warned international community that unsuccessfulness in acting to tackle CC could lead to deteriorating social structure that will lead to

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<sup>11</sup>Ibid., 8-27.

<sup>12</sup>Ban Ki-Moon, “Address to the United Nations International School-United Nations Conference on ‘Global Warming: Confronting the Crisis’,” *UN*, March 1, 2007, [www.un.org/apps/news/infocus/sgspeeches/search\\_full.asp?statID=70](http://www.un.org/apps/news/infocus/sgspeeches/search_full.asp?statID=70) (accessed January 12, 2018).

social unrest and violence.<sup>13</sup> This was a clear indication to the severity of the situation that CC is bewildering.

Lorraine Elliott and Mely Caballero-Anthony's edited work titled, "Human Security and Climate Change in Southeast Asia: Managing risk and resilience," comprehends required history, implications and the general way forward to CC. According to Elliott and Anthony, "climate change is implicated in threats to security and particularly to human security... that taking a human security approach to climate security will actually help to deliver more secure peoples, societies and states."<sup>14</sup> Rattan Lal in, 'Climate Change and Food Security in South Asia,'<sup>15</sup> discusses CC-induced temperature rise, change in precipitation level, rise of the sea level, melting of glaciers and degradation of the environment in SA, arguing that CC is a major concern in SA because of its impact on alterations in temperature and precipitation, rise of the sea level, melting of the Himalayan glaciers, and degradation of natural resources and the environment. Quentin Wodon in their edited book titled, 'Climate Change and Migration: Evidence from the Middle East and North Africa,'<sup>16</sup> revolves around the impact of CC on household living. The authors believe that the people being affected by CC are opting for such coping strategies that can be used in case of CC and extreme weather shocks.

Moreover, posing an alarmist situation the *Board of the Bulletin of the Atomic Scientists* set the Doomsday clock from seven to five

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<sup>13</sup>Ban Ki-Moon, "Remarks to the Global Environment Forum," *UN*, August 11, 2009, [www.un.org/apps/news/infocus/speeches/statmentsfull.asp](http://www.un.org/apps/news/infocus/speeches/statmentsfull.asp) (accessed January 17, 2018).

<sup>14</sup>Lorraine Elliott and Mely Caballero et al., *Human Security and Climate Change in Southeast Asia: Managing risk and resilience* (New York: 2013), xii.

<sup>15</sup>Rattan Lal et al, *Climate Change and Food Security in South Asia* (London: Springer, 2011), 13-30.

<sup>16</sup>Quentin Wodon et al, *Climate Change and Migration: Evidence from the Middle East and North Africa* (Washington: The World Bank, 2014), 237-265.

minutes to midnight, inferring that “global warming poses a dire threat to human civilization that is second only to nuclear weapons” in its report of January 2007.<sup>17</sup> In September 2007, International Institute for Strategic Studies (IISS) qualified CC as an “existential security threat” in its annual Strategic Survey.<sup>18</sup> It suggested that “the security dimension [of climate change] will come increasingly to the forefront as countries begin to see falls in available resources and economic vitality, increased stress on their armed forces, greater instability in region of strategic import, increase in ethnic rivalries, and a widening gap between rich and poor.”<sup>19</sup> In a similar alarmist tone 2004 report commissioned for the Pentagon predicted that CC would result in, “nuclear conflict, mega-droughts, famine and widespread rioting.”<sup>20</sup> There are many similar instances where CC is presented as a grave danger to human race but the most convincing was the awarding of the 2007 Nobel Peace Prize jointly to former US Vice President Al Gore and the IPCC for their valuable work on CC, which left little room for critics that CC does not lie in security domain. While announcing the Noble Peace Prize, the Norwegian Noble Committee said that CC has made HS vulnerable as it “increased danger of violent conflicts and wars, within and between states.”<sup>21</sup>

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<sup>17</sup>“Doomsday Clock’ Moves Two Minutes Closer to Midnight,” *Bulletin of the Atomic Scientists*, January 17, 2007, [www.thebulletin.org/minutes-to-midnight/board-statementshtml](http://www.thebulletin.org/minutes-to-midnight/board-statementshtml) (accessed February 1, 2018).

<sup>18</sup> “Strategic Policy Issues, Strategic Survey 107”, *International Institute for Strategic Studies*, no. 1 (2007): 47.

