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Climate Change and Governance Gap in South Asia

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Article

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Abstract

Climate Change is one of the most concerning non-traditional security threats which is affecting the world at an unprecedented pace. South Asia is the most vulnerable region in terms of climate change with countries across the region are facing challenges like sea-level rise, biodiversity loss, uneven patterns of rainfall, global warming, climate-induced migration, food scarcity, extreme floods and much more which are further responsible for the critical nexus of food and water security. This research paper provides critical analysis on how these problems creates a governance gap in South Asia and requires the need for a comprehensive regional governance framework which is a major gap in this research. This paper also analyzes the various protocols, declarations and reports related to Climate Change which are not responsive towards the specific vulnerabilities of South Asia. Ineffectiveness of **South Asian Association for Regional Cooperation i.e. SAARC-** major regional grouping of South Asia- particularly due to political disputes and conflicts between countries is also the major factor in governance gap. This paper adopts Qualitative research methodology which includes the analysis of both primary and secondary sources. Finally, this paper proposes the need for a Polycentric governance framework for the effective coordination and cooperation in South Asia.

INTRODUCTION

Intergovernmental Panel on Climate Change (IPCC) defines Climate Change as "change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer". Similarly, the **United Nations Framework on Climate Change (1992)** defines it as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate vulnerability observed over comparable time periods". It is clear from these definitions that Climate Change is the evolving global challenge which needs cooperation at a wider pace and South Asia is not the exception. Located in the Asian continent, the region comprises eight countries- India, Pakistan, Bangladesh, Nepal, Bhutan, Afghanistan, Sri Lanka and Maldives. Countries across the region are experiencing the brunt of the climate change further exacerbated by lack of regional cooperation framework. **Ahmad et.al. (2024)** argues that South Asia is highly vulnerable to extreme weather events, including river flooding, sea-level rise and extreme temperatures which exacerbate threats like food supplies, livestock, land and crops, resulting in severe food crises that can trigger migration. Climate change impacts such as water scarcity, soil fertility, soil erosion, land degradation and floods, combine with other socioeconomic factors like poverty and inequality further promotes climate-induced migration (**Ahmad et.al, 2024).**

The relationship between climate change and water security is equally significant. According to Afzal and Nishtar (2023**)**, Climate Change has a negative impact on water supply, quality and demand. It is predicted that South Asia will experience a variety of different climate variations – with some areas receive more rainfall while other may not. Places where the particular crops are grown will face an adverse influence on yields of the wheat and rice due to higher temperatures (Afzal and Nishtar, 2023). Both the rainwater and groundwater are susceptible to climate shifts and sea level rise with many South Asian nations are concerned about their water supplies. By 2050, water scarcity will affect around 2.5 billion persons in South Asia which are responsible for severe droughts especially during the warm season (Afzal and Nishtar, 2023**).** All these severe consequences provide the need for regional governance framework as put forward by **Keohane and Victor (2011)** that Climate governance would not be governed by a single comprehensive regime but rather would emerge as a climate change regime complex- a set of overlapping institutions. In fact, climate change recognized as a major concern in South Asia in the **14th Declaration of SAARC summit held in New Delhi on 3–4 April,2007.** The SAARC leaders called for pursuing climate-resilient development in South Asia and the Paragraph 12 of this declaration reaffirmed that protection and conservation of the environment

should remain a priority area for SAARC cooperation. However, the declaration largely remained a framework of commitments rather than establishing strong enforcement financing or implementation mechanisms which represents an important dimension of the climate governance deficit in South Asia.

At the global level, the **United Nations Framework Convention on Climate Change (1992)** which was adopted in the **Earth Summit (1992)** in wake of the growing Climate Change concern affecting the whole world. However, it does not by itself adequately address the specific dimensions of climate change in South Asia despite the region's comparable vulnerabilities to sea level rise and glacial melt. The framework mandates the transfer of environmentally sound technologies, but it does not detail specific mechanisms for adopting these technologies to South Asian context such as specialized agriculture for flood prone deltas or technical solutions. The convention focuses heavily on national inventories, policies and implementation measures. For region like South Asia, lack of regional cooperation framework made a huge gap. Therefore, Climate Change in South Asia should be understood not only as an environmental challenge but also as a regional governance concern.

