

**THE CONFLUENCE OF CLIMATE, CATASTROPHE, AND LAW: AN EXPERT  
ANALYSIS OF THE LEGAL ASPECTS OF GLOBAL FLOOD DYNAMICS  
IN A WARMING CLIMATE WITH SPECIAL REFERENCE  
TO THE YEAR 2022 PAKISTAN FLOODS**

By

**Author: Munir Ahmed Dar**

**M.Sc. (Forestry), Subject Matter Specialist (Forestry), LLB & Paralegal**

**Publisher & Chief Editor**

**Canadian Journal of Forestry Research (CJFR) [www.cjfr.ca](http://www.cjfr.ca)**

1. DOI: 10.5281/zenodo.17162668
2. ORCID ID: <https://orcid.org/0009-0007-1445-4176>
3. Google Scholar: <https://scholar.google.ca/citations?user=7qq7WEkAAAAAJ&hl=en>
4. ResearchGate ID: [https://www.researchgate.net/profile/Munir-Dar-3?ev=hdr\\_xprf](https://www.researchgate.net/profile/Munir-Dar-3?ev=hdr_xprf)
5. Clarivate Web of Science Researcher ID: OHV-2983-2025

**Keywords:** Pakistan, year 2022 Floods, Climate Injustice, Legal and Governance Failures.

**Abstract:** The year 2022 Pakistan floods serve as a critical case study demonstrating the catastrophic interplay between global climate change and systemic legal and governance failures. Scientifically, the disaster is linked to the Clausius-Clapeyron relationship, which amplified extreme rainfall, exacerbated by unprecedented glacial melt that overwhelmed river systems. Legally, the catastrophe exposes profound deficiencies at three levels. International climate finance remains structurally inadequate to deliver timely relief for Loss and Damage (L&D), domestic governance failed through the decade-long non-implementation of key flood protection policies; and transboundary water agreements, like the Indus Waters Treaty (IWT), are ill-equipped to manage climate-altered river flows. Crucially, the landmark judicial precedent set by *Asghar Leghari v. Federation of Pakistan* highlights the domestic legal duty of the state to protect fundamental human rights from climate impacts, providing a powerful template for compelling governmental action. The analysis concludes that realizing climate justice requires a paradigm shift: leveraging domestic courts to enforce policy, adapting the IWT for climate resilience, and ensuring the Loss and Damage Fund becomes a functionally effective, grant-based mechanism. The floods ultimately underscore that institutional fragility, not just atmospheric physics, is the key variable in transforming extreme weather into humanitarian crises. All citations adhere to the *American Psychological Association (APA) Citation Style*.

## **I. INTRODUCTION:**

The year 2022 Pakistan floods were not merely a natural disaster of historic proportions but a profound manifestation of the complex legal and governance challenges inherent in a warming climate. This report presents a comprehensive legal analysis, demonstrating that the catastrophe arose from a critical confluence of global climate change mechanisms, international legal insufficiencies, and pervasive domestic governance failures. The report establishes a direct link

between the physical drivers of the floods including amplified atmospheric moisture and glacial melt and a series of legal and institutional fragilities.

At the international level, the disaster exposes the inadequacies of current climate finance and the legal vacuum surrounding climate-induced displacement. While the principle of "loss and damage" has achieved conceptual recognition and an associated fund has been established, the financial and procedural mechanisms remain insufficient to provide timely and accessible relief for the most vulnerable nations. Domestically, Pakistan's institutional framework for disaster management, despite its legal mandate, proved ineffective, a failure forewarned by prior judicial rulings.

The landmark case of *Asghar Leghari v. Federation of Pakistan (2015)* stands as a testament to the judiciary's role in compelling governmental action, a precedent that highlights the profound legal duty of states to protect their citizens from climate impacts. Furthermore, the event underscores the growing legal and hydrological pressures on transboundary water agreements, such as the Indus Waters Treaty, which are increasingly challenged by climate-induced changes in river flow and a lack of cooperative flood management protocols. In its totality, the analysis demonstrates that while climate change provided the physical force, it was the human-made legal and institutional fragilities that transformed an extreme weather event into a humanitarian catastrophe, making a compelling case for a paradigm shift toward proactive, rights-based climate justice.