<sup>19</sup> *Ibid.*, 68.

<sup>20</sup> M. Townsend and P. Harris, “Now the Pentagon Tells Bush: Climate Change Will Destroy us,” *Observer*, February 22, 2004, [www.guardian.co.uk/environment/2004/eb/22/usnews.theobserver](http://www.guardian.co.uk/environment/2004/eb/22/usnews.theobserver) (accessed December 24, 2017).

<sup>21</sup> Norwegian Noble Committee, “Announcement: The Nobel Peace Prize for 2007,” *Oslo*, October 12, 2007, [http://nobelpeaceprize.org/en\\_GB/laureates/laureates-2007/](http://nobelpeaceprize.org/en_GB/laureates/laureates-2007/) (accessed January 12, 2018).



After the UNSG report's (64/350), as discussed before, warm support by UNGA and subsequent debates over CC and security nexus in UNGA led to the addition of a sub-section on HS implications of CC in the Fifth assessment Report of the IPCC (2013-14). According to the report, CC-induced migration, displacement of people, resources competition and extreme weather conditions such as heat waves usually result in poverty and economic downfall, which has the ability to instigate violent inter as well as intra state conflicts. The report went on to allude that "trans-boundary impacts of climate change such as changes in sea ice, shared water resources and pelagic fish stocks have the potential to increase rivalry among states... throughout the 21<sup>st</sup> century climate change impacts are projected to slow down economic growth, make poverty reduction more difficult, further erode food security and prolong existing and create new poverty traps." Furthermore, Mark Lynas in his famous book titled, "Six Degrees: Our Future on a Hotter Planet," argues that "any crisis in food production could quickly escalate into a crisis for the whole Pakistan economy... Farmers across the country may find themselves outmatched in turn by big cities like Lahore, Hyderabad, and Karachi, which each support populations in the millions."<sup>22</sup>

Collectively, all the IPCC reports warned that CC would eventually result in resource scarcity for an increased world population, vulnerability to extreme weather patterns, food and water insecurity and , thus, leading to infectious diseases. Simply, CC is expected to result in unrest and violence specially in those countries that are more vulnerable to resouces scarcities, share territorial disputues and has hostile past in their buckets.

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<sup>22</sup>Mark Lynas, *Six Degrees: Our Future on a Hotter Planet* (USA: National Geographic Society: 2008), 162.

In most of this CC and security nexus work, however, primary efforts to find ways that connect CC and security especially non-traditional security have been made by scholars like Homer-Dixon and Myres. Generally, two assumptions have been made by most of these scholars. One, according to them, CC could lead to instability by disrupting social and administrative relations<sup>23</sup> and, therefore, could result in “civil turmoil and outright violence”.<sup>24</sup> Second, CC-induced insecurities will evenly be fathered internally as well as externally. Fears are also there over the possibility of the emergence of “failed state” as a result of which CC could nurture extremist ideologies.<sup>25</sup> Finally, CC could result in inter and intra state conflict whose “spill over” effect could result in divergent regional implication.

Resultantly, numerous states started taking actions to tackle the effects of CC. In March 2008, the High Representative and the European Commission (HREC) published a paper for the Council of European Union on the topic climate change and international security.<sup>26</sup> In September 2009, the British government appointed Rear Admiral Neil Morisetti as a climate and energy security envoy on the reference that “climate change will act as an increasingly powerful amplifier of instability across some of the most volatile regions of the world.”<sup>27</sup> The United States too in its 2010

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<sup>23</sup>T. Homer-Dixon, “On the threshold: Environmental changes as causes of acute conflict,” *International Security* 16, no. 2 (1991): 91.

<sup>24</sup>N. Myres, “Environment and Security,” *Foreign Policy* 74, (1989): 24.

<sup>25</sup>CAN Corporation, “National Security and the Threat of Climate Change,” (2007), [https://www.cna.org/cna\\_files/pdf/national%20security](https://www.cna.org/cna_files/pdf/national%20security) (accessed January 21, 2018).

<sup>26</sup>“Climate Change and International Security,” *Paper from the High Representative and the European Commission to the European Council*, March 14, 2008, [http://www.consilium.europa.eu/uedocs/cms\\_data/docs/pressdata/en/reports](http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/reports) (accessed February 12, 2018).

