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Climate Change legislation: A Comparative Study of the legal framework of the United States and Pakistan

Zain Ullah
Student, Department of Sociology and Criminology, University of Sargodha,
zainullah1214@gmail.com

Sidra Ilyas
Advocate Peshawar High, and Visiting Lecturer at the Department of Law, Hazara University Mansehra

Nabeel Hassan
Student, the Higher School of Economics, Russia

Mohsin Raza
Student, Dadabhoy Institute of Higher Education Karachi

Yasin Zaman
Graduate, Department of Law, Hazara University Mansehra

Abstract
This study is an endeavor to analyze the climate change legislative framework of the United States and the Islamic Republic of Pakistan. It thoroughly looks into the unique local circumstances of these two nations; particularly the political landscape, historical background, and economic capability that influence legislative responses to a global challenge. It employs a qualitative research method on the one hand and comparative on the other, and examines primary legal texts, existing secondary literature, and the landmark judicial decisions. The study fundamentally revolves around two main questions. Firstly, it deals with the question of how the distinct political landscapes and historical contexts of the two countries have shaped the development and implementation of their respective climate change legislation. Secondly, it explores the reciprocal lessons for each nation with respect to the climate framework of the other. The study also highlights the major divergences in the two frameworks, like the United States' decentralized and multi-scalar governance model and Pakistan's transition from a centralized to a decentralized structure, especially after the 18th constitutional Amendment. Finally, it concludes that though climate legislation is a global matter, its implementation remains intensely localized.

Keywords: Climate Legislation, Environmental Policy, Adaptation, Mitigation, United States, Pakistan

Introduction
Climate change has emerged as one of the most important global concerns of the early twenty-first century. It combines concerns about how humans interact with nature, the duties of well-off countries towards the third world, the effects of local actions on the global environment, and the responsibilities of the present to future generations

(Liverman, 2009). International discourse to address climate change has been intense and ongoing for the past 35 years. In the 1980s and early 1990s, awareness regarding the worldwide impact of human activity on the environment emerged strongly. The discovery of the ozone hole over Antarctica and the growing threat of climate change served as catalysts for this movement (Maslin, 2023).

The term "climate change legislation" is somewhat ambiguous, with both the term "legislation" and the term "climate change" having multiple meanings. 'Climate change legislation' primarily deals with laws, rules, policies, and decrees of a similar nature that specifically address climate change or that relate to the reduction of energy consumption, encouraging the use of low-carbon energy sources, combating deforestation, encouraging sustainable land use, sustainable transportation, or adapting to the effects of climate change (Nachmany, 2015).

In 1985, during the International Conference on Assessment of the Role of Carbon Dioxide and of Other Greenhouse Gases in Climate Variations and Associated Impacts (held in Austria), scientists urged policymakers to work together to explore ways to reduce climate change, which is human-induced in nature. It became much more urgent in 1988 after the discovery of the ozone hole.

There emerged a Global consensus that States should also consider the elaboration of a legally binding convention on climate change, which would address emissions of greenhouse gases not covered by the Ozone Layer protection regime, like the 1985 Vienna Convention for the Protection of the Ozone Layer and the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer. A first step was the creation of the Intergovernmental Panel on Climate Change (IPCC) by the World Meteorological Organization (WMO) and the United Nations Environment Program (UNEP) in 1988 as a scientific intergovernmental body to give decision makers an assessment of the most recent scientific research and its policy implications for mitigation and adaptation (Bodansky, 1993).

There is no country in the world that does not have at least one climate change-related law or policy. There are 1,800 climate-related laws worldwide, with well over 20 in the most prolific nations. While some are legislative actions passed by parliament, others are executive orders or policies made by governments. In the Judicial domain, more than 1,500 court cases involving climate change have been dealt with, out of which 1,100 cases took place in the United States. (Eskander, 2020). The United States have an intricate framework of climate legislation due to the complex interactions between federal, state, and municipal laws that work together to mitigate greenhouse gas emissions and promote environmental sustainability, At the federal level, the crux of the United States climate policy is the Clean Air Act (CAA), under which the Environmental Protection Agency (EPA) regulates emissions of greenhouse gases as air pollutants. This follows the landmark Supreme Court decision in *Massachusetts v. EPA* (2007).