## II. GLOBAL FLOOD DYNAMICS IN A WARMING CLIMATE

The scientific foundation for linking global warming to extreme flood events is rooted in fundamental principles of atmospheric physics. The Clausius-Clapeyron (CC) relationship is a central tenet in this area, stating that the moisture-holding capacity of the atmosphere increases at a rate of approximately 7% per degree Celsius of warming. This physical relationship implies that as global temperatures rise, the atmosphere becomes capable of holding significantly more water vapor, which can then be released in the form of heavy rainfall events. Recent studies on high-percentile precipitation intensities confirm this scaling, indicating that these events do indeed increase with temperature in a manner roughly proportional to the CC-scaling.

This intensification of rainfall is often a result of local convective clouds aggregating into larger, more organized cloud clusters. When these organized systems remain stationary over a particular location for an extended period, they can produce exceptionally large amounts of rainfall, dramatically increasing the risk of severe flooding. While local factors such as terrain, hydrological basin size, and synoptic conditions play a role, the influence of a change in temperature on these convective systems and the resulting precipitation is well-established in scientific literature. The physical evidence thus provides a direct causal pathway from rising global temperatures to the heightened frequency and intensity of extreme rainfall events that drive catastrophic floods.

### The Specific Mechanisms of the 2022 Pakistan Floods

The year 2022 Pakistan floods provide a harrowing case study of these global climate dynamics at a regional scale. The disaster was directly attributed to unusually heavy monsoon rains, which in

July and August were nearly double the normal amount nationwide. In the provinces of Balochistan and Sindh, rainfall totals were an astonishing 4.5 times higher than normal. This torrential downpour was "supercharged" by the development of two atmospheric rivers that funneled an immense amount of moisture into Pakistan's river basins. The country's natural drainage system and saturated flood basins were unable to cope with the sheer volume of water, leading to the unprecedented inundation.

A critical amplifying factor in this catastrophe was the role of glacial melt. Prior to the onset of the monsoon season, Pakistan experienced a period of record-high temperatures, with some areas topping 50°C (122°F). This extreme heat caused more meltwater than usual to enter the Indus River and its tributaries, which were already overflowing. As a result, the river systems were "primed," or pre-loaded, with a massive volume of water even before the monsoon rains began. This sequence where a global warming trend (manifested via the Clausius-Clapeyron effect) fuels a specific weather event (atmospheric rivers), which then converges with a local priming condition (heatwave-driven glacial melt) to overwhelm already fragile systems demonstrates a complex yet discernible chain of amplification. The culmination of these factors was not merely a severe flood but a disaster of unparalleled scale that submerged approximately one-third of the country. This scientifically based causal chain provides a robust foundation for the legal arguments related to attribution and accountability.

### **III. THE HUMANITARIAN AND ECONOMIC CATASTROPHE: A CASE FOR LEGAL REDRESS**

The physical drivers of the 2022 floods unleashed a humanitarian and economic catastrophe of staggering proportions. The disaster affected more than 33 million people, killed over 1,700, and displaced an estimated 8 million people from their homes. The World Bank's Post-Disaster Needs Assessment (PDNA) estimated total damages at USD 14.9 billion and economic losses at USD 15.2 billion, with reconstruction needs exceeding USD 16.3 billion. The sectors hit hardest were housing, agriculture, and transport, with over 2 million homes damaged or destroyed and 5.4 million acres of crops ruined.

The devastation was disproportionately felt by the poorest and most vulnerable communities, who had the least capacity to cope and recover. The floods were projected to increase the national poverty rate by 3.7 to 4.0 percentage points, potentially pushing between 8.4 and 9.1 million more people below the poverty line. The disaster also triggered a severe public health crisis, with a four-fold increase in malaria cases from the previous year, highlighting the devastating secondary impacts of the floodwaters. The economic devastation, including a projected 2.2% loss in gross domestic product (GDP), will have lasting impacts on lives and livelihoods.