<sup>27</sup>“Climate Security: Visit of Rear Admiral Neil Morisetti to Oslo,” *British Embassy Oslo*, November 20, 2009, (accessed February 1, 2018).

“Quadrennial Defense Review Report” referred CC as a potential security threat as it have the ability to instigate future conflicts.<sup>28</sup> Moreover, a 2007 report captioned, “National Security and the Threats of Climate Change”, holds CC as “a threat multiplier for instability in some of the most volatile regions of the world.” However, according to 2014 report the projected impacts of CC will be more than threat multipliers; they will serve as catalysts for instability and conflict.<sup>29</sup> Also, according to a statement by US Secretary of State John Kerry, CC is “a global threat of the same magnitude as terrorism, epidemics and weapons of mass destruction.”<sup>30</sup> Last, but not the least, “climate change-induced increase in the frequency and or intensity of extreme weather events... would lead to economic and political instability which can have dangerous national security implication.”<sup>31</sup> Hence, the security and CC nexus is obvious globally as well as in case of South Asia.

### **Climate Change in South Asia**

SA comprises sub-Himalayan countries including Afghanistan, Bangladesh, India, Iran, Nepal, Pakistan and Sri Lanka. These countries are part of the South Asian Association for Regional Cooperation (SAARC). The region, comprising less than 4% of the world’s land area and home to more than 1.7 billion people representing 21% of the world’s population, is already one of the

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<sup>28</sup> *Quadrennial Defense Review Report* (Washington DC: US Department of Defense, 2010), XV-7.

<sup>29</sup> *Ibid.*, 9.

<sup>30</sup> Dylan Adler, “The Changing Climate of Security”, *State of the Planet*, December 9, 2015, <http://blogs.ei.columbia.edu/2015/12/09/the-changing-climate-of-security/> (accessed March 2, 2018).

<sup>31</sup> “White House Report: The National Security implications of a Changing Climate,” *The White House*, May 20, 2015, <https://www.whitehouse.gov/the-press-office/2015/05/20/white-house-report-national-security-implications-changing-climate> (accessed March 2, 2018).

most environmentally challenged parts of the world.<sup>32</sup> The region is usually characterised by diverse climates. In this vein, CC is going to hit SA the hardest among other regions. This is because of the fact that climate of the region is compounded with higher temperatures, extreme weather, floods and mounting sea level and cyclonic activities in the Bay of Bangal and the Arabian Sea. According to a report by the Asian Disaster Preparedness Centre “Bangladesh is already under pressure from increasing demands for food and the parallel problems of depletion of agriculture land and water resources and an overburdening of local or national governance capacities.”<sup>33</sup> According to a joint report by Clean Air Initiative for Asian Cities Centre (CAI-Asia) and Cities Development Initiative for Asia (CDIA), in the similar vein, Bangladesh is vulnerable to frequent and severe tropical cyclones, heavy and erratic rainfall, higher river flows in warm months, river bank erosion, increased sedimentation in riverbeds, increased saline intrusion, increased droughts, rising sea level and warmer and more humid weather; India will be implicated by CC through its water resources, agriculture and food production, health, forests, climate events (such as cyclones, flood, droughts) and coastal areas; Pakistan is vulnerable to loss in biodiversity, water insecurity, rise in sea level and frequent cyclones, droughts and abnormal shifts in weather patterns; and Sri Lanka can be impacted by climate change through increase in the frequency and intensity of

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<sup>32</sup>Tariq Waseem Ghazi, A.N.M Muniruzzaman and A.K. Singh, “Climate Change & Security in South Asia: Cooperating for Peace,” *Global Military Advisory Council on Climate Change* no. 2 (May 4, 2016), <http://gmacc.org/wpcontent/uploads/2016/05/> (accessed March 4, 2018).

<sup>33</sup>Arpita Bhattacharyya and Michael Werz, “Climate Change, Migration, and Conflict in South Asia,” *Centre of American Progress*, December 2012, <https://www.americanprogress.orgclimate-change-migration-and-conflict-in-south-asia> (accessed March 7, 2018).

disasters, landslides, variability and unpredictability of rainfall patterns, increase in temperature and sea level rise.<sup>34</sup>

Hereunder are the specific signs and impacts of CC on SA, such as rising temperature, extreme weather events, glacier melting, sea level rise, infectious diseases and black carbon.