LITERATURE REVIEW

There is extensive literature available on the Climate Change problem and its devastating impact on the countries of the region. However, few of them discusses about the governance crisis. India is the 5th climate prone country in the world and sea level is projected to rise 15–38 centimeters which will affect major cities and the economic hub of India (Barrech et.al, 2023). Extreme heatwaves will increase by nearly 15% in India and increasing population, water mismanagement, urbanization and greater variability in precipitation are massively contributing to poverty and hunger (Barrech et.al, 2023). Agricultural production is increasingly affected by severe heatwaves and sandstorms caused by climate change as pointed out by Ahmad et.al. (2024).

According to Klare (2020), Water is viewed as a pivotal factor in identifying countries vulnerability to the effects of climate change which pose a significant threat of instability and conflict. Indus Water Treaty (IWT) was signed between India and Pakistan in 1960 by the mediation of World Bank over the sharing of Indus River water. However, Farid and Ashraf (2025) argue that the construction of hydroelectric projects on the western rivers such as Baglihar dam on the Chenab and Kishanganga Hydroelectric Project on Jhelum will have devastating consequences on Pakistan. Unmitigating Climate Change, fluctuating glacial movements, water scarcity, geo-political implications are some of the problems which current treaty is not able to cope to the modern-day realities of water security (Farid and Ashraf, 2025; Niazi and Shaiekh, 2025). These challenges increased seasonal differences and will affect both countries farming industry and stability of other economies. Glacial retreat in the Himalayas, erratic monsoons and intensified floodings or droughts pose challenges to water security in both countries (Khatoon et.al, 2025). Pakistan is also the 8th most affected country by Climate Change, while the flood of 2022 affected 33 million people and caused damage to 35 billion dollars to Pakistan's economy (Barrech et.al, 2023).

Warming due to Climate Change is also expected to increase the intensity of monsoon in downpour resulting in massive flooding which will turn rivers into seasonal streams with low water levels and leads to other problems like loss of valuable topsoil, biodiversity loss, massive population displacement and health problems (Klare, 2020; Niazi and Sheikh, 2025). Munir et.al. (2026) also provides that IWT has failed to cope with the current climate as the treaty was formulated in a relatively stable hydrological context. Emerging concerns relating to glacier melt, changing precipitation conditions, seasonal variability and climate uncertainty are not adequately addressed within the existing treaty framework. This indicates a significant governance gap in the management of transboundary water resources under changing climate conditions. Sabir et.al. (2026) argue that Ganga water sharing treaty between India and Bangladesh of 1996 is limited in scope as compared to contemporary climate risk in the basin with sea level rise,

storm surge, coastal erosion, salinity intrusion and displacement poses risk on the physical basis of statehood. The frequency and severity of flooding during the monsoon season have increased due to climate change, giving rise to other issues like water-logging, damaging property, disruption of property and public health hazards such as waterborne diseases (Obaidullah and Howlader, 2025). Increased evaporation and erratic rainfall patterns driven by Climate Change exacerbate water scarcity particularly in rural areas dependent on surface water for irrigation and in urban areas, it significantly decreases working productivity (Obaidullah and Howlader, 2025).

Poor people remain most vulnerable to climate change as pointed out by Barrech et.al. (2023) as Bangladesh is predicted to lose third of its agricultural GDP by 2050, while around 11% of its land may become barren and 13 million people are likely to become internal climate migrants. The rise of sea level has been projected to 19.6 inches and the country will face unbearable heat and humidity if the carbon emissions are not controlled (Barrech et.al, 2023). The Brahmaputra River Basin is the 4th largest river basin in the world in terms of average discharge but the Climate Change is having an adverse effect on the community livelihoods and the natural ecology of the Brahmaputra (Vij et.al, 2020). Communities in the lower Brahmaputra basin face extensive flooding due to increased river flows and droughts as a result of changes in monsoon rainfall and with the rising temperature, the glacier melt processes may affect the precipitation in the Himalayan Belt of the Brahmaputra, changing the discharge in the floodplains (Vij et.al, 2020). In addition to these challenges, many Indian academics, environmentalists and civil society groups oppose the ongoing hydropower projects for issues such as submergence of large tracts of forest and agricultural land, destruction of the river and massive demographic changes.

