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Pakistan under Climate Change Patterns: Challenges for Security and Survival

Dr. Muhammad Ahmad¹ Monibah Arif²

¹ Lecturer, Political Science, Govt. Graduate College, Township, Lahore, Punjab, Pakistan.

Email: ahmadsheikhlahore@gmail.com

² Undergraduate Student, Department of Political Science, University of the Punjab, Lahore, Punjab, Pakistan.

Email: monibaharif996@gmail.com

Corresponding Author: Dr. Muhammad Ahmad, **Correspondence through:** ahmadsheikhlahore@gmail.com

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ABSTRACT

In the twenty-first century, climate change has evolved from an environmental problem into a non-traditional security challenge, particularly for fragile states like Pakistan. Intensifying climatic variations such as changing temperature, rainfall patterns, floods, and heat waves, are compounding socio-economic pressures as well as generating new vulnerabilities. These impacts erode Pakistan's economic, strategic and environmental security. That places unprecedented stress on state institutions, thus undermining the foundation of the state's stability, legitimacy, and continuity. Against this backdrop, this research aims to examine how rapidly changing climate patterns in Pakistan are reshaping the national security structure and posing threats to the state's survival. Guided by the Human Security Paradigm and State Survival Theory, this study argues that climate change weakens the state's security and capacity to deliver essential services by constraining individual and institutional resilience. The research applies qualitative and exploratory methodology to interpret the data. The findings identify that climate change posing threats to security and survival. By positioning Pakistan as a crucial case, the climate-induced vulnerabilities intersect with national security and survival in recent times.

Keywords: Climate Change, Pakistan, Security, Survival, Challenges.

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1. Introduction

Climate Change has emerged as the greatest threat to all countries on the planet. It has altered the traditional notion of security. Prior to this, traditional national security was interpreted as tangible and immediate threats, such as those posed by extremist movements, internal insurgencies, and inter-state conflicts, and before the world was least concerned about nontraditional security threats, and they were also unaware of the lethality associated with such threats (Burrows, 2023). Now, in the twenty-first century, changing climate patterns have redefined the security paradigms, and unlike those traditional security threats that emerge from identifiable adversaries, climate change constitutes a diffuse and borderless phenomenon with far-reaching implications for human and national survival (Sunday & Amaechi, 2024). The phenomenon does not only pose a single threat, but it also has numerous negative consequences for the economy, humanity, the environment, and flora and fauna in the world. Flooding, heat waves, droughts, glacier melt, increasing sea levels, and changes in rain patterns are some of the repercussions of climate change (Shukla et al., 2021). For Pakistan, which lies at the junction of geopolitical tensions and environmental vulnerability, these effects of climate change extend well beyond the environmental degradation and have become convoluted challenge for its security and survival. The state is facing recurring climate change shocks in form of intensified monsoon patterns, accelerated glacial melt, recurring floods, prolonged droughts, and unprecedented heat waves, which have turned climate change into an existential concern for the state (Aslam et al, 2024; UNDP, 2025). Being an extremely vulnerable country to climate change, Pakistan faces a variety of climate-related stresses, such as water scarcity, food insecurity, economic setback, poverty escalation, hindrance in military preparedness and political instability intensifying social chaos and unrest. These stressors from the environment not only put strain on livelihoods and create socioeconomic inequities but also create competition and tensions between communities, regions and even countries over scarce natural assets such as water and land, increasing the possibility of internal

national disintegration and external conflict with other countries (Imran, 2018). In the absence of effective governance mechanisms in place to efficiently manage natural resources, these intensifying consequences of environmental degradation exacerbate present security problems internally and externally, offering a tremendous challenge to Pakistan's stability and security.

Internally, the consequences of climate stress manifest in weakened governance capacities, inter-provincial rivalries, and ethnic tensions, creating fertile ground for radicalization and social unrest, resulting challenges for security and survival inside the border. Externally, Pakistan's vulnerability is compounded by regional water disputes with India and Afghanistan, where shared river systems are increasingly contested amid declining flows and unpredictable monsoon patterns, creating trans-border security challenges (Ullah & Takaaki, 2016). Therefore, Pakistan's survival and security internally and externally depends on its ability to re-conceptualize climate change as a central element of its national security doctrine, but not merely as an environmental or developmental concern. Integrating climate resilience into governance, defense and foreign policy tools is essential for ensuring long-term stability and safeguarding national sovereignty in an unpredictable climatic future.

