CLIMATE CHANGE AND SECURITY NEXUS: INDIA'S VULNERABILITY AND PREPAREDNESS

ANADI

INTRODUCTION

Climate change is one of the 21st century's most pressing threats to international stability. Long-lasting droughts, higher sea levels, and more frequent and severe storms harm people everywhere as the planet warms. These effects are particularly severe in conflict-affected areas. They can amplify economic, social, and political causes of insecurity, putting vulnerable populations on the front lines of numerous overlapping crises. South Asia currently has one-fourth of the world's population, and by 2050, that number will increase by 40 per cent. In the future, it will be extremely difficult to feed a growing population.[1] Due to its high rates of population increase, resource degradation, continuously high rates of poverty, and food insecurity, South Asia is one of the world's most vulnerable

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1. World Health Organisation (WHO) (2020), *UNICEF/WHO/The World Bank Group Joint Child Malnutrition Estimates: Levels and Trends in Child Malnutrition*, key findings of the 2020 edition.

regions to climate change.[2] By the end of this century, the South Asian economy could see annual losses of up to 9 per cent due to the effects of climate change.[3] If the damage caused by floods, droughts, and other extreme weather events is taken into account, the human and financial costs could increase even further. According to a report by the Asian Development Bank (ADB) titled "Assessing the Costs of Climate Change and Adaptation in South Asia", the economies of Bangladesh, Bhutan, India, the Maldives, Nepal, and Sri Lanka will collectively lose an average of 1.8 per cent of their annual Gross Domestic Product (GDP) by 2050, increasing to 8.8 per cent by 2100.[4] South Asia's GDP would see an yearly decline of only 1.3 per cent by 2050 and 2.5 per cent by 2100 if countries worldwide cooperate to limit the rise in average global temperature below 2°C.[5] Additionally, the expense of defending South Asia from the worst effects of climate change would be almost halved.

This paper seeks to offer a comprehensive assessment of the condition of climate change in South Asia and to explain the different variables contributing to the region's heightened vulnerability. It attempts to provide an in-depth discussion of climate change in the South Asia region from the vantage point of peace and security. Although climate change is an overarching subject, this analysis focusses on the framework that describes the facts of concerns related to climate change, such as the climatic insecurity framework and how it affects human security and causes conflicts. The most recent Intergovernmental Panel on Climate Change (IPCC) assessment report is also analysed to learn about the most pressing environmental threats. A study of the potential threat to India's security posed by climate change has been drafted based on these assessments and

2. E.B. Barbier and J.P. Hochard, "Land Degradation and Poverty", *Nature Sustainability*, vol. 1 no. 11, 2018, pp. 623-631, doi: 10.1038/s41893-018-0155-4.
3. United Nations Climate Change, *Climate Change Danger to South Asia's Economy*, https://unfccc.int/news/climate-change-danger-to-south-asias-economy. Accessed on January 30, 2023.
4. Asian Development Bank, Mahfuz Ahmed and Suphachol Suphachalasai, *Assessing the Costs of Climate Change and Adaptation in South Asia*, June 2014, https://www.adb.org/sites/default/files/publication/42811/assessing-costs-climate-change-and-adaptation-south-asia.pdf. Accessed on January 30, 2023.
5. Ibid.

other reviews. Further, initiatives undertaken by India to tackle climate change have also been given in detail.

HUMAN SECURITY IMPLICATIONS OF CLIMATE CHANGE

The notion of human security was brought forward by the United Nations Development Programme (UNDP) in 1994. The paradigm of human security shifts the focus of security away from states and towards individuals.[6] It aims to reduce the suffering of human beings from existing power asymmetries and processes, and focusses on empowerment of human beings. As opposed to conventional, state-centric notions of security, which largely focus on the safety of states against armed assault, human security is usually regarded as the one that focusses on the security of individuals, their protection, and their empowerment.[7] Hence, in the paradigm of human security, the referent object of security is an individual being. Thus, viewing the issue of climate change through the paradigm of human security makes one look at the issue in a more comprehensive way. It enables one to view climate change as a threat to the life and well-being of every individual. Detraz and Betsill label this approach as the environmental security discourse.[8] Climate change has the potential to pose a threat to human lives by endangering food and health security and giving rise to climate change induced migration.