The Himalayan Cryosphere Complex is one of the most significant environmental systems in the region. However, the accumulation of Black Carbon from factories, cooking and vehicle exacerbates climate change with glacier melting. The Assessment of Hindu Kush Himalaya by International Centre for Integrated Mountain Development (ICIMOD) indicates that Cryosphere of the region is rapidly changing and this has an impact on water resources, ecosystems and society (Sabir et.al,2026). The Indo-Gangetic Plain is also among the world's most polluted regions. Transport, industry, coal, brick kilns, agriculture, household energy and crop residue burning are evident in India, Pakistan, Nepal and Bangladesh, further aggravating the impacts of Climate Change. Ali and Jaleel (2024) provide that since 1990s the satellite data has indicated an acceleration in sea level rise due to influence of El-Nino Southern Oscillation contributing to variations in sea-surface height and coastal flooding. Maldives have a maximum elevation of just2.4 meters above sea level- making them extremely vulnerable to sea level rise and coastal flooding. It is increasing at a rate of about 0.2 inches per year, which is higher than the average of 0.13 inches per year (Ali and Jaleel, 2024).

Coastal flooding in the islands of Komandoo and Kudahuvadhoo in 2015 and 2020 displaced many families and caused substantial economic losses. Due to sea level rise, infrastructure like roads, buildings and utilities have become prone to damage and disruption from flooding events. Ali and Jaleel (2024) cite the example of Male power plant which was completely inundated during a coastal flood in 1987, resulting in the disruption of electricity supply was for several days. The country's pristine beaches, coral reefs and atolls that attract 1.5 million tourists are increasingly at risk of damage which will jeopardize the growth and sustainability of the tourism industry. Many farmers practice aquaculture and agriculture along the coastline and due to intrusion of saltwater into soil, islands became unsuitable for farming and increased salinity has damaged or killed certain crops (Ali and Jaleel, 2024). Sea levels rise poses severe threats to the health and well-being of Maldives. Water scarcity and lack of access to safe drinking water led to increased rates of diarrhea and other water borne diseases, especially in children. These vulnerabilities are not limited to the Maldives. Bangladesh, India and Sri Lanka also face increasing risk from sea-level rise with subsequent consequences of displacement and coastal erosion (Sabir et.al, 2026).

In 2007, IPCC estimated that Climate Change would increase the sea-level to 0.6 meters or by year 2100 and its Fourth Assessment report predicts Climate Change will intensify extreme weather events such as cyclones and storm surges along the Bay of Bengal. The report also indicates that the accumulation of Greenhouse Gases (GHG) produced by anthropogenic fossil fuel combustion and change in land use on the atmosphere is the main cause of sea-level Rise (Rabbani et.al, 2010; Hananto et.al, 2022). The Indo-Bhutan Hydro-Power cooperation in Brahmaputra River basin which covers countries like China, India, Bhutan and Bangladesh with substantial share of Bhutan's territory lies within the basin. However, environmental concerns such as biodiversity loss, ecosystem disruption and community displacement are increasingly challenged the sustainability of hydropower cooperation. Climate Change is also creating risk for water availability and competition from solar and wind energy (Barua et.al,2026). Bhutan remains highly dependent on climate sensitive sectors such as agriculture, hydropower and tourism, while the future of hydropower is facing an extreme risk from extreme weather, droughts and floods triggered by climate change. Tobden (2022) also highlights that the temperature in Himalayas is increasing at three times greater than the global mean average which IPCC has projected to rise at three degrees Celsius by 2050, further aggravating the impact of climate change.