### **Rising Temperatures and Extreme Weather Events**

Rising temperatures have rigorous distress on SA. According to a press release by the World Meteorological Organization (WMO) on March 21, 2016 “many countries saw intense heat waves. The most devastating ones in terms of human impact were in India and Pakistan. Asia, as a continent, had its hottest year on record in 2015.”<sup>35</sup> In Southern Pakistan, Sindh province and Karachi that is Sindh’s capital, approximately 2,000 people lost their lives because of dehydration and heat strokes.<sup>36</sup> Indian States of Rajasthan, Punjab, Gujrat, Odisha and Bihar are also suffering from continuous rise in heat waves since last five years wherein almost 2,500 people were killed alone in May 2015 owing to rising temperatures and subsequently extreme weather conditions.<sup>37</sup> In April 2016 in India, moreover, at least 300 people died due to heat-related complications.<sup>38</sup> Furthermore, a rise of 1°- 2° C will reduce rice and wheat production yields in Pakistan and India.

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<sup>34</sup>“Climate Change and Infrastructure in Asian Cities,” *CIA-Asia and CDIA* (April 2012): 3-33.

<sup>35</sup>“WMO Report: 2015 shattered temperature records,” *UN*, March 23, 2016, <http://www.un.org/sustainabledevelopment/blog/2016/03/wmo-report-2015-shatteredtemperature-records> (accessed March 10, 2018).

<sup>36</sup>Kamran Haider and Khurram Anis, “Heat Wave Death Toll Rises to 2,000 in Pakistan’s Financial Hub,” *Bloomberg News*, June 24, 2015.

<sup>37</sup>“Heatwaves Hits Thailand, India,” *NASA Earth Observatory*, May 4, 2016, <http://earthobservatory.nasa.gov/IOTD/view.php?id=87981&src=eoaiotd> (accessed March 12, 2018).

<sup>38</sup>*Ibid.*

According to the words of Asif Shuja<sup>39</sup>, former Director-General of Pakistan Environmental Protection Agency (PEPA), scarcity of weather prediction technology is the root cause of such human-loss incidents as it not only restrains government efforts in tackling such calamities but also negates people fair chances to adapt themselves to upcoming threat. Therefore, according to Asif Shuja, it is pertinent to establish a robust mechanism for exchange of data (e.g. water flows and temperature shifts etc.) among CC-affected countries for mitigation and adaptation measures against CC-related weather variation. In this vein, preparation of Heat Action Plan<sup>40</sup> by the Municipality of the commercial centre Ahmedabad, Indian State of Gujrat, to cope with these challenges is a welcome initiative.

Intimately related to the impacts of rising temperatures, moreover, extreme weather events like that of hurricanes, tornados, blizzards, heavy rain and snow fall, floods, dust, storms and droughts have been order of the day in SA. Low rainfalls in 2014, on the one hand, impinged upon food security in Pakistan while, and on the other hand, heavy monsoon rains and floods costed 367 human lives and almost 1 million acres of cropland.<sup>41</sup> Almost 150 people of unsettled territory of Jammu and Kashmir were killed by these floods. In a similar way, 2014 Cyclone Hudhud caused human deaths and destruction in many villages of

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<sup>39</sup>Tariq Waseem Ghazi, A.N.M Muniruzzaman and A.K. Singh, "Climate Change & Security in South Asia: Cooperating for Peace," *Global Military Advisory Council on Climate Change*, no. 2 (May 9, 2016).

<sup>40</sup>Anjali Jaiswal, "From Austin to Ahmedabad: Building Heat-Resilient Cities on the Frontlines of Climate Change" *NRDC*, October 15, 2015, <https://www.nrdc.org/experts/anjali-jaiswal/austinahmedabad-building-heat-resilient-cities-frontlines-climate-change> (accessed February 11, 2019).

<sup>41</sup>Sönke Kreft et al., "Global Climate Risk index 2016: Who Suffers Most from Extreme Weather Events? Weather-related Loss Events in 2014 and 1995 to 2014," *German Watch briefing paper*, <https://germanwatch.org/en/download/13503.pdf> (accessed February 11, 2019).