Food Security

The changing climate has the potential to aggravate health issues and give rise to food insecurity. Food insecurity is one of the major detrimental effects of climate change. Dupond and Pearman have given reasons for the link between climate change and food insecurity,

6. United Nations Development Programme, 1994, Human Development Report 1994: New Dimensions of Human Security (New York), https://hdr.undp.org/content/human-development-report-1994. Accessed on November 10, 2022.
7. United Nations Trust Fund for Human Security, Human Security Unit, United Nations, "Human Security in Theory and Practice", https://www.unocha.org/sites/dms/HSU/Publications%20and%20Products/Human%20Security%20Tools/Human%20Security%20in%20Theory%20and%20Practice%20English.pdf. Accessed on November 10, 2022.
8. Nicole Detraz and Michele Betsill, "Climate Change and Environmental Security: For Whom the Discourse Shifts", *International Studies Perspectives*, vol. 10, no. 3, 2009, p. 306.

that is, first, desertification and erosion in different areas will occur due to increasing temperature and unevenly distributed rainfall which will further reduce arable lands. Second, arable lands would become unusable due to the rise in sea levels. Third, agricultural activities will get deteriorated due to extreme weather events. All these factors induced due to climate change will result in food insecurity.[9] In Sub-Saharan Africa, South Asia, and Southeast Asia, where agricultural families are disproportionately poor and vulnerable, around 80 per cent of the world's population is most in danger from crop failures and hunger caused by climate change.[10]

Health Security

The health consequences of climate change like heightened potential for contracting malaria and other illnesses will put extra burden on poor countries. For instance, water-borne disease is a reason behind the deaths of millions of children under the age of five every year. According to the IPCC report, the global temperature rise must be kept to 1.5°C in order to avoid catastrophic health effects and millions of fatalities brought on by climate change.[11] Health is already being impacted by climate change in a variety of ways, including the increased frequency of extreme weather events like heatwaves, storms, and floods, the disruption of food systems, an increase in zoonoses and food-, water-, and vector-borne diseases, and mental health problems.[12]

Migration

Further, climate change can endanger human security in the 21st century by leading towards a rise in sea level and loss of territory,

9. Alan Dupond and Graeme Pearman, "Heating up the Planet Climate: Change and Security", Lowy Institute Paper, https://www.lowyinstitute.org/publications/heating-planet-climate-change-security. Accessed on November 10, 2022.
10. The World Bank, "What You Need to Know About Food Security and Climate Change", https://www.worldbank.org/en/news/feature/2022/10/17/what-you-need-to-know-about-food-security-and-climate-change. Accessed on January 30, 2023.
11. World Health Organisation, "Climate Change and Health", https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health. Accessed on January 30, 2023.
12. Ibid.

and internal population displacement.[13] The severity of its effects is making migration a growing factor, and as the effects of climate change worsen, the frequency of migration is anticipated to increase significantly in the years to come. According to the Global Report on Internal Displacement 2022, the majority of the annual internal displacement that occurred in South Asia was caused by disasters.[14] During the year, there were over 5.3 million disaster-related displacements, which is a high number globally but less than the region's 10-year average of 6.2 million.[15]

TRADITIONAL SECURITY CONCERNS OF CLIMATE CHANGE

In the traditional security approach, the state is viewed as the primary referrent object and security provider, and force is employed to achieve security. In the state-centric understanding of security, upholding territorial integrity, national independence and sovereignty are the core values.[16] According to the traditional view of security, climate change has the potential to give rise to violent conflicts and aggravate existing conflicts. For instance, climate change can give rise to violent conflicts among countries over scarce resources.[17] Further, along with violent conflict, climate instigated scarcity may further cause climate instigated destabilising migration, and, eventually, may cause state instability. Garcia has explained this from a national security perspective wherein financial insecurity may become a threat to peace and stability, which, consequently, will cause social unrest in the country.[18] Such instability in the state functioning eventually becomes a breeding ground for conflict over resources, large population movement and terrorism.[19]

13. Denise Garcia, "Warming to a Redefinition of International Security—The Formation of a Norm against Climate Change," *International Relations*, 24(3), 2010, pp.272-273.
14. Global Report on Internal Displacement 2022, "Children and Youth in Internal Displacement", https://www.internal-displacement.org/sites/default/files/publications/documents/IDMC_GRID_2022_LR.pdf#page=37. Accessed on January 30, 2023.
15. Ibid.
16. Benjamin Miller, "The Concept of Security: Should it be Redefined?," *The Journal of Strategic Studies*, vol. 24, no. 2, 2001, p. 17.
17. Nicole Detraz, "Threats or Vulnerabilities? Assessing the Link between Climate Change and Security," *Global Environment Politics*, 11(3), 2011, pp. 109-112.
18. Garcia, n. 12.
19. Ibid.

