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Revisiting the Indus Waters Treaty: Legal Obligations and Climate Realities in the Twenty-First Century

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Abstract

The Indus Waters Treaty of 1960 is a landmark agreement. It has survived wars and political crises between India and Pakistan. The Treaty divides the six rivers of the Indus system. It gives the eastern rivers to India and the western rivers to Pakistan. It also sets up a detailed dispute-resolution mechanism. For over sixty years, this framework worked well. However, the Treaty was built on mid-twentieth-century science. At that time, experts believed river flows were stable and predictable. That assumption is no longer true. Climate change is altering the Indus Basin. Glaciers are melting faster. Monsoon rains are becoming erratic. Floods are more severe. Droughts last longer. These changes challenge the Treaty's fixed rules. The Treaty does not mention climate adaptation. It has no periodic review clause. It does not protect environmental flows. Recent disputes over hydropower projects have exposed these weaknesses. In 2025, India suspended key parts of the Treaty. This showed how fragile cooperation can be. This paper examines whether the Treaty can handle these new pressures. It reviews the Treaty's legal structure. It analyses climate projections for the basin. It draws lessons from the Nile and Mekong rivers. Those basins have developed joint climate strategies. The paper argues that the Treaty needs modernisation. This does not mean renegotiating its core terms. Instead, we should strengthen the Permanent Indus Commission. We should improve data sharing. We should add environmental flow rules. We should create crisis protocols. These steps would make the Treaty more resilient. They would protect the water security of over 300 million people.

Keywords: Indus Waters Treaty, Climate Change Adaptation, Transboundary Water Law, Permanent Indus Commission, Hydrological Variability, India-Pakistan Relations, Water Security, Treaty Modernisation, International Watercourses

1. Introduction

The Indus Waters Treaty is one of the most successful water-sharing agreements in history. It was signed in Karachi on 19 September 1960. The World Bank acted as the mediator. India and Pakistan had fought three wars by that point. They were deeply suspicious of each other. Yet they managed to agree on a detailed water plan. This was a remarkable achievement.

The Treaty divides the Indus river system. The system has six main rivers. India received the three eastern rivers. These are the Sutlej, the Beas, and the Ravi. Pakistan received the three western rivers. These are

the Indus, the Jhelum, and the Chenab. However, the division is not absolute. India can use the western rivers for certain purposes. These include run-of-the-river hydropower. India can also use a small amount of water for domestic use. These uses are controlled by strict technical rules.

The Treaty was designed to last forever. Its framers believed they had settled all major issues. They created the Permanent Indus Commission to handle day-to-day matters. They built a dispute-resolution ladder. The first step is the Commission. The second is a Neutral Expert. The third is a Court of Arbitration. This system gave both sides a legal path forward. It reduced the temptation to use force.

For decades, the Treaty delivered stability. It functioned during the wars of 1965 and 1971. It continued during the Kargil conflict in 1999. The Permanent Indus Commission met regularly. Data was exchanged. Projects were inspected. The system was not perfect. There were tensions. But the Treaty held.

Today, however, the Treaty faces new and powerful pressures. The first pressure is environmental. The Hindu Kush Himalayan region is warming rapidly. Glaciers are shrinking. Snowfall patterns are changing. The monsoon is becoming less predictable. These changes affect the timing and volume of river flows. The Treaty's rules were based on historical data. That data is no longer a reliable guide to the future [1].

The second pressure is geopolitical. India-Pakistan relations have worsened in recent years. Both sides view water as a strategic asset. In April 2025, India suspended certain Treaty obligations. It stopped sharing hydrological data. It threatened to accelerate water diversion projects [2]. Pakistan called this an act of war. The crisis showed how quickly cooperation can break down [3].

The third pressure is institutional. The Treaty's main body is the Permanent Indus Commission. But the Commission is only a bilateral group. It does not manage the whole basin. It does not study climate change. It does not protect ecosystems. It does not talk to upstream neighbours like China or Afghanistan. This institutional gap is becoming harder to ignore.