Before 1970, environmental protection legislation in the United States was almost nonexistent. There were no federal Clean Water Act programs, no national clean air regulations, and no laws about toxic substances or hazardous waste. Even a federal agency for environmental protection did not exist. But within the span of ten years, the legal landscape drastically changed. Many federal environmental protection statutes and thousands of pages of federal regulations came into being. A federal environmental agency, the United States Environmental Protection Agency ("EPA"), also came into existence, which was primarily responsible for the implementation of a host of newly enacted environmental protection laws (Lazarus, 2001).

In the beginning, the United States Climate legislation was directed towards pollution control. Landmark statutes like the Clean Air Act (1970) and the National Environmental Policy Act (1969), are the main legal endeavours in this regard, which laid the foundation for federal regulation of air quality and environmental assessment. However, later, the Clean Air Act acknowledged greenhouse gases as pollutants, following the US Supreme Court's judgment in the landmark case of *Massachusetts v. EPA* (2007). This proved to be a turning point. The federal commitment to renewable energy, reduction in carbon emissions, and climate resilience was enhanced by further legislative and policy initiatives, such as the Energy Independence and Security Act (2007) and the Inflation Reduction Act (2022). In the meantime, apart from the federal initiatives, some notable state-led endeavours like California's Global Warming Solutions Act (2006) also played an important role. This showcased the decentralized nature of climate legislation in the United States. In response to the increasing urgency of climate change, the United States' legal framework has reformed itself from fragmented environmental regulations to an integrated, multi-level approach that addresses both adaptation and mitigation.

Like many nations worldwide, Pakistan is battling the unbearable challenges brought on by climate change. Pakistan has taken important steps to lessen the impact of this issue through legislative measures like the Climate Change Act because it recognizes how urgent it is to address it (Khan, 2024). The Pakistan Environmental Protection Act of 1997 served as the initial framework for environmental policy. It mostly dealt with pollution control and environmental management. However, as intensifying frequency of climate-related calamities like floods, droughts, and glacial melting led to the National Climate Change Policy (NCCP) 2012, which offered a thorough plan for adaptation and mitigation

in several important areas. The NCCP was made further efficient via The Framework for Implementation of Climate Change Policy (2014–2030), which outlined certain sectoral and institutional activities.

An important turning point in Pakistan's attempts to address the issues brought on by climate change is the Climate Change Act of 2017 (Khan, 2024). This act established the Climate Change Council and Climate Change Authority to oversee and coordinate national climate actions at the national level. Furthermore, after the 18th constitutional amendment, Provincial governments also took on more responsibility. They enacted many localized environmental and climate laws. All of these changes reflect Pakistan's growing will to combat climate change through a multi-level, institutionalized legislative framework that is in line with its global commitments under the UNFCCC and Paris Agreement.

This Study comparatively examines the climate change legal frameworks of the United States and Pakistan in order to elaborate distinction between the approaches of a global developed emitter nation and a vulnerable developing nation. Primarily, this study aims at a systematic comparison of climate legislation between the two nations by analysing its evolution, major legal instruments and institutional mechanisms. It will examine the decentralisation and multilevel governance model of the United States framework on the one hand, and the more centralized and evolving climate change legal framework of Pakistan. Last but not least, this study identifies potential legal and policy transferable lessons that each of nation can learn from the other's experience.

In short, this study bridges a gap in comparative environmental law by offering an in-depth understanding of how different national circumstances, like economic capacity, political structure, and vulnerability, shape legal responses to Climate Change. The ultimate goal of this analysis is to provide insightful information to international as well as local policy makers, legal professionals, and international stakeholders who want to improve climate governance through a strong and flexible legal framework.

Research Questions

How do the distinct political structures and historical backgrounds of the United States and Pakistan shaped the development and implementation of their climate change legislation?

In what ways can the climate governance of a developed nation like the United States and a developing nation like Pakistan offer reciprocal and transferable lessons for enhancing adaptive capacity and mitigation efforts in each other's legal frameworks?

Research Methodology

This study employs a qualitative research approach and a comparative case study design to analyse the climate change legal frameworks of the United States and Pakistan. Primarily, it is descriptive and analytical in nature and examines the evolution, key instruments, and institutional architectures of both countries. This study utilises primary as well as secondary data. Primary data, like statutes, pivotal court rulings, and executive policies, from each country. The core primary data includes key legal texts such as the United States Clean Air Act and the Inflation Reduction Act; and Pakistan's Climate Change Act of 2017 and National Climate Change Policy.

