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Melting Boundaries: Climate Induced Effects on Inter- Provincial Conflicts in Pakistan

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ABSTRACT

This article examines how climate change functions as a "threat multiplier" by intensifying inter-provincial conflicts in Pakistan, particularly in relation to water governance within the Indus Basin system. Drawing on the conceptual frameworks of climate justice, environmental federalism, and hydro-hegemony, the study investigates how climate-induced stressors such as glacial melt, shifting monsoon patterns, droughts, and floods aggravate historical grievances and institutional asymmetries among the provinces of Punjab, Sindh, and Balochistan. Using a qualitative, comparative case study methodology, this research synthesizes peer-reviewed literature, government data, and international case comparisons (e.g., the Nile Basin and Tigris-Euphrates systems) to situate Pakistan's internal disputes within a global context of climate-induced political tensions. The findings reveal that climate change has magnified inter-provincial mistrust over water distribution, undermined cooperative governance structures such as the Indus River System Authority (IRSA), and exposed the limitations of decentralized environmental policy in the absence of coordinated adaptation mechanisms. The study concludes by arguing for a reimagining of environmental federalism in Pakistan one that

prioritizes climate equity, institutional reform, and collaborative resilience across provincial boundaries.
Keywords: Climate change; Inter-provincial conflict; Indus Basin; Climate justice; Environmental federalism; Hydro-hegemony; Pakistan; Water governance; IRSA; Glacial melt

INTRODUCTION

Changing climate has become an important factor that has led to hydrological stability in high mountains areas and especially in the Hindu KushHimalaya (HKH) range, which is a source of water to more than three billion individuals via principal Trans- Boundary Rivers, such as the Indus Basin (Bolch et al. Wester et al., 2019; Wenne et al., 2017; Wang et al., 2019; Rice et al, 2019; Goff et al., 2018; Li et al., 2022b). Increased rapid melting of glaciers, changed precipitation patterns and changes in timing and frequency of extreme ventures of hydro meteorological events are transforming the timing and the amount of water moving in South Asia (Immerzeel, Pellicciotti, & Bierkens, 2013; Rasul,2014). Such changes are especially momentous in Pakistan where the Indus River System is supplied by glacial and snow melt affect the agricultural products, energy and human security.

The Water governance system in Pakistan is characterized by an old interprovincial question. For allocation of water in the past, legal processes have been used to form legal frameworks like the one adopted in 1991 known as Water Apportionment Accord and the institutional processes like Indus River System Authority (IRSA). However, emerging evidence suggests that climate-induced hydrological stress is undermining the functionality of these frameworks, heightening interprovincial contestation particularly among Punjab, Sindh, and Balochistan (Mustafa, Akhter, & Nasrallah, 2013; Anwar & Bhatti, 2016). These conflicts are often framed in political or administrative terms, yet there is limited inquiry into the extent to which upstream climate variability and glacial retreat act as structural drivers of provincial-level disputes over water allocation. While considerable scholarship has examined trans-boundary water conflicts between India and Pakistan (Wolf & Newton, 2008; Dinar et al., 2015), as well as the politicization of internal water distribution (Ranjan, 2012), few studies explicitly link climatic transformations in the Himalayas to subnational water conflict dynamics within Pakistan. This represents a critical gap in the literature on environmental security and hydro-political resilience in South Asia.

This study addresses that lacuna by analyzing the extent to which Himalayan glacial retreat, driven by anthropogenic climate change, exacerbates interprovincial water disputes in Pakistan. Through a qualitative analysis of historical records, climate data, and institutional responses, the research seeks to evaluate how environmental change in the upper Indus Basin interacts with downstream political geography to reshape patterns of conflict over water. This study determines how water scarcity caused by climate explains the intensification of provincial war in Pakistan.