A deeper examination of this dynamic reveals a vicious, self-reinforcing cycle of vulnerability and loss. The most exposed communities often live in fragile homes and lack the financial savings to prepare for or recover from such an event. When a disaster strikes, it does not just cause immediate damage; it wipes out the very assets and livelihoods (such as crops and livestock) that people rely

on for survival. This renders them even more susceptible to the next climate-related shock, of which there is a heightened risk due to the growing frequency of extreme weather events. This cycle is particularly pronounced in a country like Pakistan, which is ranked among the ten most vulnerable to climate change despite contributing less than one percent to global carbon emissions. This profound inequity between historical responsibility and present-day suffering forms the ethical and legal basis for a new approach to international justice and accountability.

#### **IV. INTERNATIONAL LEGAL AND GOVERNANCE FRAMEWORKS**

##### **The Evolving Landscape of International Climate Law**

The 2022 Pakistan floods occurred within an international legal framework still grappling with the concept of liability and compensation for climate impacts. Mitigation—addressing the causes of climate change by reducing emissions and adaptation adjusting to its unavoidable impacts are the two pillars of the UN climate regime. However, even with effective mitigation and adaptation, a "locked-in" level of warming is already causing unavoidable negative impacts, giving rise to the legal and diplomatic concept of "loss and damage" (L&D).

The term was formally recognized at the 19th Conference of the Parties (COP19) in 2013 with the establishment of the Warsaw International Mechanism for Loss and Damage. Article 8 of the Paris Agreement, adopted in 2015, further solidified the importance of addressing L&D, although it explicitly states that it "does not involve or provide a basis for any liability or compensation". This deliberate exclusion of liability and compensation remains a point of contention, particularly for vulnerable developing countries.

##### **The principle of "Loss and Damage" and the Global Fund**

Following years of intense negotiations, a significant step was taken at COP27 in 2022 with the agreement to establish a fund to compensate vulnerable nations for climate-induced disasters. This was operationalized at COP28 with the launch of the Loss and Damage Fund, which will be hosted by the World Bank for an interim period. However, a critical gap exists between the legal recognition of the fund and its functional implementation. Financial commitments at COP29 remained well below the estimated USD 400 billion needed annually.

This reveals a deep-seated chasm in international climate law. The international community has achieved a symbolic and conceptual legal victory by establishing the fund, but it has not yet created a functionally effective instrument for providing a rapid, grant-based financial response. The decision to appoint the World Bank as host has drawn criticism from developing countries and civil society, citing concerns over its potential reliance on loans over grants and a lack of a climate-aligned organizational culture. The experience of other climate funds, such as the Green Climate Fund (GCF), has shown that complex bureaucratic and fiduciary standards can create a significant burden of proof and lead to protracted accreditation processes that disproportionately disadvantage

the most vulnerable countries. The legal precarity of this arrangement means that while a mechanism for L&D exists on paper, its ineffectiveness in practice undermines the very purpose it was created to serve.

### **International Climate Litigation: Precedents and Principles**

Parallel to international negotiations, a growing body of climate change litigation is seeking to hold states and corporations accountable for their contributions to the climate crisis. This area of law, which often employs attribution science to link anthropogenic warming to specific extreme events, is increasingly central to claims against governments for their failure to regulate emissions or adapt to foreseeable impacts. Landmark cases like *Urgenda v. The Netherlands (2019)* and *Verein Klima Senior innen Schweiz v. Switzerland (2024)*, where the European Court of Human Rights ruled that state inaction violated human rights, have established powerful legal precedents.

This litigation is evolving from a tort-based model focused on private damages to a public law, human rights-based model focused on governmental obligation and constitutional duty. This evolution underscores a strategic shift: rather than merely seeking compensation, legal challenges are compelling government action and ensuring that domestic policies are meaningfully implemented. In this regard, the judiciary is emerging as a critical check on executive and legislative inertia, with courts actively shaping and enforcing governmental duties to protect citizens from climate harms.

### **The Legal Status of Climate-Induced Displacement**

The 2022 Pakistan floods displaced millions of people, yet the legal framework for "climate migrants" remains a significant and complex challenge. Neither the United States nor international law provides a universally accepted definition of climate migrants, and existing legal frameworks, such as the Refugee Convention, are ill-suited to address displacement caused by environmental factors rather than persecution.