This paper addresses these challenges. It asks a simple question. Can the Indus Waters Treaty remain effective in a changing world? The answer is yes, but only with changes. The paper is divided into four parts. The first part explains the Treaty's legal framework. The second part examines climate impacts on the basin. The third part analyses recent disputes and the 2025 crisis. The fourth part proposes a reform agenda. The argument is pragmatic. We do not need to rewrite the Treaty entirely. But we do need to update how it is implemented. This would secure the water future for both nations.

2. Literature Review

Scholars have studied the Indus Waters Treaty from many angles. Early research focused on how the Treaty was negotiated. Biswas (1992) provided a detailed account [4]. He showed how the World Bank pushed both sides to compromise. He highlighted the technical expertise involved. The negotiators were not just diplomats. They were engineers and lawyers. They understood the river systems in great depth.

Another stream of scholarship examined the Treaty's institutional strength. Salman (2008) studied the Baglihar dispute [5]. He asked whether the dispute-resolution process worked well. He found that the Neutral Expert procedure was effective. It provided a clear answer. Both sides accepted the decision. This was a testament to the Treaty's design.

Wolf and Newton (2009) placed the Treaty in a broader context [6]. They compared it with other transboundary agreements. They argued that the Indus Treaty was unusually detailed. Most river treaties are vague. They leave room for interpretation. The Indus Treaty tried to eliminate ambiguity. It set precise limits on storage and hydropower. This reduced the scope for conflict.

In recent years, researchers have turned to climate issues. The Hindu Kush Himalaya Assessment (Wester et al., 2019) was a major contribution [7]. It brought together hundreds of scientists. It documented the region's vulnerability. It showed that the Indus Basin depends heavily on snow and ice. This makes it especially sensitive to warming.

Immerzeel et al. (2020) looked at agriculture [8]. They showed that meltwater is essential for the Indo-Gangetic plain. Without it, food production would drop sharply. They warned that future water shortages could affect millions of people.

Khan et al. (2020) used computer models to project future flows [9]. They found that peak flows will come earlier. They also found that floods will become more intense. At the same time, low flows will last longer. This double threat is serious. It increases both flood risk and drought risk.

Huss and Hock (2018) studied glaciers globally [10]. They found that the Hindu Kush Himalayas are losing mass faster than most regions. This will reduce summer flows in the long run. The Indus Basin may face a "peak water" moment. After that, water availability will decline.

Some scholars have started to link climate science with legal analysis. Nahar (2025) argued that the Treaty must adapt [11]. She proposed adding climate provisions. She suggested creating a joint scientific committee. She also called for environmental flow standards. Her work is part of a growing trend.
However, a gap remains. Most studies look at either law or hydrology. Few connect the two systematically. This paper tries to fill that gap. It asks how the Treaty's rules interact with non-stationary hydrology. It also examines institutional responses to political shocks. This integrated approach is relatively new.

3. Research Objectives and Questions

This research has five main objectives. They are listed below.
First, the study aims to explain the Treaty's legal framework. This includes the allocation of rivers. It includes the role of the Permanent Indus Commission. It includes the dispute-resolution process.

Second, the study aims to analyse climate impacts. We want to know how the Indus Basin is changing. We look at observed trends. We also look at future projections.

Third, the study assesses the Treaty's adequacy. Are the existing rules sufficient? Can they handle climate variability? We examine the Treaty's strengths and weaknesses.

Fourth, the study evaluates recent disputes. We look at the Kishanganga and Ratle cases. We also examine the 2025 suspension crisis. We want to understand what these events reveal.

Fifth, the study proposes reforms. We draw lessons from other basins. We look at the Nile and the Mekong. We also consider international law. We suggest practical steps for modernisation.

These objectives lead to five research questions.

1. How does the Treaty allocate rights and obligations between India and Pakistan?
2. What are the major climate-change impacts affecting the Indus Basin?
3. Are the Treaty's legal obligations sufficient for climate uncertainty?
4. What lessons can we learn from other river basins?
5. What reforms are needed for climate-resilient governance?