This helps in gaining an in-depth understanding of how each country's distinct political structure and historical context have shaped its legislative response to climate change. Secondary data, including the existing literature on climate change in both countries, government reports, academic commentaries, and international policies, have also been considered. The analysis will proceed through a comparison of the two frameworks based on pre-identified themes: governance model (decentralized vs. centralized), historical evolution of laws, and institutional structures. Finally, a critical analysis will be conducted to synthesize findings and identify reciprocal and transferable lessons between the two nations' experiences.

Literature Review

Yang and Percival (2009) regard the notion of "global environmental law" as one of the most emerging fields, which has been the result of the interplay of national, international, and transnational legal systems. They highlight some major approaches for this emergence, like the adoption of legal innovations such as environmental impact assessments, the convergence of regulatory systems, and the harmonization pushed by international regimes. The study asserts that environmental legal principles are becoming more and more a part of a global commons, bypassing traditional boundaries. This is an important perspective for examining the comparative development of climate legislation in different national contexts, such as the United States and Pakistan.

Nachmany et al. (2015) provide a thorough empirical baseline and report that by 2014, almost 804 climate legislation and policies existed across 99 nations. Their study highlights the global spread of climate governance by showing a sharp doubling of legislative actions every five years. It also points out the crucial importance of overarching framework legislation and makes a distinction between the legislative and executive sources of laws (Nachmany, 2015). Similarly, Eskander et.al (2021) offer a quantitative summary of global legislative and litigation trends based on a thorough examination of the Climate Change Laws of a worldwide database. They list more than 1,800 global climate laws which

reflect the peak legislative activity between 2009–2014, before the Paris Agreement. Their data reveals that, contrary to popular belief, climate legislation is generally less partisan and political, with the left, centre, and right governments all passing laws in proportion to their tenure in power.

Regarding the climate legislation framework in the United States, Hari Osofsky (2008) examines the intricate regulations that shape the United States' climate change legislation. She contends that it is influenced by a variety of factors and distinguishes between horizontal pressures from the judicial and executive institutions, as well as the vertical pressures from international agreements and subnational players, and sociocultural forces from public awareness. He further argues that an effective national legislation is not possible without a multi-scalar approach and recognizing its place in a larger international governance framework, rather than an independent operation.

Cinnamon P. Carlarne (2019) provides a comprehensive examination of the evolution of American climate change legislation from 2009 to 2019, focusing on the relationship between federal instability and subnational innovation. He argues that, notwithstanding the unstable character of presidential leadership, as evidenced by the stark policy differences between the Obama and Trump administrations, subnational and non-state actors have consistently and transformatively carried out climate governance. The study highlights how local governments, states, and private organizations have created adaptive legal and regulatory solutions that both supplement and restrain national inaction. It further reveals that the US climate law has evolved into a fragmented yet resilient system, with decentralized efforts maintaining momentum even as the federal government retreats, highlighting the emergence of a multi-dimensional "rule of law" for climate governance in the United States.

Soomro et al (2025) analyze climate litigation from Pakistan's point of view. The study highlights the role of climate litigation in Pakistan as a critical accountability mechanism in a highly vulnerable, low-emission country. It further examined the landmark case of Leghari v. Federation of Pakistan, in which the court upheld the fundamental rights of citizens to life and a healthy environment as a result of the government's failure to implement its climate policy. This case serves as an example of how courts in underdeveloped countries can link human rights frameworks with climate governance and force executive action. The study further emphasizes the importance of climate litigation for promoting climate justice and holding states accountable, especially when political and administrative systems are reluctant to act.

The effects of climate change on international legal frameworks have been elaborated by Davenport et al. (2025) with a particular reference to Pakistan's acute vulnerability in spite of its small share in world carbon emissions. The study evaluates the effectiveness of significant international agreements such as the UNFCCC and the Paris Agreement by highlighting crucial implementation gaps due to the lack of binding enforcement measures, limited institutional capacity, and financial limitations. It emphasizes the unequal burden placed on developing countries and underscores Pakistan's struggles for climate justice and restitution. It also examines how climate change intersects with human rights and transboundary water issues, particularly the challenges in the context of the Indus Water Treaty. The study concludes with suggestions for legislative changes and improved international collaboration to improve climate resilience.