Homer Dixon, in his study titled "Environmental Scarcities and Violent Conflict: Evidence from Cases", has pointed out areas wherein scarcity due to climate change can give rise to security problems. First, conflict between states over scarce resources, such as water wars among states due to climate change induced water shortage. Second, scarcity of resources due to climate change often leads to migration which gives rise to identity-based conflict. Third, scarcity of resources often results in civil strife, economic deprivation and institutional disruption which create conditions for a rise in social unrest, instability and disruptions in the functioning of the state and society.[20] However, it should be noted that the association between climate change and conflict is not direct, that is, climate change causes scarcity and that scarcity causes conflicts.

Further, the traditional security implications of climate change involve the existential crisis situation for low-lying small islands as these states' existence and survival would be threatened by the increase in sea level brought on by climate change. The climate security literature situates the roots of contemporary conflicts in climate related issues. The most referred examples of the climate-conflict nexus are the Darfur conflict and the genocide in Rwanda.[21] In the current scenario, the emergence of the Islamic State in Syria (ISIS) and the conflict in Syria are also being connected to climate change. Kelley has argued that due to the drought that affected the Fertile Crescent between 2007 and 2010, societal tensions increased, which eventually sparked war and the emergence of the "Islamic State".[22] Further, Sellers has argued that climate change has contributed to the Syrian crisis.[23] Thus, climate change and its potential implications should be understood from the traditional security perspective also.

20. Thomas F. Homer-Dixon, "Environmental Scarcities and Violent Conflict: Evidence from Cases," *International Security*, vol. 19, no. 1, 1994, pp. 5-40.
21. Oli Brown, Anne Hammill and Robert McLeman, "Climate Change as the 'New' Security Threat: Implications for Africa," *International Affairs,* vol. 83, no. 6, 2007, pp. 1141-1154.
22. Colin P. Kelley, et al., "Climate Change in the Fertile Crescent and Implications of the Recent Syrian Drought," *Proceedings of the National Academy of Sciences of the United States of America(PNAS),* vol. 112, no. 11, 2015, pp. 3241–3246.
23. P. J. Sellers, "Cancer and Climate Change", *New York Times,* January 16, 2016.

IPCC REPORT: ALARMING CLIMATE PROJECTIONS FOR INDIA AND SOUTH ASIA

Here, a few of the critical takeaways of the report for India and the rest of South Asia will be highlighted. India and other South Asian countries can learn many lessons from the IPCC Working Group II report, synthesising studies on climate change impacts, adaptation methods, and vulnerabilities.[24] The large population density along the coastline and the high prevalence of heat stress due to rising temperature and rainfall variability make India one of the most vulnerable countries in the region to the effects of climate change. The report lists several repercussions of climate change such as widespread relocation, an 11 to 20 per cent rise in the number of people facing the risk of hunger, destruction of infrastructure, increase in night time temperature, specially during winters, a bad impact on agriculture, especially cereal production, by the end of the 21st century, increase in malnutrition among the disadvantaged groups of the population, increase in the incidence of pests and diseases, increase in erosion due to the rise in sea level, badly affected marine ecosystem due to ocean acidification, sea level and temperature rise, and increase in incidents of heat waves, and risk of heat stress.[25]

The rise in sea level would cause maximum direct damage to the GDP of the Asian countries by 2080 if effective adaptation actions are not taken. If no adaptation measures are adopted, India's GDP losses due to sea level rise by 2080 will only be second to China's. Overall, Asia might face the direct loss of about US$ 167.6 billion at 0.47 m sea level rise, US$ 272.3 billion at 1.12 m sea level rise, US$ 338.1 billion at 1.75 m sea level rise, and an additional US$ 8.5, 24 and 15 billion due to migration at the respective sea level rise.[26] It is expected that the coastal cities of the South and Southeast Asian region would see a rise in average annual economic loss due to flooding between 2005 and 2050.