The research is guided by two central questions: (1) how do climate change patterns instigate national security challenges in Pakistan? And (2) how far the governance challenges, economic constraints and food security increase the state's vulnerability in climate change threats and survival? To inquire these research questions, this study is subjected to analyze the intersection of climate change and national security in Pakistan by examining the recurring climate change patterns and most importantly, the demographic impacts of recent climate disasters like the 2022 and 2025 floods.

2. Literature Review

Pakistan has become the most climate affected nation in the world where climatic change has been seen not only as an environmental crisis, but also as a direct challenge to human security and national stability. Studies point out that the geography of the nation is fragile, encompassing

melting glaciers, changing monsoons, and increasing arid territories, which make it disproportionately vulnerable to extreme weather conditions (Imran, 2024), Mustafa (2011), in his article *Climate Change and Its Impacts with Special Focus on Pakistan*, highlighting the effects of climate change in Pakistan argues that the heat waves, rising sea level, temperature extremes, glacial retreat and resulting extreme floods are the effects imposed by climate change and these effects represent existential threats to Pakistan's human security. Most agrarian countries, like Pakistan are particularly vulnerable to climate change because their economies rely on natural resources. Climate-induced change is acutely sensitive to agriculture that takes up 37.4 percent of labor force and has an almost 22.7 percent contribution to the GDP. Fahad and Wang (2020) demonstrate that climate change is causing food insecurity, water scarcity, poverty in rural communities, particularly in the absence of support. Their previous study (2018) emphasizes that despite farmers observing climatic change, financial constraints, ineffective institutions, and information scarcity limit adaptation making environmental stress a survival issue. The IPCC estimates that due to increases in temperature and intensifying rainfall, Pakistan faces a high risk of harming the agriculture sector because of floods, desertification, and waterlogging. Mustafa (2011) highlights the issue of internal migration where floods and lack of water drives individuals out of rural regions to urban centres, overwhelming cities that are already overstretched with infrastructure pressures. Such climate lead displacements are not simply humanitarian crises, but security issues, in which resource shortages and social discontinuity are contributing to conflict and instability within the region (Henjum, 2017). The health factor is also addressed, he observes that the increase in the number of the diseases that are transmitted by vectors like malaria, dengue, and cholera after the flooding drains the already scarce resources of Pakistan.

Recurring floods, especially the disastrous events of 2010 and 2022, are some of the most devastating effects of climate change in Pakistan that have become the point of concentration in scholarships. Over the past two decades, Pakistan

has consistently ranked among the top ten most climate-vulnerable countries, suffering over 10,000 deaths and approximately \$4 billion in losses from 173 extreme weather events (Rana et al., 2023; Adnan et al., 2024; Ullah & Takaakii, 2016). Scholars argue that while climate variability triggered the floods, the extent of devastation was significantly amplified by extractive political institutions and poor governance (Springer, 2023) with limited institutional learning between 2010 and 2022 (Hussain et al., 2022).

While existing scholarship widely explains the social implications of climate change, such as internal migration, declining agricultural productivity, water scarcity, heightened disaster frequency, and the potential for political instability- Khan (2019) emphasizes that, beyond these discrete impacts, climate change poses a broader existential risk to collective human survival and the national security of Pakistan. Similarly, although research linking climate change to increased violence argues that climate change would unswervingly lead to increased violence because resource shortages and mass migration will lead to conflicts over resource-rich regions under unstable governments. These concerns were validated by the 2025 floods, which accelerated poverty, strained fiscal systems, and heightened socio-economic fragility, reinforcing the link between climate impacts and state's ability and security threats (Henjum, 2017). These studies barely mentioned Pakistan's vulnerabilities within a comprehensive security framework. The present research addresses these anticipations and examines climate change through an analytical lens to explore its implications for human security and state survival.

3. Conceptual Framework

This study combined the synthesis of the human security paradigm with state survival theory to provide a cohesive lens approach in order to define vulnerability at the societal and state levels. The human security perspective offers a change of focus, where a territorial-centric defense focus is replaced by the well-being of human beings, emphasizing many other human-level threats such as food insecurity, livelihood instability, and environmental stress as the

foundational layer of state insecurity. To complement this, state survival theory highlights the downward spiral of these human-level threats into systematic pressure and shows how human-level threats can aggregate into systematic pressure and turn into broader risks to the state's stability, institutional capacity, and long-term survival.