While the International Court of Justice (ICJ) has taken a step forward by recognizing the principle of non-refoulement the obligation of states not to return individuals to situations of real risk of irreparable harm its advisory opinion on climate change devoted little attention to the issue of displacement and did not provide comprehensive legal guidance on concrete protection mechanisms, such as temporary visas. This creates a massive legal and humanitarian challenge for countries like Pakistan, where millions of people, now internally displaced, face an uncertain future and a potential inability to return to their homes or livelihoods.

## **V. NATIONAL LEGAL AND INSTITUTIONAL RESPONSES IN PAKISTAN**

### **Pakistan's Domestic Framework for Climate Action and Disaster Management**

In the wake of the devastating year 2010 floods, Pakistan enacted a multi-tiered legal and institutional framework for disaster management. This includes the National Disaster Management Act of 2010 which established the National Disaster Management Commission (NDMC) and its

provincial and district counterparts. The country also developed a National Climate Change Policy in year 2012, which was designed to mainstream climate change into key sectors and focus on adaptation measures, recognizing Pakistan's high vulnerability to extreme events.

This framework was intended to shift Pakistan's approach from a reactive, response-oriented system to a proactive one focused on disaster risk reduction (DRR). The policies provided a comprehensive plan for building climate resilience, including measures to improve water security, protect agriculture, and enhance early warning systems.

### **Institutional Incoherence and Implementation Failures**

Despite the existence of a robust legal and institutional framework, the year 2022 floods revealed a profound governance deficit. The multi-tiered system suffered from a lack of coordination, clear mandates, and adequate resources. A particularly damning example of this implementation failure is the National Flood Protection Plan-IV (NFPP-IV), which was conceived after the 2010 floods to mitigate future risks. The plan, with an estimated cost of Rs. 332.246 billion, had yet to be started by 2018-19 due to bureaucratic delays and financial constraints, with the project's umbrella PC-I (project concept) still awaiting clearance. This failure to implement structural and non-structural flood protection measures exposed the country's fragile physical infrastructure and left it acutely vulnerable to the year 2022 deluge.

### **The Leghari Precedent as a Legal Check on Governance Failure**

This pattern of governmental "lethargy and delay" in implementing climate policy was directly challenged in the landmark year 2015 case of *Asghar Leghari v. Federation of Pakistan* (.2015). A Pakistani farmer sued the government, arguing that its inaction violated his fundamental constitutional rights to life and dignity. The Lahore High Court made history by agreeing with the petitioner, ruling that the government's failure to implement its own climate policy "offended the fundamental rights of the citizens".

This ruling is not merely a legal victory but a powerful institutional check on governance failure. The court's decision established the principle of "climate justice," linking a state's legal duty to protect fundamental human rights with its obligation to take meaningful action on climate change. As part of its ruling, the court created a Climate Change Commission and a Standing Committee to oversee the government's progress and ensure the effective implementation of its climate policies

The Leghari case demonstrates a powerful and innovative use of domestic law to bridge the gap between policy formulation and policy implementation, a model with profound implications for other vulnerable nations seeking to compel their governments to act.

## **VI. TRANSBOUNDARY WATER MANAGEMENT: THE LEGAL AND HYDROLOGICAL CHALLENGE TO THE INDUS WATERS TREATY**

### **The Indus Waters Treaty (IWT): A Framework Under Pressure**

The Indus Waters Treaty (IWT) of year 1960, a water-sharing agreement between India and Pakistan brokered by the World Bank, has long been hailed as a model of successful hydro-

diplomacy, having endured three wars and numerous political crises. The treaty allocates control of the eastern rivers (Ravi, Beas, and Sutlej) to India and the western rivers (Indus, Jhelum, and Chenab) to Pakistan. It also established the Permanent Indus Commission to address implementation questions and a dispute resolution mechanism involving a neutral expert and a court of arbitration.