24. Intergovernmental Panel on Climate Change, H.-O. Pörtner, et al., eds., *Climate Change 2022: Impacts, Adaptation, and Vulnerability,* Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, eds., (Cambridge, UK: Cambridge University Press, 2022).
25. R. Shaw, et al., "Asia", in Pörtner et al., eds., Ibid.
26. Ibid.

According to the IPCC assessment, the effect of climate change may cause the South Asian countries to lose 2 per cent of their GDP by 2050 and a loss of nearly 9 per cent by 2100 under the business-as-usual scenario.[27] The rising temperature and extreme heat is likely to make the highly populated cities of South Asia warmer, which will make daytime outdoor work dangerous and worsen the working conditions. The IPCC has highlighted that the risk to agriculture and the food system will increase with the fluctuating severity of the changing climate.[28] The South Asian countries might experience an increase of 15-20 per cent in incidents of drought due to global warming by the end of this century.[29] About 300 million people in South Asia will suffer from the loss of agricultural output brought on by temperature increase of more than 1.5 degrees Celsius.[30] The IPCC report also links the farmers' suicides with agricultural losses to highlight the human cost of climate change.[31] With the rising temperature, it is being speculated that internal climate migrants in South Asia would be 40 million by 2050.[32] It is being estimated that 0.9-2.1 million people would be displaced by inundation in the southern region due to sea level rise by 2050.[33] Moreover, if the mean sea level rise is 2m, then inundation would lead to migration of 0.73-2.1 million people by 2100.[34] Four million people were compelled to flee their homes in 2019 due to natural disasters in Bangladesh and India.[35]

27. Ibid.
28. Ibid.
29. Ibid.
30. Ibid.
31. Ibid.
32. World Bank Group, Kanta K. Rigaud, et al., *Groundswell: Preparing for Internal Climate Migration* (Washington, DC: The World Bank, 2018), https://openknowledge.worldbank.org/handle/10986/29461. Accessed on December 5, 2022.
33. Svetlana Jevrejeva, et al., "Coastal Sea Level Rise With Warming Above 2°C", *Proc. Natl. Acad. Sci.*, 113(47), 2016, pp. 13342–13347.
34. Kyle F. Davis, et al., "A Universal Model for Predicting Human Migration Under Climate Change: Examining Future Sea Level Rise in Bangladesh", *Environmental Research Letters*, vol. 13, no. 6, 2018.
35. n. 24.

INDIA'S VULNERABILITY TO CLIMATE CHANGE

The impacts of climate change on India are as diverse as the country's landscape. In June 2020, a report titled "Assessment of Climate Change over the Indian Region", by the Ministry of Earth Sciences addressed the potential repercussions of climate change under several emission scenarios.[36] The report highlighted several aspects of the potential effect of climate change on national security; these are enumerated as follows:

- The Indian Ocean's surface temperature will rise through the 21st century.
- India may suffer more rain and droughts by the end of the 21st century.
- The average annual sea level rise in the North Indian Ocean (NIO) was 1.06-1.75 mm between 1874 and 2004 and 3.3 mm between 1993 and 2017. India's growing vulnerability and long coastline make this a worrying trend.
- Climate-induced changes in precipitation will exacerbate India's water crisis. Lack of water resources further threatens the food supply and the prosperity of millions. Moreover, water scarcity influences global security. For instance, it is being projected that India and Pakistan, both water-stressed countries, may have a conflict over transnational rivers. According to a Dutch early warning programme, India and Pakistan are two of six probable water war areas.
- Many of India's neighbours are unprepared for climate change: 17 per cent of Bangladesh's landmass, or about 13 per cent of its population, could be drowned by the end of the 21st century. This is especially concerning for India, which is still recovering from the socio-economic, political, and security impacts of the 1971 Bangladesh War exodus. Further, Maldives is another climate change hotspot. Some 80 per cent of Maldives' terrain is below sea level, making its 500,000 inhabitants vulnerable. According to the IPCC report, a 100 cm rise in sea level will submerge most of the Maldivian landmass, forcing its entire population to migrate. India, as a regional power, may need to accommodate climate

36. Ministry of Earth Sciences, Government of India, R. Krishnan et al. *Assessment of Climate Change over the Indian Region* (Springer Nature, 2020).

refugees. This could be concerning for India's own order and stability.