The human security paradigm, introduced in the 1994 UNDP Human Development Report, emerged as an alternative to the historical national security model that primarily looked at the security of the territorial boundaries against military encroachers, and not more (UNDP, 1994). This security paradigm broadened the security prism by placing people rather than states' security at the center place of decision making. It defines Human security as the protection of individuals from hunger, disease, repression, and sudden and hurtful disruptions in daily life (UNDP, 1994). It redefines the referent object of security, underlining that security and survival of a state rely ultimately on the well-being of individuals and communities. According to it, Sunday & Amaechi (2024) add that human security is made of inseparable interlinked dimensions: economic, food, health, environmental, community, and political security. Endangerment of any of these dimensions, including food shortages, water scarcity, health crises, or economic instability, may not just be the subject of humanitarian interest but also bring governance to its knees, provoke unrest, and weaken state legitimacy.

State Survival Theory, rooted in realist thought, defines that the primary objective of any state is to continue its existence by preserving its territory, political authority, state legitimacy, and internal stability. Threats to state survival may come from external (such as military aggression, interstate resource conflict) or internal (such as economic decline, social unrest, weak institutions, resource shortages, or widespread human insecurity) vulnerabilities (Koivisto, 2010). In essence, the theory means that a state survives only as long as it can protect its territory, have effective governance, and maintain the support and security of its people. Classical realists such as Hobbes (1651), the modern realists such as Morgenthau (1948) and Waltz (1979) argue that state survival requires

safeguarding its territorial integrity and maintaining resilience and sovereignty within an anarchic international order. Morgenthau emphasized power accumulation for security. However, Waltz refined this by emphasizing that state survival depends on sustaining relative power and stability in a self-help system (Barry, 1991). In the post-Cold War period, the idea of state survival expanded beyond military threats to include political legitimacy, societal cohesion, economic capacity and environmental stability.

In the context of Pakistan, the combination of these two theories exposes the climate change threats in Pakistan at both the micro-level of individual welfare and the macro-level of state survival. The Human Security Paradigm elaborates that climate stress shifts into widespread human vulnerability. On the other hand, State Survival Theory explains that the accumulated pressures, governance strain, resource scarcity, and regional hydro-politics undermine the state's stability as well as long-term survival. Conceptually, the intersection of these two frameworks demonstrates that climate change functions as a threat multiplier, converting environmental setbacks into profound risks to Pakistan's sovereignty, national security, and continuity.

4. Research Methodology

This study adopts a qualitative, explanatory case study research design to provide a theoretical examination of climate change as an existential, multidimensional security challenge for Pakistan in the twenty-first century. By implementing a theoretical framework, the study constructed a context in which climate change is evaluated not merely as an environmental concern but as a structural threat capable of destabilizing both societal and state foundations. The research relied on qualitative analysis/critical evaluation of primary and secondary data, including academic journal articles, policy briefs, government reports (Pakistan Meteorological Department, Ministry of Climate Change, IRSA reports) International organization publications (UNDP, World Bank, IPCC), hydrological data, disaster impact evaluations, and reputable news sources to identify prevailing scholarly perspectives on climate-security linkages, particularly within fragile and developing states,

and to situate Pakistan within the broader discourse on non-traditional security threats. Overall, this methodological approach aimed to explore how climate change patterns instigate internal and external security challenges in Pakistan and to assess how these challenges affect Pakistan's long-term state survival.

5. Changing Patterns of Climate Change in Pakistan

Pakistan is an important state in the South Asian region because of its geographical diversity, ranging from the Himalayan glaciers of Gilgit Baltistan to the fertile plains of the Indus Basin, the coastal megacity of Karachi, the deserts of Sindh and Baluchistan, the rich geographical features underpinning through the climate change trends and stressing the natural resources (Malkani & Malik, 2017). Pakistan is the only country in the world which has four different seasons per year, like spring, winter, summer and fall. But, with the world's most severe environmental transformations, Pakistan's seasons and locations have been exposed to combination of climate stressors like rising temperatures, erratic rainfall, accelerated glacial melt, rising sea levels, and recurrent floods and droughts.