Theoretical Framework

Water has a long history of being a factor of conflict as well as cooperation, especially in politically disputable or lacking in resources areas. The hydro-politics idea- a practical framework of the contact of the hydrology and international or subnational politics is the best model to explain the disagreement over common water systems (Wolf, 1998). In contexts where the river basins are crossing the boundaries of several jurisdictions, it brings rivalries over access; timing and distribution of water may initiate deeply-set tensions especially when exacerbated by institutional imbalances or ecological destruction.

This is refined further by the environmental security literature that Terrorist groups may represent a support base to the state of the environment security and environmental change such as climate variability can be a threat multiplier serving to intensify threats already posed social, political and economic aggravations (Homer-Dixon, 1999). Within this framework, the melting of Himalayan glaciers which is vital to the Indus River System in Pakistan, has receded is not something of just environmental danger, but a structural force behind conflict among provinces whose identity and economies are enshrined on historical arguments of water access. This insight is developed by Zeitoun and Warner (2006) using the term of hydro-hegemony where dominated actors acquire domination on water resources through coercion, consent, or law mechanisms. With reference to Pakistan, Punjab is the dominant political position and its infrastructural control over Indus Basin as compared to the province of Sindh and Balochistan are among the downstream provinces. The resulting perceptions of inequity, particularly under climate-induced stress conditions, align with Zeitoun and Mirumachi's (2008) argument that control over water is often sustained less through overt conflict and more via embedded structural power within institutions.

Empirical studies increasingly support the proposition that climate change contributes to political instability and conflict, especially where governance is weak and resource dependence is high (Koubi et al., 2014). Although the causality is complex and often indirect, several mechanisms have been identified: reduced agricultural productivity, livelihood insecurity, and forced migration due to climate-induced water scarcity (Adger et al., 2014). In glacier-fed river systems, such as the Indus, the link is particularly acute: climate-induced water stress disrupts seasonal flows, reduces predictability, and strains existing water-sharing frameworks, often leading to contestation.

Hijioka et al. (2014), in the IPCC Fifth Assessment Report, note that South Asia is exceptionally vulnerable to such pathways of conflict due to its population density, dependence on monsoonal and glacial water, and institutional fragmentation. In Pakistan, rapid glacial melt coupled with weak adaptive capacity renders the country susceptible not only to inter-state but also inter-provincial conflict, a dimension largely absent in global climate-conflict literature, which focuses predominantly on international or communal scales (Ide et al., 2021).

The frameworks of water sharing in the trans- boundary system as well as federal systems have been important in resolving water allocation rights to water crack. Examples of success like the Indus Waters Treaty (IWT) between India and Pakistan or the Mekong River Commission (MRC) in South East Asia have valuable details regarding institutional endurance and adaptive administration (Dinar et al., 2015). Predictability of waters flows on which these frameworks are based on is getting diminished because of glacier melting, caused by climate, and hydrological deviation.

The Indus River Water Treaty deals with the national level whereby the 1991 Water Apportionment Accord of Pakistan was controlled. Indus River System Authority (IRSA), constitutes one of the important internal system mechanisms of governance. However, as Anwar and Bhatti (2016) claim, it is losing its effectiveness under the impact of climatic stress, mistrust between institutions, and opacity of data. It is the case with clause 14 of the Accord, which does not contain provisions on climate adjusted variability, making it rigid when conditions of long-running drought are encountered, flooding, and earthquakes all of which are increasing as a result of altering hydrology in the Himalaya.

Hydrological instability is caused by climate change and is more prone to demonstrating or even increasing vulnerabilities, hidden institutional, ethnic or regional disparity. The case of Pakistan is no exception because the latter is unique as the disputes are not only subnational but also built into a federal constitutional structure, in which water is a simultaneous item and that the political sensitivities are increasing on. Hydrological stress induced by climatic change has been one of the causes of ethnic identity and electoral geography, aggravated intra-provincial relations in Pakistan, especially during the setting of a weak federal system of water governance. The issue of erratic accelerated retreat of Himalayan glaciers coupled with irregular precipitation is prejudiced because of global warming, the reduction and unpredictable flooding of the Indus due to precipitation and increase in temperature (Bolch et al., 2012; Immerzeel, Pellicciotti, & Bierkens, 2013).