4. Research Methodology

This study uses a qualitative and doctrinal approach. It relies on primary and secondary sources. The primary sources are the Treaty text itself [12], arbitral awards [13, 14], and official World Bank statements [15, 16, 17]. We also examine the UN Watercourses Convention [18]. This is a key international legal instrument.

Secondary sources include peer-reviewed journal articles. They include books and policy reports. They include climate assessment studies. We use these to understand the scientific context.

We also use a comparative method. We examine the Nile Basin Initiative [19] and the Mekong River Commission [20]. We look at their institutional practices. We identify lessons that could apply to the Indus Treaty.

The analysis is critical and interpretive. We do not just describe the law. We assess whether it is fit for purpose. We also consider political realities. This makes the study more grounded.

5. Legal and Institutional Architecture of the Treaty

The Indus Waters Treaty is a long document. It has twelve articles and eight annexures. The annexures are particularly important. They contain the technical details. Without them, the Treaty would not work.

5.1 Core Allocations

The Treaty's main bargain is simple. Article II gives India full rights to the eastern rivers. India can use this water for any purpose. There are no restrictions. Article III gives Pakistan full rights to the western rivers. However, this is subject to Indian usage rights. These rights are spelled out in the annexures.

India can build run-of-the-river hydropower plants on the western rivers. This means it can generate electricity without storing water. India can also have small storage for domestic use. It can store up to a certain volume. These volumes are defined precisely. They vary by river.

Annexure D sets storage limits. For the Indus, the limit is 0.40 million acre-feet. For the Jhelum, it is 1.50 million acre-feet. For the Chenab, it is 1.70 million acre-feet. These numbers were chosen carefully. They were designed to protect Pakistan's flows.

Annexure E deals with run-of-the-river plants. It sets rules for pondage. Pondage is the storage of water behind the dam. The Treaty limits pondage to 2 million acre-feet per project. It also sets rules for drawdown. Drawdown is the release of water to flush sediment. The Treaty allows drawdown flushing. But it must be done in a controlled way.

Annexure F covers the Neutral Expert procedure. It sets out the process for appointing a Neutral Expert and the binding nature of the Expert's decision.

Annexure G covers the Court of Arbitration. It details the composition, procedure, and finality of the Court's award.

5.2 The Permanent Indus Commission

The operational heart of the Treaty is Article VIII. This establishes the Permanent Indus Commission. The Commission has one Commissioner from each country. The Commissioners are high-ranking officials. They are usually engineers.

The Commission has several duties. First, it establishes cooperative arrangements. It decides how to implement the Treaty. Second, it settles questions that arise. If a technical issue comes up, the Commission deals with it. Third, it conducts a general tour of inspection once every five years. The Commissioners visit projects on both sides. They check for compliance.

The Commission's most critical function is data exchange. India and Pakistan share daily river readings. They share flood forecasts. This information is vital for Pakistan. Pakistan is the downstream country. It needs to know what is coming. Without this data, Pakistan cannot manage its reservoirs. It cannot issue flood warnings.

The data exchange has worked well for decades. Even during wars, it continued. This shows the Treaty's strength. However, the system has limits. The data is mainly real-time. It does not include climate projections. It does not include vulnerability assessments. This limits its usefulness.

5.3 The Dispute-Resolution Mechanism

Article IX sets out the dispute-resolution process. It is a graded ladder. There are three steps.
Step one is the Commission. If a difference arises, it must go to the Commission first. A "difference" is a technical question. It could be about interpreting the Treaty. It could be about a project design. The Commission tries to resolve it.

Step two is the Neutral Expert. If the Commission cannot resolve the matter, either side can refer it. The Neutral Expert is an independent person. Both sides must agree on this person. The Expert studies the issue. They issue a decision. That decision is final and binding.

Step three is the Court of Arbitration. This is for broader disputes. A "dispute" is not just technical. It involves bigger questions. Either side can initiate the Court. The Court has seven members. Each side appoints two. The other three are independent. The Court's award is legally binding.

This mechanism has been used several times. The Baglihar case went to a Neutral Expert. The Kishanganga case went to a Court of Arbitration [13]. Both processes were peaceful. Both produced clear rulings. This shows the system works.