Over the past century, Pakistan has experienced approximately 0.6°C rise in temperature between 1901 and 2000 which can further rise to additional 1.3–4.9°C rise by 2100 under high-emission scenarios (World Bank, 2021). With increase in temperature, Heat waves have become more frequent and intense. As in April 2022 Jacobabad recorded hottest summer with 51°C, making it one of the hottest places on earth (Pakistan Meteorological Department [PMD], 2022). Moreover, the 2025 heat wave again broke records by killing over 150 people in Sindh and Punjab (Nouman & Shams, 2024). These rising temperature has extended summers in Sindh and Punjab and intensified desertification in the Thar desert resulting shorten crop cycles, reduce labor productivity, and place immense stress on food and water security (Immerzeel et al., 2010)

Another major concern of Climate Change lies in rapid melting glaciers in northern areas. Pakistan hosts the largest number of glaciers outside the Polar Regions. Rising temperatures have

accelerated glacial retreat, increasing the risk of Glacial Lake Outburst Floods (GLOFs). In 2022, a GLOF in Hunza washed away bridges and damaged the Karakoram Highway (ICIMOD, 2022). The melting glacier creates surges in water flow and increase flood risks, while in the long term they signal a future of chronic water scarcity.

Rainfall patterns have also become increasingly erratic, with monsoons is projected to increase by 15–20% in intensity, but with unpredictability delivering both extreme rainfall and extended dry spells (IPCC, 2021). The changing rainfall pattern makes Pakistan's river system vulnerable to irregular water flow causing floods. For example, the 2022 floods were triggered by record-breaking monsoon rainfall, which was nearly three times the national average, with Sindh and Balochistan receiving 466% and 437% more than usual (Ali Siyal, 2025). Just three years later, the 2025 floods devastated Punjab and Sindh due to extreme rainfall, displacing over millions of people and destroying crops. While such rainfall events drown many areas, some regions face prolonged dry spells. In Balochistan and Tharparkar, extended droughts alternating with flash flood cripple livelihoods, trigger malnutrition, and accelerate migration, producing a dual crisis where floods and droughts alternate unpredictably across the country.

The implications of these climate patterns for Pakistan are not only environmental but it interacts with Pakistan's fragile socio-political landscape to create profound threats to national security and survival. Repeated disasters are making Pakistan vulnerable and eroding Pakistan both internally and externally. Food insecurity, economic instability, migration, and resource disputes undermine internal cohesion, climate change magnifies Pakistan's fragile trans-boundary water relations.

6. Climate Change Patterns and Challenges for National Security and Survival

National security can be defined as the best possible way, which is a combination of a state's internal and external security. It includes all expected measures necessary to safeguard its stability, sovereignty, and the well-being of citizens. Internal security refers to the protection

of a state from threats that erupt within its territory. These threats can be political, economic, social or environmental. On the other hand, external security includes the defense of a state's sovereignty and integrity against external actors' aggression or interference (Burrows, 2023). In simple terms, national security can be represented as the protection of the state and its people from all forms of threats, both inside and outside its borders. These two dimensions are deeply interconnected: a stable internal environment enhances a nation's ability to defend itself externally, while peaceful and cooperative external relations contribute to domestic stability (Walt, 1991). Hence, national security is often viewed as an umbrella concept that integrates both internal and external dimensions into a single framework. According to Retter et al. (2020), collectively, national security encompasses social cohesion, military strength, economic stability, human welfare, food availability, and environmental sustainability, ensuring the protection of sovereignty within and beyond the state's borders. If any of these components are compromised, the country's overall national security is endangered.

In this context, the survival of the state, defined as its ability to protect its people and preserve its presence as an independent sovereign entity in the face of internal and external threats. Therefore, the survival of a state under climate change refers to its ability to preserve territorial integrity, human welfare and institutional stability amid the social disruptions caused by climate variability (Barnett & Adger, 2007; Barry, 1991). It strengthens the capability of Pakistan to safeguard its population, uphold institutional legitimacy, sustain its economy, and preserve sovereignty despite the increasing frequency of climate-induced disasters.

Climate change in Pakistan has triggered food, health, economic, environmental and social insecurity. The convergence of these insecurities creates a cycle of fragility that strikes at the very foundation of state survival by crippling the state institutions' ability to protect citizens, sustain stability, and maintain sovereignty. Ranked as the eighth most vulnerable country to climate change, Pakistan faces a situation where environmental stress is not merely an ecological issue but a fundamental national security threat,

one that jeopardizes both the internal stability and external sovereignty essential for the state's survival.