The 1991 Water Accord has been put under pressure as never before because of these changes. This Accord is not flexible to consider the changing climatic conditions and results into feeling of injustice in distribution between the provinces (Anwar & Bhatti, 2016). Sindh being a downstream province, during scarcity of water has constantly been accusing Punjab of overdrawing water in its downstream periods and Balochistan has complained that Sindh has not yet allowed its due share of water (Mustafa, Akhter, & Nasrallah, 2013). The ever growing intensity and prevalence of droughts and floods caused by melted glaciers and the increased monsoonal patterns worsened water-sharing agreements and escalated the local resentments (Rasul, 2014; Hijioka et al., 2014). These are not just administrative disagreements, but they have deep roots in ethno-political inclinations especially where the sustainability of life, through farming, is jeopardized by a shortage of water enhances regional disparities. In that sense climate change is a multiplier of structural threats which worsens pre-existing centrifugal tendencies to the

detriment of the posited funds of Pakistan's ability of responding to environmental stressors within a federated environment.

METHODOLOGY

In this research a qualitative-descriptive research design and a historical institutional research design have been deployed. This study explores the relationship between the glaciers retreat in the Himalayas brought about by climate change and interprovincial water wars in Pakistan. The qualitative method allows a full immersion into the situation of complicated socio-environmental relations and the historical-institutional perspective helps in analysis of changing water management systems, legal contracts and interprovincial politics (Peters, 2012; Thelen, 2003). The research also includes causal aspect making correlations between the climatic change and change in interprovincial conflict patterns.

Data Sources

This study is based on purely secondary data which was comprised of the following:

1. Peer-reviewed academic literature from journals such as Climatic Change, Water International, Environmental Politics, and Journal of Hydrology – Regional Studies.
2. Policy reports and technical assessments from credible national and international institutions, including: The Intergovernmental Panel on Climate Change (IPCC) reports (e.g., IPCC, 2021), The International Centre for Integrated Mountain Development (ICIMOD) glacier monitoring and hydrological studies (e.g., Wester et al., 2019) It also contains reports by the Pakistan Council of Research in Water Resources (PCRWR) and the Indus River System Authority (IRSA), World Bank and UNEP climate-water nexus reports.
3. Historical treaties and legal documents, including: The 1991 Water Apportionment Accord, The Indus Waters Treaty (1960) and the irrigation laws that were enacted in the colonial era like the Northern India Canal and Drainage Act (1873) .

Analytical Approach

The document analysis method is used as its main approach, which finally permits arriving at systematic interpretations of data in text format to find out patterns, themes, and association of cause and effect (Bowen, 2009). This comprises a critical read of legal contracts, climatic data reports and academic judgments of glaciations and water issues. The paper also resorts to the causal process tracing in the investigation of sequence of environmental alterations and particularly glacial melt its related social-political implications on interprovincial sharing of water (Beach & Pedersen, 2019). Also, the bounded unit of analysis is employed through examination of Pakistan as a case study in the greater Hindu Kush Himalaya hydrological zone. The approach offers the situational complexity to track the manner in which international climatic changes are expressed in local disputes dynamics. The interaction of glacial retreat, institutional water governance with

politics and inter-provincial contestations in Pakistan are the empirical basis of the study.

Case Context: Indus Basin and Himalayan Glaciers

1. Himalayan Glacial Retreat

The Hindu Kush–Himalaya (HKH) region, known as the as the "Third Pole," with the second largest largest volume of ice outside the polar regions and feeds the hydrological systems of major rivers across South and Central Asia (Wester et al., 2019). Climate models and satellite data prove that there is a rapid retreat of glaciers across the eastern and central Himalayas because of rising temperatures and changed precipitation patterns (Bolch et al., 2012). HKH ranges have lost up to 8% of their volume between 2000 to 2016 and most severe in the central Himalayan ranges, while the Karakoram range expressed a different behavior called Karakoram Anomaly with slight mass gain (Kääb et al., 2012; Bolch et al., 2019). This retreat is negatively affecting in the formation of glacial lakes, increasing the risk of glacial lake outburst floods (GLOFs), which threats life, infrastructure, and agriculture in the downstream.