The fundamental legal instrument in Pakistan regarding climate change, Pakistan's landmark Climate Change Act of 2017, has been effectively analysed from the aspects of implementation mechanisms, enforcement frameworks, and institutional efficiency by Khan et.al (2024). The study focuses on the establishment of major organizations such as the Pakistan Climate Change Council and Climate Change Authority as a foundational step. On the other hand, it highlights important operational challenges like institutional fragmentation, poor coordination between the federal and provincial levels, and a lack of financial resources. The study concludes that although the Act offers a vital legal framework for mainstreaming climate considerations, these implementation gaps limit the Act's effectiveness in producing any significant emission reductions and enhancing climate resilience. It stresses the crucial need for stronger institutional capacity and stakeholder engagement.

Gul et al. (2024) evaluate major legal frameworks and examine the crucial role of Pakistan's judiciary in promoting climate governance through some landmark cases. In this regard, the famous **Leghari v. Federation of Pakistan (2015)** case had a revolutionary effect, which ruled that climate inaction violates fundamental rights. This resulted in the establishment of a Climate Change Commission for oversight on climate policies. The study places this judicial activism within a larger legal framework, such as the Disaster Management Act (2010) and the Climate Change Act (2017). However, it also highlights how these laws' potential is hampered by ongoing implementation issues, a lack of funding, and lax enforcement, making the judiciary the main force behind accountability.

Parveen et al. (2023) offer a regional comparison analysis, looking at India and Pakistan's shared climate vulnerabilities and differing policy responses within the framework of the Sustainable Development Goals (SDGs). The study identifies typical issues that become worse in the strategically important Indus River Basin, including

intense heat, water scarcity, and agricultural disruptions. The study emphasizes how collaborative water governance and climate adaptation initiatives are hampered by pre-existing geopolitical issues, especially those pertaining to the Indus Waters Treaty. It concludes that, in spite of political and structural obstacles, coordinated regional action is not only required for sustainable development but also offers a possible means of lowering tensions and fostering resilience through common policy and technology solutions.

In short, these existing literature underscores that climate change legislation has evolved under the aegis of complex interactions among international, national, and subnational actors. There exists vast research on the climate legislation framework of the United States and Pakistan, yet separately. However, despite the significant body of research, a clear comparative legal analysis between the climate change frameworks of a developed emitter like the United States and a developing, climate-vulnerable state like Pakistan remains limited. This study is an endeavor to fill this research gap by systematically examining how differing political, historical, and institutional contexts shape their respective climate legislations, and what reciprocal lessons can be drawn to strengthen both systems.

The United States' climate change legal framework

A decentralized and multi-level governance system operates the climate change legal framework of the United States that integrates federal laws, judicial rulings, and state-level initiatives. Its base is provided by federal statutes, and states and courts support innovation and enforcement. States frequently enact more stringent, location-specific regulations, while the federal government sets national standards. The most important major environmental legislative actions taken by the federal government, as well as the states of the United States, have been discussed in this part. Landmark laws such as the National Environmental Policy Act (1969) and the Clean Air Act (1970) laid the foundation for modern U.S. climate governance.

National Environmental Policy Act (NEPA) of 1969

The National Environmental Policy Act (NEPA) of 1969 is considered the foundation as of U.S. environmental legislation, which made the federal government's commitment to incorporating environmental factors into its decision-making processes clear. Section 101 (42 U.S.C. § 4331) is a reflection of national environmental policy, which states that the federal government must "use all practicable means and measures" to establish and preserve the circumstances necessary for people and the environment to coexist in productive harmony. Section 102 (42 U.S.C. § 4332) is the crux of this act's procedures, which mandates all federal agencies to prepare a comprehensive Environmental Impact Statement (EIS) for every major federal action that significantly affects the quality of the human environment. This guarantees that environmental effects are thoroughly assessed in addition to technical and financial factors. Furthermore, the Council on Environmental Quality (CEQ), which is part of the Executive Office of the President and is tasked with advising the President and guaranteeing uniform NEPA implementation across federal agencies, is also established by Section 204 (42 U.S.C. § 4344). By institutionalising environmental accountability, transparency, and public engagement through these principles, the National Environmental Policy Act set the stage for later United States climate legislation like the Clean Air Act and became a global model for environmental governance.