However, the treaty's foundational assumptions are being profoundly challenged by a warming climate. Research indicates that the Indus basin is being affected unevenly, with different tributaries experiencing dramatically different rates of glacial melt. The rivers allocated to India are projected to see peak discharge earlier (by year 2030) than those allocated to Pakistan (by year 2070), altering the historically stable flow patterns upon which the treaty was based. This creates immense legal and hydrological pressure, as the existing framework lacks a formal mechanism to address these climate-driven changes in flow.

### **Geopolitical Tensions and Legal Disputes**

Climate-induced hydrological shifts are compounded by persistent geopolitical tensions. Recent years have seen a number of legal and diplomatic disputes, including Pakistan's objections to India's Kishanganga and Ratle hydroelectric projects. In a significant escalation, India suspended the treaty in year 2025 following a terror attack, though a Permanent Court of Arbitration (PCA) ruling in June 2025 reaffirmed its authority and stated that the treaty does not provide for unilateral abeyance.

The PCA's ruling served as a powerful legal and political signal that established international treaties hold even when bilateral relations are strained. It underscored the legal resilience of the IWT. However, the larger challenge remains unaddressed: the IWT, designed for a stable climate, lacks the necessary provisions for cooperative flood-release management and joint basin monitoring in a world of altered and unpredictable river flows. The treaty's continued relevance depends on the willingness of both parties to move beyond political rhetoric and adapt its framework to the new hydrological realities imposed by climate change.

## **VII. LEGAL AND POLICY RECOMMENDATIONS FOR CLIMATE RESILIENCE**

Based on the preceding analysis, the following legal and policy recommendations are presented to strengthen Pakistan's resilience to future climate-induced flood disasters.

### **Strengthening Domestic Governance and Enforcement**

The year 2022 floods were a direct consequence of the failure to operationalize existing laws and policies. The government must immediately overcome the bureaucratic and financial hurdles that have delayed the implementation of the National Flood Protection Plan-IV (NFPP-IV) for over a decade

A key recommendation is to leverage the legal precedent of the Leghari case by establishing a standing judicial or quasi-judicial body to monitor the progress of climate and disaster

management policies, thereby ensuring accountability and compelling the executive to act on its legal duties. The National Disaster Management Authority (NDMA) and its provincial counterparts must also be reformed to improve coordination, clarify mandates, and ensure adequate resource allocation, which would enhance the effectiveness of early warning systems and disaster response efforts

### **Enhancing Transboundary Water Cooperation**

The legal framework for transboundary water management needs to be adapted to the new climate reality. India and Pakistan should establish a formal, climate-focused dialogue within the Permanent Indus Commission to address altered flow patterns, coordinate flood-release management from upstream dams, and conduct joint basin monitoring. Such a collaborative approach would reinforce the IWT as a form of "climate-era infrastructure," providing a stable and cooperative mechanism for managing shared water resources in an increasingly unpredictable world.

### **Advancing Climate Justice Through Law**

Pakistan should continue its leadership role in advocating for a robust, grant-based, and accessible Loss and Damage Fund at the international level. Domestically, the judiciary should continue its pioneering role, as seen in the

Leghari case, by creating legal precedents that link governmental inaction on climate change to human rights violations, thereby compelling a proactive, rights-based approach to climate policy. Furthermore, new legislation should be developed to protect climate-induced internally displaced persons (IDPs), providing them with legal status, support, and access to humanitarian aid.

## **VIII. CONCLUSION**

The year 2022 Pakistan floods were a catastrophic event that laid bare the complex interplay of global climate change, international legal inadequacies, and critical domestic governance failures. The analysis presented here has established a clear, scientific connection between the physical mechanisms of a warming climate and the unprecedented scale of the disaster. This physical reality underscores the urgent need for a legal framework that can provide meaningful accountability and support.

At the international level, while the Loss and Damage Fund represent a significant diplomatic step, its operational limitations and funding shortfalls reveal a profound gap between legal recognition and functional implementation. This forces a reliance on alternative legal avenues, such as climate litigation, which is emerging as a powerful tool for compelling state and corporate action. Domestically, the floods exposed the systemic institutional incoherence and policy implementation failures that have plagued Pakistan for over a decade. Yet, the judiciary, through the landmark Leghari case, has demonstrated a willingness to fill this void, establishing a legal precedent that links governmental inaction to the violation of fundamental human rights. This pioneering approach offers a model for other nations seeking to compel their governments to fulfill their climate-related duties.