ICIMOD's predicts that even under a moderate melting scenario, about one-third of HKH glaciers could deplete by 2100, while high-emission ratios may cause a loss exceeding two-thirds (Wester et al., 2019). This huge decrease in glacial mass has severe affects for seasonal runoff in glacier-fed river systems, including the Indus.

2. Role of Glaciers in the Indus River System

The Indus River System (IRS) is the main fresh water source in Pakistan and it contributes almost 90% of the agricultural water of the country and the sustenance of 200 million plus population (Qureshi, 2011; FAO, 2020). Contrary to other south Asia rivers like the Ganges and Brahmaputra which are full of pollution, this river has no pollution. The Indus is monsoon-fed and therefore a larger share of the water is attributed to the glaciers and snowmelt of the mountain ranges in the region estimated at 5060 percent of the flow each year (Immerzeel et al., 2010; Lutz et al., 2014). This dependency makes IRS a peculiarly sensitive thing to variations of glaciers and snow and disturbing the timing and quantity of the runoff due to increased temperature. Variations in snowmelt on a seasonal basis as well as meltdown on the glaciers vary the hydrological regime to cause a shift in peak that occurs during the summer to the early spring. This may cause decreasing the supply of water at the most decisive stage of growth season. The consequence of this imbalance leads to downstream effects of irrigation timing, hydro-power, production and reservoir management. Furthermore, long-term reduction in glacial input could lead to a "peak water" scenario, followed by chronic decline; compounding pressures on Pakistan's already stressed water system (Immerzeel et al., 2010).

3. Pakistan's Climate Vulnerability and Water Stress

Pakistan is ranked among the world's most climate-vulnerable countries, consistently appearing in the top ten of the Global Climate Risk Index (Germanwatch, 2021). The IPCC Sixth Assessment Report (2021) projects significant reductions in regional glacial mass and changes in precipitation patterns across South Asia, warning of intensified water stress in arid and semi-arid countries like Pakistan. National data corroborate these trends: per capita water availability in Pakistan has dropped from 5,260 cubic meters in 1951 to less than 1,000 cubic meters by 2020 crossing the threshold for water scarcity (Pakistan Council of Research in Water Resources (PCRWR, 2020).

Moreover, projections suggest that Pakistan could face a 30% decline in water availability by 2047 due to combined effects of population growth, mismanagement, and climate change (FAO, 2020). Increased frequency of droughts and flooding events both linked to Himalayan cryosphere changes have also severely impacted agricultural productivity, food security, and energy infrastructure. The National Climate Change Policy (GoP, 2021) explicitly recognizes glacial retreat and altered river flows as key national security risks, particularly in relation to water distribution among provinces.

Interprovincial Water Conflicts in Pakistan

1. Colonial Legacies and Canal Imperialism

The origins of interprovincial water disputes in Pakistan are deeply rooted in the colonial infrastructure and institutional arrangements developed under British rule. During the late 19th and early 20th centuries, British authorities implemented large-scale irrigation projects in the Punjab province to expand agricultural productivity and assert control over frontier regions. This process termed canal imperialism involved the construction of massive canal networks that disproportionately benefited Punjab, while marginalizing downstream regions such as Sindh (Gilmartin, 1994; Mustafa, 2002). The prioritization of Punjab's irrigation needs institutionalized upstream dominance and embedded asymmetric hydrological access within the administrative framework of British India (Ali, 2010).

The Northern India Canal and Drainage Act (1873) and subsequent irrigation agreements failed to consider ecological sustainability or equitable inter-regional distribution. By the time of independence in 1947, these inherited disparities were already shaping political grievances and would become critical flashpoints in Pakistan's federal-provincial relations over water.