Clean Air Act (CAA) of 1970

One of the most important environmental laws in the United States is the Clean Air Act (CAA) of 1970, which is regarded as the major federal law controlling air quality. It establishes a thorough framework for controlling air pollution and safeguarding the welfare and health of the public. Section 101 (42 U.S.C. § 7401) outlines the Congressional findings and purpose and recognizes that air pollution endangers public health and welfare. It declares that it is the responsibility of the federal government to promote pollution prevention and control. Another essential Section, section 109 (42 U.S.C. § 7409) authorizes the Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to human health and the environment. It is considered the backbone of this act. The power of the EPA has been enhanced under Section 111 (42 U.S.C. § 7411) by rendering it the power to establish New Source Performance Standards (NSPS) for emissions from new or modified stationary sources. Greenhouse gases were formally recognized as "air pollutants" under this Act following the Supreme Court's historic ruling in Massachusetts v. EPA (2007). It has broadened its scope to include climate change regulation. When taken as a whole, these provisions make the Clean Air Act a dynamic piece of legislation that is crucial to American efforts to reduce emissions and combat climate change challenges.

Energy Independence and Security Act (EISA) 2007 (Public Law 110–140; 42 U.S.C. §§ 17001–17385)

The Energy Independence and Security Act is an overarching energy policy statute of the United States that primarily consists of provisions aimed at boosting renewable energy availability and energy efficiency (Sissine, 2007). It is a reflection of a great achievement in the United States' climate change legislative framework. It's an effort to promote clean energy, reduce dependence on foreign oil, and address climate change through sustainable development. Under Title I (42 U.S.C. § 17011), this act establishes Corporate Average Fuel Economy (CAFE), which requires vehicles to

meet standards set out, in order to achieve higher fuel efficiency and reduce greenhouse gas emissions. Title II requires a greater amount of biofuels to be blended into the nation's gasoline supply through the Renewable Fuel Standard (RFS). This aims to encourage the development and production of renewable fuels. Similarly, Title III (42 U.S.C. § 17031) calls for federal leadership in lowering energy use in residential and commercial structures, emphasizing energy-efficient building standards. In short, by combining energy innovation and climate policy, EISA is an endeavor to strengthen the US economy's long-term energy resilience. It accelerates its transition towards a low-carbon economy.

Inflation Reduction Act (IRA) of 2022

With the goals of drastically lowering greenhouse gas emissions while fostering economic expansion and energy security, the Inflation Reduction Act (IRA) of 2022 (Pub. L. No. 117–169) is considered the most comprehensive and ambitious piece of climate and clean energy legislation in American history. The act is consists mainly of eight titles. Each of these titles contains some provisions that directly or indirectly address issues related to climate change, which also includes the reduction of the United States' greenhouse gas (GHG) emissions or promotion of adaptation and resilience to climate change impacts (Ramseur, 2023).

The IRA allots almost $369 billion for energy and climate initiatives, building on the framework established by previous laws such as the Energy Independence and Security Act and the Clean Air Act. Under Section 60103, it establishes the Greenhouse Gas Reduction Fund to finance clean energy and emission reduction projects. Section 13401 introduces new incentives for electric vehicles (26 U.S.C. § 30D) while under Section 13101, it extends and expands tax credits for renewable energy production and investment (26 U.S.C. §§ 45, 48). The IRA's multi-sectoral approach, which combines economic incentives with environmental goals to promote a sustainable and low-carbon future, marks a significant step in U.S. climate policy.

Landmark Judicial Decisions

Massachusetts v. EPA* (2007)

The US climate change legislative framework and environmental governance were reshaped by the historic Massachusetts v. Environmental Protection Agency case decided by the U.S. Supreme Court in 2007. A group of states, led by Massachusetts, petitioned the Court in order to compel the Environmental Protection Agency (EPA) to regulate greenhouse gases (GHGs) under the Clean Air Act (CAA). The petitioners contended that motor vehicle GHG emissions exacerbate climate change and endanger the environment and public health. Previously, the EPA had refused to regulate such emissions, arguing that climate change was a global issue outside its jurisdiction and that the CAA had not given it the authority to do so. However, the Court dismissed this argument and held that GHGs are covered by the Act's broad definition of "air pollutants" under Section 302(g) (42 U.S.C. § 7602(g)). Hence, the court thereby upheld the EPA's jurisdiction and duty to regulate them.

Furthermore, the Court also confirmed that states have the legal right to sue the federal government for climate inaction. The judiciary's role in upholding environmental accountability and promoting climate governance in the US was strengthened by this ruling, which not only compelled the EPA to start regulating GHGs but also established a crucial precedent for future climate litigations.