However, the system assumes stable hydrology. It assumes the facts are known. Climate change changes this. The facts are no longer certain. The Treaty does not have a mechanism to review its own rules. This is a major gap.

5.4 Gaps in the Treaty

The Treaty has notable omissions. It does not cover groundwater. Groundwater is a critical resource. Both countries use it heavily. In many areas, groundwater is being depleted. Climate change makes this worse. The Treaty does not address this.

The Treaty does not cover environmental flows. It does not protect river ecosystems. It only cares about human uses. This is a problem. Healthy rivers need minimum flows. Without them, fish populations decline. Water quality suffers.

The Treaty does not mention climate change. It was written long before this became a concern. There is no adaptation clause. There is no review clause. The Treaty cannot be updated except by mutual agreement. This makes it rigid.

The Treaty does not cover upstream neighbours. China and Afghanistan contribute to the Indus headwaters. They have built dams. This affects downstream flows. The Treaty has nothing to say about this. It only governs India and Pakistan.

6. Climate Change and Hydrological Transformation in the Indus Basin

The Indus Basin is one of the most climate-vulnerable regions in the world. It is home to over 300 million people. Most of them depend on agriculture. The basin provides water for irrigation. It also provides hydropower. Any change in the river system has huge consequences.

6.1 The Source of Water

The Indus River gets its water from three main sources. The first is winter snow. Snow falls in the mountains from December to March. This snow melts in spring and summer. The second is the summer monsoon. Rain falls heavily from June to September. This adds a lot of water to the rivers. The third is glacial melt. Glaciers release water continuously during warm months. They act as a buffer. They provide water when other sources are low.

Glacial melt contributes about 25 to 30 per cent of the total flow. This is a very high share. Most rivers get far less from glaciers. The Indus is special because of its high mountains. This makes it sensitive to temperature changes.

6.2 Observed Changes

Temperatures in the Hindu Kush Himalaya have risen faster than the global average. This has caused observable changes. First, glaciers are shrinking. They are losing mass every year. Some small glaciers have disappeared entirely. Second, snow cover is declining. Spring snow is melting earlier. This changes the timing of river flows.

Third, monsoon patterns are shifting. The monsoon is becoming more erratic. Some years bring heavy floods. Other years bring droughts. This unpredictability is difficult for farmers. They cannot plan their crops.

Fourth, extreme events are becoming more common. Floods are more severe. Droughts are longer. In 2010, Pakistan suffered a catastrophic flood. It affected 20 million people. Scientists linked this to climate change. Similar events are likely in the future.

6.3 Future Projections

Scientists have used computer models to project the future. They have run different scenarios. Some scenarios assume high emissions. Others assume lower emissions. The high-emission scenarios are alarming.

One major projection is earlier peak flows. Historically, peak flows occurred in July and August. In the future, they may occur in June. This is because snow melts earlier. It is also because the monsoon may start earlier. This shift affects reservoir operations. Dams were built for the old schedule. They may not work well with the new one.

Another projection is more intense floods. One study found that peak floods could increase by 50 to 100 per cent [9]. This is a big increase. It means dams must be stronger. Spillways must be larger. If they are not, there is a risk of dam failure.

At the same time, low flows will become more common. There will be longer dry seasons. This is a problem for Pakistan. Pakistan relies on the Indus for summer irrigation. If summer flows drop, crops will suffer. The country may face food shortages.

In the long term, glacier melt will decline. This is because glaciers are shrinking. After a certain point, they cannot sustain melt rates. This is called "peak water". After peak water, flows start falling. This could happen in the second half of the century. It is a serious threat to water security.

6.4 Socio-Economic Impacts

These hydrological changes have real-world effects. Agriculture is the main user of water. It accounts for about 90 per cent of total consumption. If water availability changes, farmers must adapt. They may need to change crops. They may need to use more groundwater. But groundwater is already overused. This is not a sustainable solution.