2. Post-Independence Rearrangements and Institutional Conflicts

Following independence, Pakistan's hydrological regime underwent major transformations. The most significant early development was the Indus Waters Treaty (IWT) signed in 1960 between India and Pakistan, which allocated the three eastern rivers (Ravi, Beas, Sutlej) to India and the three western rivers (Indus, Jhelum, Chenab) to Pakistan (Wolf & Newton, 2008). While internationally celebrated for preventing water war, the IWT had profound domestic consequences, as the loss of eastern rivers required new infrastructural developments (e.g., Tarbela and Mangla dams) and redefined internal water distribution within Pakistan

(Zawahri, 2009). The internal federal landscape further shifted with the One Unit Scheme (1955–1970), which amalgamated Pakistan's western provinces into a single administrative unit. While intended to ensure parity with East Pakistan, the scheme centralized political and economic power in Punjab, reinforcing existing inequities in water access (Talbot, 2002). The dissolution of One Unit and reversion to provincial governance in 1970s re-introduced federal tensions, as provinces began contesting water allocations amid rising population pressures and irrigation demands.

The creation of the Indus River System Authority (IRSA) in 1992 under the 1991 Water Apportionment Accord was intended to institutionalize equitable water distribution. The Accord allocated 117.35 million acre-feet (MAF) among provinces based on historical usage: Punjab (55.94 MAF), Sindh (48.76 MAF), Balochistan (3.87 MAF), and Khyber Pakhtunkhwa (6.78 MAF) (Anwar & Bhatti, 2016). While initially perceived as a milestone, the agreement soon came under strain due to ambiguities in clauses dealing with shortages, seasonal adjustments, and record-based allocation methods. Notably, Clause 14 which addressed system-wise distribution based on 1977–1982 usage data has been the most contested, particularly by Sindh, which accuses Punjab of drawing more than its share during dry periods (Mustafa, 2010).

3. Climate-Era Contestation and Federal Inertia (1991–2020)

From the 1990s onward, climate-induced water variability has increasingly stressed IRSA's institutional capacity. Recurring droughts in the early 2000s and devastating floods in 2010 and 2014 exposed critical weaknesses in adaptive governance, as provincial tensions over timing, quantity, and monitoring of water releases escalated (Rasul, 2014). Balochistan has accused Sindh of failing to release its full share, while Sindh has alleged upstream manipulation by Punjab during scarcity conditions. Such conflicts are not only due to the lack of resources but also because of overlapping issues of ethno-regional marginalization, ecological vulnerability and lack of institutional trust (Mirbahar & Toor, 2016).

Nevertheless, IRSA usually finds itself on the firing line among provincial disputes, even though it was characterized as a technocratic entity. It is handicapped by a want of independent supervision and autonomous administrative mechanisms (Qureshi, 2020). There was also no re-calibration of the 1991 Accord that was adjusted to climate changes, although glacier melt ratio and rainfall patterns substantially altered. This governance incompetency along with population and agricultural pressures has turned water issues between provinces to be not only regular but also institutionalized.

Climate Change as a multiplier of Conflict

Climate change acts as a structural threat as well as an eminent danger to the environment multiplier in the resource-strained or a politically fragmented area. The compounding in Pakistan impacts of glacier melting, alterations in precipitation, and intense weather periods have drastically changed the hydro-political environment cranking up interprovincial competition about water allocation. Such weather disturbances have aggravated earlier problems of governance through their

lowered predictability of water, undermined institutional efficacy, and increasing perceptions that water was less secure. The public expected less of their governments and became increasingly likely to react to the government for disproportionality in the resource allocation (IPCC, 2021; Mustafa, 2010).

One of the most visible consequences of climate-induced hydrological variability in Pakistan has been the increasing frequency and intensity of floods and droughts, particularly between 2010 and 2022. The 2010 super-floods, considered among the worst in Pakistan's history, displaced over 20 million people and inundated 20% of the country's landmass (Rasul, 2014). The 2022 floods were even more catastrophic, affecting over 33 million people and causing damage exceeding USD 30 billion (WAPDA, 2022). These events were largely attributed to abnormal monsoonal activity and rapid glacier melt, which overwhelmed existing drainage and dam infrastructure. Provinces accused one another of mishandling floodwaters, reinforcing interprovincial distrust and claims of political bias in disaster response (IRSA, 2022).