Prominent State-Level Legislation:

California's Global Warming Solutions Act (AB 32) of 2006

One of the first state-level initiatives that established California as a leader in climate regulation was the California Global Warming Solutions Act (AB 32) of 2006. The Act was passed in order to bring the state's greenhouse gas emissions down to 1990 levels by 2020. It gave the California Air Resources Board (CARB) the authority to establish and carry out a wide range of market-based and regulatory tools, including the first economy-wide cap-and-trade system in the country. AB 32, which is based on California Health and Safety Code §§ 38500–38599, promotes cleaner mobility, energy efficiency, and renewable energy. Its execution showed that, in spite of shifts in federal policy, subnational governments could spearhead climate action. AB 32 is referred as a paradigm for decentralized, innovation-driven climate legislation, which has impacted several US states and foreign jurisdictions.

Pakistan's climate change legal framework

Pakistan Environmental Protection Act (1997), the National Climate Change Policy (2012), and the Climate Change Act (2017) are the backbone of Pakistan's climate legislative framework. This section discusses these major legal endeavors one by one.

Pakistan Environmental Protection Act (PEPA) of 1997

The Pakistan Environmental Protection Act (PEPA) of 1997 is considered as the basis of the legal framework for climate change governance in Pakistan. The act aimed at providing a comprehensive framework for pollution control and environmental management. It institutionalized environmental protection at the national level. For the purpose of formulating national environmental policies and promoting coordination with the provincial efforts, this act establishes the Pakistan Environmental Protection Council (PEPC) (section 5). Similarly, the Pakistan Environmental Protection

Agency (Pak-EPA) has been empowered to enforce environmental standards, oversee industrial emissions, and perform inspections under section 6. Furthermore, forbidding the release or emission of contaminants that exceed the established National Environmental Quality Standards (NEQS) is strictly forbidden (Section 11), thereby guaranteeing regulation of industrial and vehicular pollution. These provisions laid the foundation for environmental accountability and administrative coordination in Pakistan.

Additionally, via Environmental Impact Assessments (EIA) and Initial Environmental Examinations (IEE), the Act introduced procedural innovations to ensure environmental sustainability (Section 12). Section 12 also mandates that those advocating for development projects require the endorsement of the relevant agency prior to commencing any actions that could potentially harm the environment. Under Section 20, the Act enhances the authority of environmental tribunals to adjudicate on violations and impose penalties, in order to strengthen enforcement mechanisms. These provisions made PEPA 1997 a cornerstone of Pakistan's environmental legislation, fostering preventive measures, accountability, and compliance. Its framework became a guide for later climate-related legislation, including the Climate Change Act of 2017.

National Climate Change Policy (NCCP) of 2012

The National Climate Change Policy (NCCP) of 2012 is a reflection of Pakistan's first comprehensive framework for addressing climate change adaptation as well as mitigation in accordance with its UNFCCC commitments. The policy intends to incorporate climate considerations into national planning and development processes across different sectors, including water, agriculture, forestry, and energy. On the one hand, the policy stresses water resource management, disaster preparedness, and food security as a strategy for adaptation, while on the other, it emphasizes mitigation measures by encouraging renewable energy resources, energy efficiency, and reduction of dependence on fossil fuels. Moreover, it highlights the importance of strengthening environmental institutions through effective coordination among federal, provincial, and local entities in order to ensure an effective implementation of policies. It also emphasizes on the inevitable importance of public awareness, capacity-building, and financial mechanisms to enhance climate resilience. These provisions signal Pakistan's shift from general environmental management to targeted climate governance.

Framework for Implementation of Climate Change Policy (2014–2030)

The Framework for Implementation of Climate Change Policy (2014–2030) has been introduced in order to operationalize the National Climate Change Policy 2012. This policy is primarily aimed at translating the NCCP 2012 into concrete actions, timelines, and institutional responsibilities for effective climate adaptation and mitigation. It offers adaptation and mitigation actions tailored to specific sectors. The framework sets out institutional arrangements for the purpose of coordination between government institutions. It clearly designates responsibilities to federal, provincial, and local authorities. It addresses the management of water resources, with recommendations for the construction of small to medium-sized dams, enhancing irrigation methods, and monitoring glaciers as means to combat droughts and floods. It also underscores the importance of mitigating climate change in the energy sector, which includes promoting renewable energy and enhancing energy efficiency as means of cutting greenhouse gas emissions. The framework's long-term vision is in line with Pakistan's development agenda and its international commitments under the UNFCCC and Paris Agreement.