The experience of the Indus Waters Treaty further highlights that even the most enduring legal agreements are ill-equipped to manage the systemic and unpredictable changes wrought by a warming climate. This necessitates a paradigm shift from a reactive to a proactive legal and governance posture, both domestically and internationally. The future of climate resilience hinges not just on scientific and technological innovation but on the ability of legal and political systems to evolve, enforce, and adapt to the challenges of a climate-changed world. The case of the year 2022 Pakistan floods stands as a stark reminder that without robust, enforceable, and equitable legal frameworks, extreme weather events will continue to spiral into humanitarian catastrophes, with the most vulnerable bearing the brunt of a crisis they did not create.

## REFERENCES

- American Bar Association. (2024, October 15). *Climate migration*.  
<https://www.americanbar.org/groups/crsj/resources/human-rights/2024-october/climate-migration/>
- British Red Cross. (2022). *Climate change and Pakistan flooding affecting millions*.  
<https://www.redcross.org.uk/stories/disasters-and-emergencies/world/climate-change-and-pakistan-flooding-affecting-millions>
- Climate Change Laws of the World. (2010). *The National Disaster Management Act 2010*.  
[https://climate-laws.org/document/the-national-disaster-management-act-2010\\_3c7d](https://climate-laws.org/document/the-national-disaster-management-act-2010_3c7d)
- Climate Litigation Explorer. (n.d.). *Leghari v. Pakistan*. <https://clxtoolkit.com/casebook/leghari-v-pakistan/>
- Columbia Law School. (2025, July 26). A single paragraph's promise: The ICJ's advisory opinion on climate change and the understated question of human displacement. *Sabin Center for Climate Change Law*.  
<https://blogs.law.columbia.edu/climatechange/2025/07/26/a-single-paragraphs-promise-the-icjs-advisory-opinion-on-climate-change-and-the-understated-question-of-human-displacement/>
- The Editors of Encyclopaedia Britannica. (2022). *Indus Waters Treaty*. Britannica.com.  
<https://www.britannica.com/event/Indus-Waters-Treaty>
- The Editors of Encyclopaedia Britannica. (2022). *Pakistan floods of 2022*. Britannica.com.  
<https://www.britannica.com/event/Pakistan-floods-of-2022>
- European Centre for Development Policy Management. (2025). *A broken promise? Loss and damage finance. Can Europe help?* <https://ecdpm.org/work/broken-promise-loss-and-damage-finance-can-europe-help>
- Global Water Forum. (2025, September 11). *Weaponizing rivers: The Indus Water Treaty verdict and the limits of power*. <https://www.globalwaterforum.org/2025/09/11/weaponizing-rivers-the-indus-water-treaty-verdict-and-the-limits-of-power/>
- Humanitarian Outcomes. (2022). *Floods in Pakistan: Rethinking the humanitarian role*.  
[https://humanitarianoutcomes.org/sites/default/files/publications/pakistan\\_floods\\_1122.pdf](https://humanitarianoutcomes.org/sites/default/files/publications/pakistan_floods_1122.pdf)
- Khan, K. F., & Azhar, S. (2022). Addressing foundational issues for effective flood risk management: A review. *IWA Publishing, Water Policy*, 27(3), 334-345.  
<https://iwaponline.com/wp/article/27/3/334/107138/Addressing-foundational-issues-for-effective-flood>