6.1 Agricultural Damage and Food Insecurity

Pakistan is a pure agrarian country, and agriculture provides livelihoods for millions of households, ensures food security, provides employment and supports both direct and indirect exports. But the agricultural pace slowed significantly due to poor governance, policy weaknesses, and unequal land distribution. The impact of climate change is worsening the existing poor state of this sector (Ali et al., 2021). The agricultural sector has suffered from a number of shortcomings, from the highest level, i.e. policy making, to the grassroots level in Pakistan. The status of land degradation in Pakistan is causing the severe challenges due to climate change and is worsening the whole situation (Imran, 2018).

Agricultural performance in Pakistan depends on several interrelated climatic factors, including optimum carbon dioxide (CO₂) concentration, temperature, solar radiation, and precipitation, along with other environmental variables such as wind speed, soil moisture, and water vapor. These factors are both causes and indicators of climate change. Although CO₂ is a key component of photosynthesis and plant growth, but due to ozone layer depletion and greenhouse effect CO₂ concentration is being excessive in the atmosphere, which leads to temperature increases that negatively affect precipitation patterns and soil moisture (Rosenzweig & Hillel, 1998). Moreover, a higher temperature will also make a number of crops unsuitable in certain areas. Therefore, there would be a shift in crops from one area to another. As agricultural productivity declines, it directly affects food security and livelihoods of people. These impacts of climate change on Pakistan's agricultural sector embody the core logic of both the Human Security Paradigm and State Survival Theory. As climate variability accelerates, floods and droughts impact soil fertility in the short, medium and long term, by depleting available organic nutrients of the soil (Imran, 2018). Then, fuel crop shortages and household's dependent on farming face severe income losses, increasing the likelihood of poverty and hunger. This

process undermines the foundational elements of human security, food, environmental, economic, and livelihood security, upon which social stability depends. These micro-level insecurities contribute to broader governance pressures, heightening poverty and social grievances that deteriorate state institutions' capacity to maintain order and deliver essential services.

Pakistan is already struggling with food insecurity. According to a study by the Sustainable Development Policy Institute (SDPI) and world food program, about 48.7% of the population was food insecure even before recent disasters, and the floods further worsened the situation (SDPI & World Food Program [WFP], 2009; SDPI, 2010). Past global experiences, such as the food price crisis of 2007–2008, have shown that scarcity of food and rising prices can trigger unrest and riots, as witnessed in countries like the Philippines, Egypt, Haiti, India, and Vietnam. Similarly, Pakistan's most food-insecure regions, such as North and South Waziristan and Dera Bugti, are also among the most conflict-prone areas, suggesting that food scarcity can intensify social tensions and instability (Imran, 2018)

6.2 Economic and Military Vulnerability

Agriculture, with a share of almost 22-24% of GDP and about 37% of the number of workers, is the mainstay of the national economy of Pakistan (Rehman et al., 2015). It supports not only livelihoods but also industrialization, trade and rural development. Being extremely reliant on this climate-sensitive industry, Pakistan is highly susceptible to climate change, which has increased in both frequency and severity in recent times (Ali et al., 2017). The cumulative damages of climate-related disasters have reached USD 14.9 billion, and the overall losses of the economy have been approximated to USD 15.2 billion. Even the 2022 floods have caused similar losses of infrastructure estimated to be 8-10% of GDP, leaving the government to redirect essential development expenditure on emergency response and recovery (World Bank, 2022). Housing, agriculture, and transport were the most severely damaged (USD 5.6 billion, USD 3.7 billion and USD 3.3 billion, respectively), whereas Sindh province took almost 70 percent of the overall losses (World Bank, 2022). High

rebuilding burdens have swelled the buried debt and undermined fiscal sovereignty, as well as limited the options of long-term development planning. Immediately following the floods of 2022 and 2025, poverty increased, with 45 percent of this population living below the poverty threshold and 10 million people at risk to enter poverty (UNDP, 2025). The largest export sector, cotton-based textile industries, was devastated, and livestock-related industries associated with leather and sports goods were compromised with frequent floods, heat waves and epidemics (Khetran, 2022).

Additionally, climate change is a major problem for the hard power of Pakistan that entails economic and military power. Hard power is the ability of a state to use economic and military resources to gain leverage over other parties as well as to achieve foreign policy goals by way of coercion or deterrence. Military capability is anchored by economic power, which provides the resources to finance defense research, technological development, and acquisition of equipment and training of military staff (Akbar, 2023). In contrast, economic interests are ensured by military strength, which protects trade routes and guarantees the access to essential resources. The interrelationship of all these pillars implies that any destabilization of economic strength also destabilizes the military capacity. The losses in agriculture and infrastructure because of climate damage have already cost Pakistan an estimated 2-6 percent of its GDP per year. Such a drop jeopardizes the capability of the nation to support defense spending, modernization of its arsenal and strategic relevance in a competitive regional setting, having a direct impact on the macro-level state survival by reducing fiscal room to fund defense spending (Khan, 2020).