Provincial Laws (Post-18th Amendment)

After the 18th Constitutional Amendment, Pakistan experienced a major shift towards environmental decentralization, granting provinces the authority to make their own laws regarding environmental challenges. Hence, the Punjab Environmental Protection (Amendment) Act, 2012, adapts the federal PEPA 1997 to fit the provincial context. It establishes the Punjab Environmental Protection Council under Section 3 and the Punjab-EPA under Section 5 to enforce standards. Following this, other provinces took similar actions. Sindh implemented its Environmental Protection Act in 2014, and Khyber Pakhtunkhwa launched its Climate Change Policy to align with national priorities. These provincial climate initiatives illustrate Pakistan's shift from a centralized environmental regime to a decentralized climate legal framework.

International Commitments

The United States is a foundational member to the United Nations Framework Convention on Climate Change (UNFCCC). Its role of the international climate regime is somewhat complex. Apart from being an early signatory to the 1992 UNFCCC, the United States also participated in the Kyoto Protocol but never ratified it. This is a significantly strange behaviour from other developed nations. In 2016, the U.S. became a signatory to the Paris Agreement. However, under the Trump administration, it was temporarily withdrawn. Intriguingly, it again rejoined during President Biden's administration (Bodansky, 1993). This reflects a complex federal commitment to binding international climate agreements.

Pakistan is a party to both the UNFCCC and its Kyoto Protocol it has consistently engaged with the international climate frameworks as a committed but vulnerable developing nation. In 2016, Pakistan ratified the Paris Agreement and submitted its Nationally Determined Contributions (NDCs) (Khan, 2024). Pakistan's international stance has consistently remained in favor of global climate action, while advocating for the principles of equity and common responsibilities. Pakistan has been stressing the need for financial and technological support from developed countries to fulfill the developing world's climate commitments under these international treaties.

Discussion

This Comparative study of the climate legal frameworks of the United States and Pakistan reveals a powerful narrative of how different national circumstances including political structure, historical development, and economic capability, significantly influence legislative responses to a shared global threat. To answer the main study factors of exploring the distinct evolutionary pathways of the two nations' frameworks and identifying the reciprocal and transferable lessons that can enhance climate governance in both contexts, this section of the study summarizes the main findings.

Divergent Pathways: Political Structures and Historical Contexts

The development of the climate legislative framework in both the United States and Pakistan is considered a direct product of their distinct political landscapes and historical contexts. The framework of the United States is a decentralized and multi-level governance model by its nature. This is a result of its federal constitution, which divides power between the federal government and state governments. According to Osofsky (2007) the climate law of the United States is a patchwork that is impacted by "horizontal pressures" from the judiciary as well as "vertical pressures from subnational players." A foundation for environmental accountability was set up by the founding federal laws, such as the Clean Air Act of 1970 and the National Environmental Policy Act of 1969. But in Massachusetts v. EPA (2007), the court played an instrumental role. It compelled the federal regulatory action on greenhouse gases, which reflects how litigation can bridge divisions in the legislative and executive branches.

Both the strengths and disadvantages of this decentralized concept are obvious. The "federal instability" is evident in the sharp policy reversals between political administrations, such as the withdrawal from and subsequent re-entry into the Paris Agreement. Nonetheless, significant state-level innovation has counterbalanced this federal policy instability. This is best demonstrated by California's Global Warming Solutions Act (2006), which established a subnational policy laboratory that frequently exceeds federal ambitions and keeps the momentum going during national inaction periods. This multi-scalar strategy has produced a robust, though disjointed, system in which state governments, the federal government, and judicial scrutiny all work together to sustain climate governance.

Totally unlike this scenario, the climate legal framework of Pakistan has experienced a transition from a 'centralized, top-down model' to a more decentralized structure. A centralized framework for environmental management was first established under the Pakistan Environmental Protection Act (1997). The country's extraordinary vulnerability to "climate-related calamities like floods, droughts, and glacial melting" served as the primary catalyst for a specialized climate framework. The real catalyst for a dedicated climate framework was not proactive policy but reactive necessity, driven by the country's extreme vulnerability to "climate-related calamities like floods, droughts, and glacial melting." This vulnerability, and Pakistan's status as a low-carbon emitter, is responsible for such a framework focused predominantly on adaptation and disaster management, which is also reflected in the National Climate Change Policy (2012).

This centralized legal landscape was drastically altered by the 18th constitutional Amendment. This amendment expressly granted the provinces more control over the environment-related matters. Although the structure of this alteration resembles that of United States federalism. As Khan et al. (2024) note, this devolution has led to new issues of "institutional fragmentation and poor coordination," which reflects the reality that decentralization can be difficult to achieve without adequate capacity building. As a result, whereas decentralization in the US is considered a source of creativity and climate resilience, Pakistan's ongoing transition to subnational governance from a formerly centralized system is rife with real-world challenges. The fundamental divergences between the climate framework of the two countries has been summarized under table. 01.