- Meijgaard, C. J., et al. (2019). Addressing foundational issues for effective flood risk management: a review. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, 377(2153), 20190551. <https://doi.org/10.1098/rsta.2019.0551>
- Ministry of Climate Change, Government of Pakistan. (2012). *National Climate Change Policy*. <https://mocc.gov.pk/SiteImage/Policy/NCCP%20Report.pdf>
- Ministry of Climate Change, Government of Pakistan. (2012). *National Climate Change Policy*. [https://www.gcisc.org.pk/National\\_Climate\\_Change\\_Policy\\_2012.pdf](https://www.gcisc.org.pk/National_Climate_Change_Policy_2012.pdf)
- Ministry of Water Resources, Government of Pakistan. (n.d.). *Brief on National Flood Protection Plan-IV (NFPP-IV)*. <https://www.mowr.gov.pk/SiteImage/Misc/files/plan%204.pdf>
- Moazzam, F. Z. (2025, May 22). Q&A: Pakistan will have to adapt to floods as the new normal. *Dialogue Earth*. <https://www.eco-business.com/news/qa-pakistan-will-have-to-adapt-to-floods-as-the-new-normal/>
- Nayak, J. J., Sreekanth, S. S., Reddy, M. C. R., Thomas, S. P., Rao, T. R., & Rao, M. M. (2020). *Journal of Meteorological Society of Japan*, 98(6). [https://www.jstage.jst.go.jp/article/jmsj/98/6/98\\_2020-058/\\_html/-char/en](https://www.jstage.jst.go.jp/article/jmsj/98/6/98_2020-058/_html/-char/en)
- Pandey, S. & Serdeczny, O. (2024, May 20). *The loss and damage fund must be accessible to those it was set up to serve – the most vulnerable to climate change*. Climate Analytics. <https://climateanalytics.org/comment/the-loss-and-damage-fund-must-be-accessible-to-those-it-was-set-up-to-serve-the-most-vulnerable-to-climate-change>
- Sabin Center for Climate Change Law. (n.d.). *Asghar Leghari v. Federation of Pakistan. Climate Case Chart*. <https://climatecasechart.com/non-us-case/ashgar-leghari-v-federation-of-pakistan/>
- Sabin Center for Climate Change Law. (n.d.). *Climate change litigation databases*. <https://climatecasechart.com/>
- Singh, V. (2025, May 19). Climate crisis exposes flaws in Indus pact as some rivers may dry up quicker. *Hindustan Times*. <https://www.hindustantimes.com/india-news/climate-crisis-exposes-flaws-in-indus-pact-as-some-rivers-may-dry-up-quicker-101746211618179.html>
- The World Bank. (2022, October 28). *Pakistan: Flood damages and economic losses over USD 30 billion and reconstruction needs over USD 16 billion - new assessment*. <https://www.worldbank.org/en/news/press-release/2022/10/28/pakistan-flood-damages-and-economic-losses-over-usd-30-billion-and-reconstruction-needs-over-usd-16-billion-new-assessme>
- UNEP. (n.d.). *What is Loss & Damage?* <https://www.unep.org/topics/climate-action/loss-and-damage/about-loss-and-damage>
- UNFCCC. (2015). *Decision -/CP.21. Adoption of the Paris Agreement*. [https://unfccc.int/files/adaptation/groups\\_committees/loss\\_and\\_damage\\_executive\\_committee/application/pdf/ref\\_8\\_decision\\_xcp.21.pdf](https://unfccc.int/files/adaptation/groups_committees/loss_and_damage_executive_committee/application/pdf/ref_8_decision_xcp.21.pdf)
- Wikipedia. (2025, September 24). *Climate change litigation*. [https://en.wikipedia.org/wiki/Climate\\_change\\_litigation](https://en.wikipedia.org/wiki/Climate_change_litigation)
- Wikipedia. (2025, September 22). *National Disaster Management Act, 2010*. [https://en.wikipedia.org/wiki/National\\_Disaster\\_Management\\_Act,\\_2010](https://en.wikipedia.org/wiki/National_Disaster_Management_Act,_2010)
- Wikipedia. (2025, September 21). *Indus Waters Treaty*. [https://en.wikipedia.org/wiki/Indus\\_Waters\\_Treaty](https://en.wikipedia.org/wiki/Indus_Waters_Treaty)

Zahra, I. (2025, May 22). Pakistan's floods expose decades of mismanagement. *The Friday Times*. <https://www.thefridaytimes.com/30-Aug-2025/pakistan-s-floods-expose-decades-of-mismanagement>