India.<sup>42</sup>Worrisome, in this regard, is the prediction of IPCC's fifth assessment report which notes that Pakistan is expected to remain among the 10 most affected countries by extreme meteorological events.

### **Glacier Melting and Sea Level Rise**

Continuous melting of glaciers and snow caps in the Tibetan Plateau owing to CC is the key concern of mounting CC-induced worries in SA. The Himalayas-Hindu Kush, Kunlun Shan, Pamir and Tien Shan mountain ranges are known as 'water towers of Asia' as these mountains provide water to much of Asian people through glacier-fed rivers. Almost 40 percent of the world population depends on the waters of these rivers wherein these rivers are the source of household water, food, fisheries and subsequently power and jobs for the people. However, in spite of this world's largest water supply from any single place, chronic seasonal water scarcity is worsening the issue.

IPCC's scenarios regarding glaciers' retreat in the region predict that rising mean annual temperature would diminish the glacier coverage by 43 to 81 percent by the start of next century, which would result in reduced water flows severely affecting water and food availability. Various articles predict "dramatic loss of glacier accumulation area on Tibetan Plateau" and connected regions<sup>43</sup> wherein Brahmaputra and Indus rivers are hypersensitive to reduction of water flows.<sup>44</sup> Moreover, traditional fuel sources for mountain and foothill inhabitants resulted in deforestation, making hillsides indefensible to landslides. Continuity of these practices will

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<sup>42</sup>Ibid.

<sup>43</sup>Kang, S., et al., "A.: Dramatic loss of glacier accumulation area on the Tibetan Plateau revealed by ice core tritium and mercury records", *The Cryosphere* 9, (2015): 1213-1222.

<sup>44</sup>WW Immerzeel, LP van Beek and MF Bierkens, "Climate change will affect the Asian water towers", *Science* 328, no. 5984 (2010): 1382-85.

not only reduce the livelihood effectiveness for the people but also endanger their lives in case of flash floods and landslides. Furthermore, given the hydrological role of the glaciers for the rivers flowing in Asia including Tarim, Syr Darya, Amu Darya, Indus, Ganges, Brahmaputra, Yangtze and Yellow rivers, almost 1.3 billion people; in China 516 million; in India and Bangladesh 526 people; Central Asia and Xinjiang province of China 49 million and Northern India and Pakistan 178 million people are vulnerable to mounting water shortages. However, these statistics only show the vulnerability of those people living in watershed, whereas water scarcity will obviously also result in reduced agricultural production.<sup>45</sup>

Recent UNDP study on Pakistan's climate challenges divulge a "decrease in glacier volume and snow cover leading to alterations in the seasonal flow patterns of Irrigation Water Requirement (IRS); increase in the formation and burst of glacial lakes; higher frequency and intensity of extreme climate events coupled with irregular monsoon rains causing frequent floods and droughts; greater demand of water due to increased evaporation rates at elevated temperatures."<sup>46</sup>

Unfortunately, glaciers melting not only results in water and food insecurity but also in other inevitable impacts of CC in the region like that of rise in sea level. It usually results in the loss of fertile land, the trespassing of salinity and making people move away from coastal areas because of acute cyclones and unavailability of fresh water. To avoid the implications, people start migrating inwards. For example, climate refugees have almost

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<sup>45</sup>Ibid.

<sup>46</sup>"Pakistan: Climate Public Expenditure and Institutional Review (CPEIR)," *UNDP*, (April 2015): 1-4, <http://www.pk.undp.org/content/dam/pakistan/docs/Environment> (accessed February 11, 2019).



reached to 2,000 per day in Bangladesh.<sup>47</sup> In this vein, Sea level rise is suspected to affect the lives of people from Balochistan in Western Pakistan to coastal regions of Myanmar in the East.

### **Infectious Diseases**

CC-induced implications usually are water scarcity, diminishing food production and rise in the level of migration, which threaten HS. Because of these, people start moving inwards, usually toward main cities; hence, urbanization takes the toll. With rising internal traffic coupled with intense weather events and minimal adaptation measure, infectious diseases start spreading. According to historical facts shown in the case study “effects of climate change on human health especially South Aisa” by Sudhakar Patra, Ravenshaw University Cuttack, Odisha, India, substantiates that vector-borne diseases like that of malaria, dengue and schistosomiasis fever spread more in warmer and wetter places. These diseases also usually become the cause of one’s death. As CC is resulting in temperature rise and heat waves, it is susceptible to also result in health related deaths in South Asian countries. In India and Sri Lanka, wet zones are likely to change into breeding zones of malaria. Nepal is already grappled with kalaazar and malaria. Deaths from heat waves and long summers in Pakistan are also no secret. In sum, the health of the people of SA is vulnerable to CC-induced infectious diseases.