THEORETICAL FRAMEWORK

This study adopts **Elinor Ostrom's theory of polycentric governa**nce to examine the institutional and coordination challenges associated with climate change in South Asia. Polycentric governance refers to a system in which multiple centres of decision-making operate at different levels while retaining a degree of independence and coordinating their actions to address shared problems. Rather than relying on a single central authority, this approach emphasises cooperation among local, national, regional and international institutions. It is particularly relevant to climate change because its consequences extend beyond political boundaries and require coordination among multiple actors. Climate change in South Asia presents a complex governance challenge because the region shares transboundary rivers, interconnected ecosystems, vulnerable coastlines and climate-sensitive economic sectors. The impacts of rising temperatures, glacier retreat, irregular monsoon patterns, floods, droughts and sea-level rise are not confined to individual countries. The Indus, Ganga and Brahmaputra river basins, for instance, connect the ecological and economic interests of India, Pakistan, Bangladesh, Nepal and Bhutan. Similarly, sea-level rise threatens the livelihoods, infrastructure and territorial security of Bangladesh, India, Sri Lanka and the Maldives. These interconnected vulnerabilities demonstrate that national climate policies, although necessary, cannot independently address the regional dimensions of climate change.

Ostrom's approach provides a useful framework for understanding why cooperation between multiple institutions is necessary to manage shared environmental resources. Polycentric governance emphasises institutional diversity, coordination, information sharing, mutual monitoring and the development of rules suited to local and regional conditions. Applied to South Asia, this perspective suggests that effective climate governance requires cooperation between national governments, regional organisations, scientific institutions, river-basin authorities and local communities. Shared climate information, coordinated disaster-warning systems, transboundary water management and collaborative adaptation strategies could strengthen the region's capacity to respond to common environmental risks. The limitations of existing regional institutions, particularly the South Asian Association for Regional Cooperation (SAARC), provide an important dimension of this analysis. Although South Asian countries have participated in regional declarations and cooperation initiatives on environmental protection and climate change, political tensions and differences in national priorities have constrained the development of sustained regional cooperation. Transboundary water management illustrates this challenge. The Indus Waters Treaty of 1960 and the Ganga Water Sharing Treaty of 1996 provide institutional arrangements for particular aspects of water sharing, but climate-induced changes in precipitation, glacier melt, flooding and seasonal water availability create additional

challenges for existing arrangements. These developments highlight the need to assess whether established institutions possess adequate mechanisms to address emerging climate risks through information sharing, joint planning and adaptive decision-making. Ostrom's theory is used as an analytical lens to assess how multiple centres of decision-making could cooperate to address common challenges without requiring complete political or institutional centralisation. The paper therefore argues that strengthening regional climate governance in South Asia requires institutional coordination, shared environmental information, adaptive transboundary agreements and sustained cooperation among the countries of the region.

ANALYSIS AND DISCUSSION

This paper argues that the problem of climate change in South Asia has exposed the vulnerabilities of governance framework especially within SAARC, and while simultaneously creating a critical nexus between water and food security. According to Aamer (2024), South Asia is one of the most water stressed-regions in the world with approximately 74% of the region's population is grappling with high water stress levels. A study conducted by **University of Leeds (2021)** highlighted that Himalayan glaciers have lost ice ten times faster over the last few decades as seen in the recent incident in Nepal where flash floods destroyed the Gyirong Port on the China-Nepal border and struck dozens of settlements along a 72 km stretch of the Trishuli River. This is particularly important because millions of people in South Asia depend directly or indirectly on the water originating in the Hindu Kush Himalayan region. **Food and Agriculture Organization (FAO)** analysis provides that around 15% of South Asia's population remains undernourished. A study published in 2021 projected 16% decline in wheat yields in South Asia by 2050 as a consequence of climate change. These have serious impact on agricultural production and food security. Bangladesh is predicted to lose one-third of its agricultural GDP by 2050 because of climate variability and extreme events (Aamer, 2024).