Aspect of Differences	United States	Pakistan
Model of Governance	Decentralized & multi-level approach	In the phase of transition from a top-down model (PEPA 1997) to a more decentralized structure (post-18th constitutional Amendment).
Primary Focus	- Economically Motivated - Mitigation-Focused	-Vulnerability acts as a catalyst -Adaptation-Focused
Historical Contexts	- Proactive nature	- Reactive in nature

	- **Catalyzed by** Judicial action like *Massachusetts v. EPA.*	- **Catalyzed by** escalating climate impacts
Judiciary's Role	- Court rulings are formally integrated into the regulatory process. - *E.G Massachusetts v. EPA*	- **Accountability Focused** - **Human Rights Lens oriented also** - **E.G.** *Leghari v. Federation of Pakistan*
Major Legal Instruments & Mechanisms	- Depends on economic tools tax credits (IRA), a cap-and-trade system (California), fuel standards (EISA) etc.	- NCCP 2012 - implementation frameworks (2014-2030)

Table 01: Major Divergences between the climate framework of the United States and Pakistan
Source: Constructed by the Author.

Reciprocal Lessons in Climate Governance (Recommendations)

This part of the discussion section deals with another important objective of this study, of identify the reciprocal and transferable lessons that can enhance climate governance in these two nations.

The Role of Judiciary and Litigation

The historic Leghari v. Federation of Pakistan case in Pakistan has a striking resemblance to the revolutionary power of the American court, especially in Massachusetts v. EPA. But the United States exhibits a more formalized incorporation of court decisions into regulatory procedures. Pakistan can learn from this by granting its judicial and quasi-judicial institutions more authority, such as the environmental tribunals under PEPA. This will establish a long-term framework of holding the government responsible, particularly when it comes to carrying out the requirements of the Climate Change Act (2017) and its implementation frameworks.

Subnational Innovation and Capacity Building

Pakistani provinces can follow the successful example of California's AB 32. Although some provinces, such as Punjab and Sindh, have passed their own environmental laws, they sometimes lack the funding and technical know-how to carry them out effectively. Pakistan may learn from the United States and concentrate on enhancing the capabilities of provincial environmental protection organizations, promoting their development into hubs of innovation. Such things must be suited to local vulnerabilities, like water scarcity in Sindh or floods caused by glacial lake outbursts in Khyber Pakhtunkhwa.

Economic Incentives and Market Mechanisms

The United States framework exemplifies the effectiveness of using financial incentives to propel the transition towards a low-carbon economy. The Inflation Reduction Act (2022) and California's cap-and-trade system are the main examples of it. Although renewable energy is included in Pakistan's policies, they may be greatly improved by adding comparable, context-appropriate financial instruments, tax credits, and investment vehicles to draw in private funding for clean energy and climate-resilient infrastructure projects.

Similarly, the United States through its climate framework id more resilientPakistann, it can draw some critical lessons from Pakistan's experience as a climate-vulnerable nation. With its emphasis on mitigation, the United States can learn from Pakistan's vulnerability-driven paradigm which places adaptation and climate justice at the forefront. Furthermore, despite its lowest emissions, Pakistan has consistently adhered to international climate pledges, highlighting the need of political consensus. This highlights a weakness that stability avoids, in contrast to the varying federal commitment of the United States. Therefore, establishing a strong, bipartisan national consensus is essential to long-term, credible climate governance.

Pakistan's climate framework is also human rights-focused, a tactic employed by many vulnerable countries. The landmark Leghari vs Federation of Pakistan case connected climate inaction to fundamental rights to life and dignity. It reinforces the moral and legal need for action by highlighting the significant effects of climate change on people. Climate governance may become more justice-focused and comprehensive with this strategy.

Conclusion

In conclusion, this study shows that although environmental law is becoming more of a "global commons," its application is highly localized, shaped by unique political systems and historical contexts. There is a stark contrast between Pakistan, a developing, vulnerability-focused, centrally-initiated but provincially-implemented framework, and the decentralized, and economically motivated model of the United States. Pakistan's system emphasizes the difficulties and requirements of developing governance capacity in an environment of extreme climate risk, while the United States framework shows resilience through decentralization.

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