Simultaneously, reduced glacial inflows into the Indus River System have triggered seasonal irrigation crises, particularly in Sindh and Balochistan. IRSA data shows that Pakistan faced an average water shortage of 15% to 30% during the Kharif and Rabi seasons between 2015 and 2021, with peak shortfalls reaching 40% in some years (IRSA, 2021). These shortages disproportionately affected lower riparian provinces, particularly Sindh, which accused Punjab of exceeding its allocation by manipulating canal closures and headworks—a long-standing point of contention dating back to the post-Accord period (Anwar & Bhatti, 2016). Balochistan similarly accused Sindh of failing to release its share, worsening tensions over interprovincial equity.

The Pakistan Council of Research in Water Resources (PCRWR) has repeatedly warned that per capita water availability dropped from 5,260 m^3 in 1951 to below 900 m^3 in 2020, categorizing the country as "water-scarce" (PCRWR, 2020). Future projections are even more alarming. Climate models anticipate further reductions in snow and glacial water contributions to the Indus by mid-century, especially under high-emissions scenarios, which could reduce annual river flow by up to 30% by 2047 (IPCC, 2021; Lutz et al., 2014). The combination of reduced availability and increased competition creates fertile ground for politicization of water among provinces and further weakens federal consensus on infrastructure projects like the Kalabagh Dam. As the impacts of climate change escalate, Pakistan's water-sharing framework already strained by historical mistrust and institutional rigidity appears increasingly ill-equipped to address dynamic hydrological realities. Without urgent reforms and climate-adaptive governance, the intersection of environmental degradation and political fragmentation will likely deepen interprovincial conflicts and erode national cohesion.

1. Climate Change as a "Threat Multiplier" in Pakistan

Climate change in Pakistan acts not as a standalone driver of conflict but as a "threat multiplier" a term widely used in security and political ecology literature

(CNA Military Advisory Board, 2014; Buhaug et al., 2015). It amplifies pre-existing socio-political tensions, particularly those embedded in resource governance, water distribution, and provincial autonomy. Rising temperatures, shifting monsoon patterns, glacial melt in the Hindu Kush-Himalayan region, and increasingly erratic river flows from the Indus Basin System (IBS) disrupt the historically fragile water-sharing mechanisms between provinces, particularly between Punjab (upstream) and Sindh (downstream). These hydro-political tensions are intensified by climate-induced variability, leading to mutual accusations of inequitable allocations, particularly in the Rabi and Kharif cropping seasons (Zawahri & Michel, 2018; Mustafa et al., 2013) This aligns with the "threat multiplier" model, where climate change exacerbates governance failures, institutional distrust, and regional grievances ultimately challenging national cohesion. For example, reduced flows in the Indus exacerbate Sindh's perceptions of Punjab's hydro-hegemony, while Balochistan alleges Khyber Pakhtunkhwa's unregulated diversions of hill torrents.

2. Theoretical Implications: Climate Justice and Environmental Federalism

At a theoretical level, climate-induced inter-provincial tensions in Pakistan raise critical questions for climate justice and environmental federalism.

Climate Justice

The distributive and procedural injustices linked to climate adaptation in Pakistan highlight a gap between vulnerability and decision-making authority. While provinces like Sindh and Balochistan face disproportionate impacts (e.g., floods, droughts, salinization), they wield less influence in national climate and water policy, reflecting an injustice in institutional power sharing (Rasul & Sharma, 2016; Leach et al., 2010). Inter-provincial struggles are not only on scarcity issues but their information, awareness, experience and rights are prioritized in the governance systems.