Coming to the governance framework, SAARC declaration of New Delhi in 2007 called for regional cooperation in early forecasting, warning and monitoring of climate disasters and member states emphasized the need for assessing and managing the risks and impacts of climate change. Also the Para 32 of the SAARC declaration in Dhaka expressed concern over the continuing degradation of the environment and reaffirmed the importance of concerted regional action for environmental protection and preservation. However, none of these declarations provide any concrete solutions of climate change due to several loopholes in its implementation and governance. The Fifth assessment report of the **IPCC (2014**) identifies weak governance, institutional barriers, limited financial resources and inadequate policy structures as barriers to adaptation. South Asian countries share rivers, mountain ecosystems, monsoon systems, coastal ecosystems, oceans, atmospheric pollution and climate risks. Thus, climate change creates problems that cannot always be effectively managed within national borders. **The Paris Agreement (2015)** is guided by equity and the principle of common but differentiated responsibilities and respective capabilities, taking different national circumstances into account but it does not establish a South Asian regional climate-governance mechanism. This creates a gap between global climate commitments and the region-specific challenges faced by South Asian countries.

Although several provisions were taken for the sustainable cooperation and management of the issue at the national levels like creation of **International Centre for Integrated Mountain Development (ICIMOD**) in 1983. It facilitates the equitable and sustainable well-being of the people of the Hindu Kush Himalayas by supporting sustainable development through active regional cooperation **(**Ali, 2013**).** Similarly, Hydro-diplomacy has been using as a means to promote regional peace between Pakistan and India by including Third-party arbitration or working on commissions can increase the chances of cooperation amongst river countries. However, such mechanisms remain issue-specific and do not constitute a comprehensive climate-governance framework.

SAARC is ineffective in the present context because of rivalries between countries and the last meeting was held in Nepal in 2014. Political tensions and competing national priorities have constrained the organisation's ability to sustain high-level engagement. However, the limitations of SAARC should not be interpreted as evidence that all regional environmental cooperation is impossible. Instead, they highlight the importance of developing flexible arrangements that can sustain technical and functional cooperation even when broader political relations are strained. The urgency of such cooperation is evident from recent disaster which occurred in the form of flash floods in Nepal (2026). Polycentric framework will allow the countries to share meaningful and sensitive information about river flows, dam operations, glacial melt, groundwater stress, land use, crop vulnerability, flood-mapping and climate mitigation (**Sabir et.al, 2026).** Rather relying exclusively on existing protocols and agreements, South Asian countries should develop its own regional mechanism according to their specific climate related vulnerabilities and shortcomings. This will mitigate the harmful consequences of climate change on the lives of ordinary people of South Asia.

CONCLUSION

To conclude, this paper demonstrates that climate change is a critical concern for South Asia and has created an interconnected nexus of water and food security, with significant implications for the livelihoods of people across the region. Issues such as floods, droughts, rising sea levels, glacier melt, and climate-induced migration are increasingly affecting South Asian countries and their populations. To address these challenges, this paper recommends the establishment of a Polycentric governance framework through which all South Asian countries can cooperate more effectively. It further argues that South Asia needs a dedicated regional climate protocol that is tailored to the region's specific vulnerabilities, priorities, and developmental requirements. Such a framework could strengthen regional cooperation and provide a more coordinated approach to addressing the transboundary impacts of climate change.

Declarations

Ethical Approval

This article does not contain any studies with human participants performed by any of the authors. Therefore, ethical approval was not required.

Informed Consent

Not applicable. This article does not involve human participants, and no informed consent was required.

Data Availability Statement

This study is based on secondary data and publicly available documentary sources. The materials underpinning the research include reports, datasets, policy documents and publications released by organisations such as the Intergovernmental Panel on Climate Change (IPCC), the Food and Agriculture Organization (FAO), the United Nations Framework Convention on Climate Change (UNFCCC), the World Bank and the South Asian Association for Regional Cooperation (SAARC), wherever relevant to the analysis. The relevant source references, extracted data, research tables and supporting methodological documentation used in the study are made available as supplementary materials for the purposes of peer review. The study does not involve the collection of primary human-subject data. No restrictions apply to sharing the authors' original research materials. Third-party datasets and publications remain subject to their respective access and copyright conditions.

Author Contribution

G.S. has prepared the whole manuscript including analysis of all primary and secondary sources, Ostrom's theory is deeply analysed in the manuscript.

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