These dynamics reflect the central insight of the interconnected relevance of the human security concept with the state survival theory: when a state's social foundations, economy and military goes deteriorate, its ability to preserve stability and exercise authority becomes increasingly fragile (Nouman, & Shams, 2024). This weakening of economic and military resilience has serious implications for national security, particularly given the ongoing regional arms modernization.

Operational readiness is another area increasingly affected by climate change, as rising temperatures, floods, and infrastructure deterioration elevate maintenance costs and reduce the functionality of mechanized weapon systems. In Pakistan, the military's crisis response capacity has already been stretched by repeated involvement in humanitarian aid and disaster relief operations, such as during the 2005 earthquake and the 2010 & 2022 floods (Burrows, 2023). While the armed forces' engagement in disaster management strengthens public confidence, it also diverts military institutions from defense preparedness and non-traditional security pressures. Climate-induced disruptions to civilian infrastructure, particularly water supply, transportation, and power systems, further stress military logistics and coordination capabilities.

6.3 Governance Erosion and Radicalization

Climate change has significantly eroded governance in Pakistan by overwhelming state capacity, exposing institutional weaknesses, and deepening public distrust. When the non-traditional insecurities intensify, the state's capacity to meet the basic needs of its population collapses, generating widespread disillusionment and weakening the social contract. (When millions of people simultaneously require shelter, food, clean water, and rebuilding of houses, state's disaster response systems become overstretched, and relief operations have often been delayed (Tierney, 2020). Meanwhile, economic losses from repeated disasters reduce government revenue while increasing demand for social support and funding for reconstruction, widening fiscal pressures and impairing the state's ability to invest in long-term climate adaptations, including health, education and other social services. Such climate disasters also disrupt essential administrative functions; for example, damage to roads, bridges, and public infrastructure. During floods the ability of local authorities impaired to deliver services, maintain order, or respond effectively. These vulnerabilities accumulate and become political in nature, as unaddressed needs create "governance vacuums" that are easily exploited by non-state actors (Barnett & Adger, 2007; Raleigh & Urdal, 2007).

State Survival Theory deepens this understanding by demonstrating that such human insecurities directly threaten the structural and functional integrity of the state. Climate-induced displacement, infrastructural breakdown, and fiscal strain undermine the state's ability to maintain territorial control, enforce authority, and deliver effective governance, functions essential for state endurance in an anarchic international system. As governance vacuums expand and state fails to adequately respond to crises, breed a sense of resentment, frustration, and hopelessness among affected people (Raleigh & Urdal, 2007). In such conditions, extremist and non-state groups step in and exploit this governance vacuum by providing relief and social services to affected communities, thereby building influence and creating parallel structures of power (Bano, 2012). Individuals (especially youth) without livelihoods then become more receptive to these alternative, social ideologies which promise them food, shelter, medical aid and economic support. Following the 2010 floods, organizations such as Lashkar-e-Taiba and Jamaat-ud-Dawa were quick to provide effective relief and rehabilitation support, filling the gap due to the weak state institutions (Muzamil et al., 2021). Their efficiency and visibility during these crises enhanced their legitimacy among affected communities and strengthened their social base. The certain developments erode state legitimacy, foster dependency on non-state actors, and create governance gaps which extremist groups try to fill creating deep implications for National stability (Feyyaz, 2019). Conceptually, therefore, climate change acts as a dual-force mechanism: firstly, it erodes human security by compromising day-to-day survival. Secondly, these accumulated insecurities weaken the state's institutional capacity and legitimacy, pushing it toward a sustainability crisis. However, it shows that climate change does not merely strain Pakistan's governance strategies, it fundamentally destabilizes the very conditions of both human well-being and state sovereignty.