Floods also cause massive damage. They wash away homes, roads, and bridges. They destroy crops and livestock. They displace communities. The cost of flood damage runs into billions of dollars. Droughts are also costly. They reduce agricultural output. They force governments to import food. This puts pressure on foreign exchange reserves.

The Treaty does not address these socio-economic dimensions. It treats water as a technical issue. It does not consider human vulnerability. This is a gap.

7. The Role of Groundwater and Upstream Riparians

7.1 Groundwater

The Indus Waters Treaty does not mention groundwater. This is a serious omission. Groundwater is a major source of water for both countries. In Pakistan, groundwater provides about 40 per cent of irrigation water. In India's Punjab, the figure is even higher. Farmers pump water from tube wells. This supplements canal supplies.

Groundwater is a buffer. When surface water is low, farmers pump more groundwater. This helps them survive droughts. However, groundwater levels are falling. They are falling because of over-extraction. In many areas, the water table is dropping by more than a metre per year. This is not sustainable.
Climate change will make the situation worse. Surface water will become less reliable. Farmers will rely more on groundwater. This will accelerate depletion. Eventually, the aquifer will run dry. This could cause a crisis.

The Treaty does not recognise this link. It treats surface water and groundwater separately. In reality, they are connected. Pumping groundwater can reduce river flows. This is because aquifers feed the rivers. The Treaty does not account for this.

7.2 Upstream Riparians

The Treaty only governs India and Pakistan. But the Indus Basin extends beyond these two countries. China controls part of the upstream area. This is the Trans-Karakoram Tract. China has built several dams in the region. One is the Darban Dam. Another is the Masca Dam. These dams can affect downstream flows.

Afghanistan also contributes to the Indus system. The Kabul River is a tributary. It flows from Afghanistan into Pakistan. Afghanistan plans to build dams on this river. This could reduce Pakistan's water supply.
The Treaty has no provisions for these upstream riparians. It cannot prevent China or Afghanistan from building dams. It cannot force them to share data. This is a major limitation. India and Pakistan cannot manage the basin fully. They only manage part of it.

Some experts argue that the Treaty should be expanded. They suggest creating a multilateral framework. This would include China and Afghanistan. It would establish data-sharing protocols. It would also set rules for new dams. This is a long-term goal. It is difficult politically. But it is worth considering.

8. Stress-Testing the Treaty: Recent Disputes and Institutional Fragility

The Treaty's weaknesses are not just theoretical. They have been exposed by real events. Two disputes are particularly important. These are the Kishanganga and Ratle cases. There is also the 2025 suspension crisis. These events show the Treaty's limits.

8.1 The Kishanganga Dispute

The Kishanganga project is on the Jhelum River. It is in Indian-administered Kashmir. The project has a capacity of 330 megawatts. It is a run-of-the-river plant. Pakistan objected to it. Pakistan said the project would reduce water supply. It argued that the design violated the Treaty.

The dispute went to a Court of Arbitration. This was the first time a Court was used. The proceedings were complex. They involved expert witnesses. They involved detailed technical arguments. The Court issued its final award in 2013 [13].

The Court allowed the project to proceed. However, it imposed conditions. It required India to maintain a minimum flow. This is called an environmental flow. It is the water that must flow downstream. The Court set the minimum flow at nine cubic metres per second. This was lower than Pakistan wanted. But it was higher than India proposed. The Court also restricted drawdown flushing. India could only do this during certain times.

The case showed that the Treaty can handle disputes. It provided a peaceful resolution. Both sides accepted the award. This was a success. However, the case also showed ambiguities. The Treaty's language was open to interpretation. Both sides had plausible arguments. The Court had to make a decision. It was not a simple application of the rules.

8.2 The Ratle Dispute

The Ratle project is on the Chenab River. It is also in Indian-administered Kashmir. It has a capacity of 850 megawatts. Pakistan objected to this project too. Pakistan said it violated the Treaty. India disagreed. The dispute took a different procedural path. In 2016, Pakistan asked for a Neutral Expert. At the same time, it sought a Court of Arbitration. India argued this was not allowed. The Treaty requires a sequence. You cannot use both processes at once.