- China's cloud seeding programme is a matter of concern for the neighbouring countries. The *South China Morning Post* has reported that as a part of its climate change mitigation strategy, China is relying on cloud seeding or scientific intervention using aircraft to scatter chemicals like silver iodide, sodium chloride into clouds for increased rainfall.[37] These techniques have the potential to interrupt the flow of the Indus, Ganga, and Brahmaputra rivers from Tibet to India. Hence, it can be speculated that China might use these weather modification mechanisms as a weapon against India by distorting the weather or causing a flood or drought during war. Therefore, India should ensure that China's actions remain in consonance with United Nation's Environmental Modification Convention (ENMOD), which prohibits states from using environmental modification techniques for military purposes.

INDIA'S EFFORTS TO COMBAT CLIMATE CHANGE: INTERNATIONAL PARTNERSHIPS AND COMMITMENTS

To counter the detrimental repercussions of climate change, all countries are required to minimise the Greenhouse Gases (GHGs) emissions. Moreover, India is regarded as one of the top emitters of carbon dioxide (CO_2) in the world, accounting for 7 per cent of all CO_2 emissions worldwide. The CO_2 emissions of India increased by 10.5 per cent in 2021 as compared to 2020.[38] Therefore, among the South Asian countries, much focus is on India's mitigation efforts, considering its larger contribution in the overall GHGs emission in the region.

The Nationally Determined Contributions (NDCs) of India under the Paris Agreement include: reducing its GDP emission intensity

37. Coco Feng, "Master of Weather? China in Drive to Advance Rain-Making Tech," *South China Morning Post,* December 10, 2020, https://www.scmp.com/tech/policy/article/3113392/master-weather-china-drive-advance-rain-making-tech#. Accessed on June 15, 2023.
38. Tara Subramaniam, " The World Needs India to Avert Climate Catastrophe: Can Modi Deliver?", CNN, https://edition.cnn.com/2022/11/07/india/india-climate-change-efforts-cop27-intl-hnk/index.html. Accessed on December 18, 2022.

by 45 per cent from 2005 levels by 2030; 50 per cent of all electricity to be generated through non-fossil fuel energy resources by 2030; increasing the carbon sink by 2.5–3 billion tonnes of CO_2 equivalent through tree and forest cover by 2030.[39] Further, in the recent United Nations Climate Change Conference (COP26) in Glasgow, India presented the five nector elements (*Panchamrit*) of its climate actions such as: to attain 500 Giga Watt (GW) non-fossil energy capacity by 2030; to reduce total projected carbon emissions by 1 billion tonnes till 2030; to achieve the goal of net zero emissions by 2070; aim to use renewable energy sources for 50 per cent of its energy needs by 2030; and, to cut the economy's carbon intensity by 45 per cent from the 2005 levels by 2030.[40] India has also shared the *mantra* of LiFE (Lifestyle for Environment) for combatting climate change. India has highlighted, in the COP26, the need of an environmentally conscious lifestyle and, mindful and deliberate utilisation of resources to combat climate change.

Other significant initiatives that India has undertaken include the International Solar Alliance with France in 2015 for efficient utilisation of solar energy, and the One Sun, One World, One Grid project with the UK to share solar energy across the globe. Further, the Government of India had launched the National Action Plan on Climate Change in 2008 that includes eight National Missions on climate change such as: National Solar Mission, National Mission for Enhanced Energy Efficiency, National Mission on Sustainable Habitat, National Water Mission, National Mission for Sustaining the Himalayan Ecosystem, National Mission for a Green India, National Mission for Sustainable Agriculture, and National Mission on Strategic Knowledge for Climate Change.[41]

39. Government of India, " India's Updated First Nationally Determined Contribution Under Paris Agreement 2021-2030," https://unfccc.int/sites/default/files/NDC/2022-08/India%20Updated%20First%20Nationally%20Determined%20Contrib.pdf. Accessed on December 18, 2022.
40. Ministry of Environment, Forest and Climate Change, "India's Stand at COP-26" (Delhi: PIB, 2022), https://pib.gov.in/PressReleasePage.aspx?PRID=1795071. Accessed on December 18, 2022.
41. Department of Science and Technology, Ministry of Science and Technology, Government of India, "Climate Change Programme," https://dst.gov.in/climate-change-programme. Accessed on December 18, 2022.