6.4 Interprovincial Water Conflict

The origins of interprovincial water disputes in Pakistan lie in the colonial hydrological arrangements developed under British rule. Before independence of Pakistan, present-day Punjab was regarded as the "food basket" of the

Indian subcontinent due to its fertile land and irrigation systems. During the late 19th and early 20th centuries, British authorities implemented large-scale irrigation projects in the Punjab province to expand its agricultural productivity and revenues and also assert control over frontier regions. After the independence, Punjab got its share of British built irrigation system under the Indus water treaty (Mustafa et al., 2013). Moreover, the Water Apportionment Accord (WAA) 1991 and the creation of the Indus River System Authority (IRSA) in 1992 sought to institutionalize interprovincial water distribution in Pakistan. The Accord allocated 117.35 million acre-feet (MAF) of water among provinces based on historical usage: Punjab (55.94 MAF), Sindh (48.76 MAF), Balochistan (3.87MAF), and Khyber Pakhtunkhwa (6.78 MAF) (Anwar & Bhatti, 2018). For allocation of water in the past, legal processes have been adopted to form legal frameworks, including the Water Apportionment Accord 1991 and the establishment of the Indus River System Authority (IRSA) for the settlement of provincial water conflict. However, emerging evidence suggests that climate-induced hydrological stress has destabilized the functionality of these frameworks, heightening interprovincial contestation particularly among Punjab, Sindh, and Balochistan.

Rising temperatures, accelerated glacial melt in the Hindu Kush-Himalayan region, altered monsoon dynamics, and increasingly erratic river flows in IBS have strained IRSA's allocation mechanisms and intensified interprovincial mistrust, particularly acute between Punjab (upstream) and Sindh (downstream) (Khan, 2020). Punjab, being upstream on several rivers, bore the initial brunt of floodwaters; however, during major climate-induced flood events, such as those in 2010, 2022, and 2025. Downstream provinces, particularly Sindh, have accused Punjab of failing to coordinate effectively in the release of water, thereby exposing them to greater flood risks. This accusation gains sharper resonance in times of climate change crisis, as Sindh has historically alleged Punjab to exercise upstream hydro-hegemony by controlling release and control schedules of canal headworks. (Mustafa, Akhter, & Nasrallah, 2013). On the contrary, during low-flow years, Sindh has been frequently accused by

Baluchistan of withholding its allocated share of water. Thereby, such differences became the cause of worsening tensions over interprovincial equity. Structural scarcity further intensified these disputes. From 1951 to 2020, Pakistan's per capita water availability declined from 5,260 cubic meters to below 900 cubic meters by placing the country in the "water-scarce" category (PCRWR, 2020). Climate projections indicate that flow contributions from glacial and snowmelt may decline by up to 30% by 2047 under high-emissions scenarios, further shrinking the water availability for provincial allocations (IPCC, 2021; Lutz et al., 2014). The combination of reduced availability and increased competition creates fertile ground for the politicisation of water among provinces and further weakens federal consensus on infrastructure projects like the Kalabagh Dam.

In this way, the floods of 2025 did not simply expose Pakistan's vulnerability to climate change; they also aggravated entrenched inter-provincial grievances and fueled regional rivalries. Therefore, under the climate stress, water disputes between the two federating units within Pakistan have the potential to turn into real conflict, which can be a challenge to national stability.

6.5 Conflicts with Neighbors

Climate change transforms long-standing water disputes in South Asia into security risks for Pakistan, particularly in relation to India over the Indus Basin and Afghanistan over the Kabul River. Historically rooted conflicts over the Indus Basin with India and the Kabul River with Afghanistan are now sharpened by glacial melt, heavy rainfall, and devastating floods. Since the division of British India in 1947, Pakistan has had a water conflict with India over the flow of the Indus water basin across the new international border (Feyyaz, 2019). These immediate tensions regarding the discontinuation of water flow from India to Pakistan posed a survival threat for a newly born country.

Within the Human Security Paradigm, disruptions in water availability, by any means, directly endanger the survival, livelihoods, and socio-economic stability of Pakistan's population. The country had its first water crisis with India in 1948 when India stopped water