### **Impact of Black Carbon**

The Hydro Fluorocarbons (HFCs), black carbon, tropospheric ozone and methane are usually known as short-lived climate pollutants.

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<sup>47</sup>Poppy Mc Pherson, “Dhaka: the city where climate refugees are already a reality,” *The Guardian*, December 1, 2015, <http://www.theguardian.com/cities/2015/dec/01/dhaka-city-climate-refugees-reality> (accessed February 11, 2019).

Still, these are much more chronic than carbon dioxide (CO<sub>2</sub>) in resulting of global warming. Black soot, black carbon and organic carbon, basically absorbs sunlight and speed up the warming process. Depending upon black carbon quantity, it steps up the glacier melting process and adds in to global warming.

### **Climate Change Induced Human Insecurity in South Asia**

Though United Nations Development Program (UNDP) has been at the forefront in germinating HS debate but the genesis of HS approach goes back to the two reports of the Brandt Commission titled “North-South: A Program for Survival” and “Common Crisis” published in 1980 and 1983 respectively wherein the key concern have been the survival of human being on a fragile planet.<sup>48</sup> According to another report by the Commission on Global Governance “threats to the earth’s life support system... challenge the security of people far more than the threat of external aggression.”<sup>49</sup> In a similar way, according to late revered Dr. Mahbub ul Haq of Human Development Centre of Pakistan, HS can be regarded as the security of income, employment, food, health, education and environment, including insecurity emanating from violence within the household, by the community and the state against women, children and minorities.<sup>50</sup> According to his words:

Human Security, in the last analysis, is a child who did not die, a disease that did not spread, an ethnic tension that did not explode in violence, a woman who was not raped, a poor person who did not starve, a dissident who was not silenced, a human spirit that was not crushed. Human security is not a

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<sup>48</sup>“Common Crisis,” The Brandt Commission 1983, <http://files.globalmarshallplan.org/inhalt/coc2.pdf> (accessed February 7, 2018).

<sup>49</sup>“Commission on the Global Governance”, *Our Global Neighborhood* (Oxford University Press, 1995), 79.

<sup>50</sup>Mahbub ul Haq Human Development Centre, *Human Development in South Asia 2005: Human Security in South Asia* (Oxford University Press, 2006), 1.

concern with weapons. It is concern with human dignity.<sup>51</sup>

Moreover, the IPCC Working Group's Fourth Assessment Report (AR4) includes a separate report on HS wherein it is defined, in the context of CC, "as a condition that exists when the vital core of human lives is protected, and when people have the freedom and capacity to live with dignity."<sup>52</sup> Though, the vital core of human lives are numerous including various material and non-material aspect but poverty, many kinds of discriminations and extreme weather events or environmental disasters such as hurricanes, droughts and floods undermine HS the most. Subsequently, these effects exacerbate from individuals to the community level, threatening political stability of the country.<sup>53</sup>

The Human Development in South Asia Report 2005 captioned following key elements causing human insecurity in SA pertaining to CC:<sup>54</sup>

- 1) Disconnect between economic growth and human development and fragile economic policies of South Asian states have resulted in human insecurity.
- 2) Inter-state conflicts are owing to deep-rooted historical feelings of prejudice.
- 3) The key cause of conflicts among South Asian states is economic vulnerabilities.
- 4) South Asian states need to improve their health infrastructure.
- 5) Decisive actions are need of the hour to hamper environmental degradation and disasters subsequently.

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<sup>51</sup>Ibid., 7.

<sup>52</sup>Adger, WN; Pulhin, JM; Barnett, J; et al., "Human Security", *College of Life and Environmental Sciences*, December 1, 2014, <https://ore.exeter.ac.uk/repository/handle/10871/20276> (accessed February 11, 2019).

<sup>53</sup>Ibid.

<sup>54</sup>Ibid.

- 6) Women and children are more vulnerable to climate change-induced consequences in South Asia.
- 7) There is also a need of institutionalization of good governance in the region for the betterment and protection of people.