Environmental Federalism

The 18th Constitutional Amendment of Pakistan transferred powers on environment and water matters to provinces but environmental pressure revealed the weakness of decentralized governance coordination to deal with such issues. Indus River System Authority (IRSA) that is supposed to mediate in the water settlement seems to have no authority or perceived impartiality to avert disagreements. Due to this, environmental federalism, Pakistan is experiencing a dilemma, that is, how to integrate provincial autonomy with the collective ecological programme and action in climate-sensitive terrain (Rasul, 2016; Mehmood, 2022).The inter-provincial confrontations, therefore, unveil a necessity to develop the new model of environmental federalism, one that incorporates adaptation governance, collaborative climate risk analysis and multi-scalar climate justice frameworks.

CONCLUSION

This study examined the relationship between climate change and inter-provincial tug of war in Pakistan emphasizing on the environmental changes

especially that related to water scarcity and availability are reshaping the federal cohesion and institutional trust. The major theme was about how climate change is a type of multiplier (Buhaug et al., 2015) that increases the levels of water conflicts in the Indus River System especially by Punjab, Balochistan, and Sindh. The aim was to analyze the causes and effects of climate changes and variation-induced changes, namely, the shrinkage of glaciers in Himalaya-Karakoram-Himalayan issue, the unpredictability of monsoons, more frequent flooding and droughts and heat waves have been accentuated by the development of more intense resource-based

The research enquired about the heart of the matter in terms of: question is how the climate change is making inter-provincial conflicts worse in Pakistan and what are climate justice and federal environmental governance theoretical implications? The research adopted data triangulation through a qualitative case study method to capture the data, institutional reports, government documents and academic literature. It was based on the study of political ecology perspectives on the theory, climate justice, and the hydro-hegemony theory. It used comparison analysis with world climate affected regions (Zeitoun & Warner, 2006) including the Nile Basin and Tigris Euphrates system. The results indicate that the existence of climate change has not only aggravated the inter-provincial rivalry in Pakistan but has also enhanced it indirectly. The war over water allocation has increased when there is a low river flow brought about by a decrease in glacial input and the shift in rain patterns

Sindh has frequently accused Punjab of withholding water and violating the 1991 Water Apportionment Accord claims that resurface with particular urgency during drought years (Mustafa et al., 2013; Zawahri & Michel, 2018). Balochistan claims it does not receive its due share of water from Sindh, particularly during periods of prolonged aridity reflecting how climate variability has strained downstream relations in a chain of mistrust (Mehmood, 2022). The Kalabagh Dam controversy has been reactivated during water-scarce years, as proponents cite climate-induced storage needs, while opponents particularly in Sindh and KP view it as an instrument of upstream control, threatening ecological flows and provincial autonomy (Rasul, 2016; Mustafa et al., 2013). These conflicts are not rooted solely in climate change, but climate stress has intensified existing structural inequalities and perceptions of hydro-hegemony, where Punjab, as the upstream and politically dominant actor, is seen as controlling water infrastructure and flows to its advantage (Zawahri & Michel, 2018; Zeitoun & Warner, 2006).

The significance of the study lies in its contribution to the understanding of climate change as a threat multiplier that destabilizes federal cooperation by increasing the frequency and severity of disputes over common-pool resources. The climate justice implications of unequal exposure and adaptation capacity where downstream provinces (Sindh and Balochistan) bear disproportionate burdens without adequate institutional power or climate finance (Leach et al., 2010; Rasul & Sharma, 2016). The institutional weaknesses of Pakistan's model of environmental federalism, where the post-18th Amendment devolution of environmental authority

has not been accompanied by coordinated climate governance, transparent data-sharing or inclusive planning (Mehmood, 2022).

To conclude our discussion and analysis, it can be said that climate change in Pakistan has transformed environmental stress into a political fault line within the federal structure. A Continuous blame game is in practice among provinces over sharing of water. Without cooperative, climate-sensitive reforms in water governance and provincial coordination, these inter-provincial tensions may deepen undermining national resilience to climate change and challenging the very foundations of federalism.

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