supplies from the Ferozepur headworks into Pakistan's Dipalpur canal and the main branches of the Upper Bari Doab Canal. Pakistan protested strongly, as this cut off irrigation water to millions of acres of agricultural land (Khan, 2020). With the mediation of the World Bank, the Indus Waters Treaty (IWT) of 1960 was signed between the two hostile neighboring states. The treaty divided the Indus Basin between India and Pakistan, granting Pakistan control over the western rivers (Indus, Jhelum, and Chenab). India was allowed to control the eastern rivers (Ravi, Beas, and Sutlej). But, disputes soon emerged as India pursued upstream dams and hydroelectric projects on Pakistan-controlled western rivers (For instance, Baglihar Dam on the Chenab, Kishanganga Hydroelectric Project on the Jhelum), raising Pakistan's concerns over its downstream water security (Hussain, Khalid & Imran, 2021). On the western front, Pakistan inherently reliance on the Kabul River, which flows from Afghanistan into Pakistan before joining the Indus. The Kabul River Basin (KRB), which contributes up to 20–28 MAF (million acre-feet) annually to the Indus system, indicating there was no formal water-sharing treaty between the two countries (Andik & Mianabadi, 2023). Afghanistan increasingly pursuing hydropower projects such as the Shahtoot Dam near Kabul and the Kama Dam in Nangarhar. That construction threatening the reductions in downstream water flows in Khyber Pakhtunkhwa and in the Indus river system by 16 to 17%, directly challenging water security (Halasah et al., 2019). India and Afghanistan defend their dam constructions as a means to secure their own water needs. An imperative that is compatible with the State Survival Theory, which implies that states need to ensure access to their most essential resources as the ultimate survival and power tool. But Pakistan, with its economic, agricultural, and domestic water demands largely reliant on trans-boundary flows. These upstream projects present the possibilities of instigating strategic challenges.

These geopolitical tensions intended to intensify the whole situation due to climate change because it disrupts the hydrological bases of the preexisting water-sharing settlement. Increased glacial melting in the Hindu Kush Himalaya region, inconsistent monsoon cycles, and natural

extremes, including the large floods in 2010–2022, have led to vulnerable rivers (Immerzeel et al., 2010; IPCC, 2022; Lutz et al., 2014). Theoretically, climate change functions as a structural stressor that transforms Pakistan's long-standing transboundary water disputes with India and Afghanistan into multidimensional security challenges. In the Human Security Paradigm, problems of water supply jeopardize the living and livelihoods of the people, food security and socio-economic well-being of Pakistan. Meanwhile, State Survival Theory posits that the scarcity of resources undermines the state's operations become vulnerable. The tension between states increases the tendency to acquire more resources for their survival (Barnett and Adger, 2007; Rasul et al., 2021; Barry, 1991). Therefore, Pakistan is concerned with the hostile behavior of India and Afghanistan owing to control over the rivers flows, which potentially hamper the economic growth and state survival.

7. Policy Recommendations

The Government of Pakistan needs to enhance glacier monitoring in certain northern areas with the help of satellite technology, collaboration and remote sensing. There is also a need to promote international climate research institutions within the state

Pakistan should introduce comprehensive agricultural reforms to address climate change challenges. Strong policy-making and coordination in federal and provincial institutions are essential to implement sustainable agricultural practices

There is also a need to address the long-standing water disputes with neighboring states, India and Afghanistan. Multidimensional security challenges in Pakistan can be addressed by water reservoirs, new investments in dams, and the rehabilitation of existing water storage infrastructure, which is essential to store excess water during high-flow periods

Pakistan should pay attention to adopting a comprehensive food security policy model like other developed countries to ensure stable food production, strategic food reserves and efficient distribution systems in order to deal with the damages of climate-induced crop scarcities

Pakistan's climate change challenges are aligned

with defense strategies and national security. Government policymakers should recognize climate-induced economic instability, resource scarcity, and migration as substantial security threats that can affect domestic stability

Pakistan is deprived of strong and transparent institutions that are necessary to address security challenges and economic crises effectively. Pakistan's improved governance will increase the ability to deal with climate-related threats as well as maintain national stability

Conclusion

In Pakistan, climate change has outgrown its stereotypical framework as an environmental or a developmental issue, and it has become a complex security crisis working at both micro and macro levels. The changing climatic patterns are reshaping the national security setting and posing structural challenges to the very existence of the state. Repeating climatic disasters, for

instance, the disastrous floods in 2010, 2022 and 2025, have caused profound humanitarian and financial damages. The heightened domestic and international unrest has led to consistent disasters for the state security. These crises have placed significant challenges to governance, increased exposure to economic vulnerability, and increased competition over the scarce resources. Consequently, there is growing pressure on the agency of Pakistan to ensure the sovereignty, economic resiliency and sovereign decision-making. Ultimately, Pakistan's survival and long-term stability depend on its ability to incorporate climate resiliency into its national security architecture. Pakistan can strengthen its survival and stability by solidifying the compromised governance structures, investing in climate-resilient infrastructures, and restructuring its water management institutions.

Conflict of Interest

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