### **Food Insecurity and Water Stress**

Food insecurity refers to the scenario where there is shortage of food items or high food prices or both that makes the poorest the most vulnerable. According to 1996 World Food Summit, “food security exist when all people, all the times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.”<sup>55</sup> Food insecurity is usually the result of land degradation, soil infertility usually owing to deforestation, abundance of chemical usage over soil, inefficient irrigation and water-logging, unequal distribution of food and market failure in controlling of food prices, overexploitation and over-capitalization of fisheries and coastal pollution that destroys production grounds. Food insecurity, in a similar manner, result in heightening poverty, intensifying domestic injustices and social commotions.

IPCC AR5 (IPCC Fifth Assessment Report) points out eight key dimensions where CC have critical impacts wherein four of them directly or indirectly relates to food security; one, loss of rural livelihoods and income; two, loss of marine and coastal ecosystems; and three, loss of inland and terrestrial ecosystems, and breakdown of food systems. In SA, similarly, the situation is not different from the rest of the world.

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<sup>55</sup>“World Food Summit”, *Rome Declaration on World Food Security* (Rome: FAO, 1996), <http://www.fao.org/docrep/003/w3613e/w3613e00.HTM> (accessed February 11, 2019).

Bangladesh is already vulnerable to the reduction of cultivable land to the sea. Rise in temperatures and subsequent altered monsoon patterns had lessened agricultural production, thereby, threatening livelihood of many citizens of Bangladesh.<sup>56</sup> According to agriculture scientists, Bangladesh's rice and wheat production is expected to fall by 2050 to 8 per cent and 32 per cent respectively.<sup>57</sup> Given the increasing CC impacts on agriculture and existing food insecurity as nearly 30 million women and 12 million under 5 children are suffering from malnutrition,<sup>58</sup> it is rational to infer, giving the growing frequency of CC that these statistics are going to increase further in time to come. Pakistan is vulnerable to increase in desertification over the next five decades. Moreover, Pakistan is already a victim of food insecurity as 48.7 per cent population<sup>59</sup> is suffering from malnutrition and increasing food insecurity will result in unemployment, rise in poverty and economic destabilization. In this sense, CC will not only result in food insecurity but also threaten the lives particular linkages between CC and conflict has been another inevitable challenge. However, despite these challenges there is no excuse for not of (rural) people in Pakistan.<sup>60</sup> Almost 330 million Indians have been

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<sup>56</sup>Fatima Siraj, "Bangladesh: Striving for food security," *South Asia Global Affairs*, last modified 2012, [www.saglobalaffairs.com/back-issues/1319-bangladesh-striving-for-food-security.html](http://www.saglobalaffairs.com/back-issues/1319-bangladesh-striving-for-food-security.html) (accessed February 11, 2019).

<sup>57</sup>M Abdul Latif Mondal, "Challenges to our food security," *The Daily Star*, last modified November 23, 2010, <http://www.thedailystar.net/news-detail-163215> (accessed August 15, 2018).

<sup>58</sup>"Bangladesh: Unemployment, food prices spur growing hunger," *IRIN*, last modified July 22, 2010, [www.irinnews.org/report/89920/bangladesh-unemployment-food-prices-spur-growing-hunger](http://www.irinnews.org/report/89920/bangladesh-unemployment-food-prices-spur-growing-hunger) (accessed August 14, 2018).

<sup>59</sup>Dr. Syed Aamer Abdullah et al., "Common Country Assessment Pakistan 2011," *UNDP*, January 31, 2012, <http://www.undp.org/content/dam/pakistan/docs/Legal%20Framework/UNDP-PKCommon%20Country%20Assessment> (accessed February 11, 2019).

<sup>60</sup>Samina Khalil, "Climate Change Impacts; Disasters and Conflicts," *Pakistan Journal of Applied Economics* 24, no. 2 (2014): 195-214.

the victim of droughts in 2016.<sup>61</sup> Shortage of water owing to changed patterns of monsoon rainfall resulted in water scarcity for irrigation purpose, thereby, affecting Indian farmers which constitute more than half the population of India. These farmers try to migrate to Mumbai where they had no shelter as well jobs. In India, statistically, western state of Maharashtra is one of the worst hot areas in the region as nearly 9 million farmers<sup>62</sup> are going through water insecurity and subsequent implications.

### **Climate Migration and Refugees**

Water stress and food insecurity often led people to migrate. Such migration could be inward as well as outward. In the case of inward migration, pressure on the main cities usually gives birth to unemployment, poverty and social evils. However, whether it is large-scale migration within the country or across the borders, it is “perhaps the most worrisome problem associated with rising temperatures and sea levels... [and one which] could easily trigger major security concerns and spike regional tensions.”<sup>63</sup> Besides security concerns, the HS perspective worries about the dangers to those whose homes, livelihood and lives becomes vulnerable to sea-level rise, desertification and loss of arable land, extreme weather events and natural disasters. Moreover, CC-induced disasters also cause displacement on a major scale. In the floods of 2009 nearly 1 million people of Bangladesh and 1.5 million of India

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<sup>61</sup>Vidhi Doshi, “India’s drought migrants head to cities in desperate search for water,” *The Guardian*, last modified April 27, 2016, <http://www.theguardian.com/global-development/2016/apr/27/india-drought-migrantshead-to-cities-in-desperate-search-for-water> (accessed August 15, 2018).

<sup>62</sup>Ibid.

<sup>63</sup>Cambell et al., *The Age of Consequences: The Foreign Policy and National Security Implications of Global Climate Change* (Washington, DC: Centre for Strategic and International Studies/Centre for a New American Security, 2007), 8.

were internally displaced. In Pakistan, too, approximately 20 million people were displaced in 2010 floods.

## Conclusion

SA, as a whole, is going to face the major challenge of climate refugees. According to IPCC, environmental disasters might result in the increase in climate refugees in Bangladesh.<sup>64</sup> In a similar vein, World Bank estimates predict that CC could bring 62 million people below the extreme poverty line in the South Asia region by 2030, owing to agricultural impacts of CC.<sup>65</sup> The situation becomes more acute if geostrategic rivalries among South Asian nations especially India and Pakistan are taken into consideration. Massive displacements would generate country-wide displacements, which would take no time in spiraling outwards. Moreover, resource conflicts may also erupt. For example, earlier in 2016 protesters in the northern state of Haryana cut off the supply of SyL Canal to Delhi for the fulfillment of their demands.<sup>66</sup> Pakistan and India being low and middle riparian countries could be the ground zero of resource conflicts, in this regard. In such scenario, the influx of climate refugees could add fuel to the fire of security issues.

The discourse covering climate change and conflict has been mired with uncertainty owing to ambiguous ways connecting them. The uncertainty has mostly been because of innate intricacy of CC

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<sup>64</sup>Xinhua, "Bangladeshis under threat of climate-change induced migration," *China.org.cn*, last modified November 29, 2012, [http://www.china.org.cn/environment/2012-11/29/content\\_27270955.htm](http://www.china.org.cn/environment/2012-11/29/content_27270955.htm) (accessed August 15, 2018).

<sup>65</sup>"Climate Change Action Plan," *World Bank Group*, April 7, 2016, <https://www.ontario.ca/page/climate-change-action-plan> (accessed August 15, 2018).

<sup>66</sup>AFP, "Delhi faces water crisis after canal sabotaged in deadly protest," *The Guardian*, last modified February 22, 2016, <http://www.theguardian.com/world/2016/feb/22/india-caste-protesters-accept-offr-to-end-riotsand-water-crisis> (accessed August 15, 2018).

projections. Moreover, the complexity in accurately mapping population growth, identifying the outbreak of conflict accurately and determine the taking initiative to adapt to and tackle CC and its implications.

CC is, for sure, happening and generating the conditions for water stress and food insecurity. Both water stress and food insecurity could lead to conflict or violence. In case of migration, usually occurring due to extreme events like that of droughts, heat waves, floods, changing rain/monsoon patterns, sea level rise and subsequent decreased soil fertility and storms or cyclones, it is not certain whether conflicts would occur during the migration or displacement process or afterwards. However, what is known for sure is the consequences for human beings. It does not only affect human lives through water stress, food insecurity, heat waves, malnutrition and vector borne diseases but could also instigate violence through conflict over scare resources, outward migration, and street agitation owing to unemployment, poverty and in worst case scenario deaths of vulnerable peoples.