The World Bank was the treaty guarantor. It had to decide what to do. In December 2016, the Bank paused both processes [15]. It wanted to give the parties time to talk. In April 2022, the Bank resumed the processes [17]. It asked the parties to choose a path. India insisted on the Neutral Expert. Pakistan insisted on the Court. The Bank then appointed both a Neutral Expert and a Court.

India challenged this decision. It said it violated the Treaty. The case is still ongoing. This dispute shows the Treaty's procedural weakness. The mechanism can become a source of conflict. It also shows the difficulty of third-party intervention. The World Bank is trying to be neutral. But both sides question its actions.

8.3 The 2025 Suspension Crisis

The most serious event was in April 2025. A major terrorist attack occurred in Kashmir. India blamed Pakistan-backed militants. India decided to respond. It announced a temporary suspension of Treaty obligations.

India stopped sharing hydrological data. It stopped giving flood forecasts. It also threatened to divert more water. It said it would accelerate projects on the western rivers [2]. These actions directly violated the Treaty.

Pakistan was alarmed. It said this was an act of war. It argued that water is a life-and-death matter. Pakistan depends on the Indus. It cannot manage its water without Indian data. The crisis showed the Treaty's fragility. A political event brought cooperation to a halt.

The crisis also showed the absence of emergency protocols. The Treaty does not have crisis-management rules. There are no back-channel communication lines. The Permanent Indus Commission was inactive. There was no forum for dialogue. Both sides resorted to threats.

Eventually, the crisis eased. International pressure helped. The United States and China urged restraint. The World Bank offered mediation. But the damage was done. Trust had been broken. The Treaty was no longer seen as invulnerable.

In a related development, on 27 June 2025, the Court of Arbitration issued a Supplemental Award [14]. It confirmed that India's suspension of Treaty obligations did not affect the Court's competence to continue hearing disputes concerning the Kishenganga and Ratle projects. This clarified the legal position but did not resolve the underlying political tensions.

8.4 Institutional Gaps Revealed

These events highlight institutional gaps. The Permanent Indus Commission is not enough. It is a bilateral body. It cannot handle geopolitical crises. It does not have a climate mandate. It does not have an emergency role.

The Treaty also lacks environmental provisions. There are no rules for ecosystem protection. There are no rules for drought management. There are no rules for flood coordination. These gaps are serious. They need to be addressed.

9. Pathways for Modernisation: Lessons from Comparative Practice

Modernisation does not require renegotiation. That would be too difficult. Politically, neither side wants to open the Treaty. However, they can agree on practical measures. These can be done through protocols or side agreements. There are useful models from other basins.

9.1 The Nile Basin Initiative

The Nile River is shared by eleven countries. It is a complex basin. There is no comprehensive treaty like the Indus. However, the Nile Basin Initiative (NBI) provides a forum. The NBI was established in 1999. It has a shared vision. It aims to promote cooperation.

The NBI has a Climate Change Strategy [19]. This strategy was adopted in 2013. It focuses on building resilience. It encourages joint vulnerability assessments. It promotes knowledge sharing. It aims to climate-proof investment projects. These are practical steps.

The NBI does not replace national sovereignty. It does not allocate water. It simply provides a platform. Countries can work together voluntarily. This has helped build trust. It has also improved technical capacity.

The lesson for the Indus is clear. India and Pakistan could create a parallel platform. This platform would focus on climate adaptation. It would not reopen the Treaty's allocation. It would be purely technical. It would build shared knowledge. This could reduce tensions.

9.2 The Mekong River Commission

The Mekong River is also shared by multiple countries. The Mekong River Commission (MRC) was established in 1995. It includes Cambodia, Laos, Thailand, and Vietnam. China and Myanmar are dialogue partners.

The MRC has a Climate Change Adaptation Initiative (CCAI) [20]. This initiative runs from 2011 to 2015. It developed basin-wide climate indicators. It integrated climate scenarios into planning. It emphasised proactive collaboration. The MRC does not just react to disputes. It anticipates problems.

The MRC also has a data-sharing system. Countries share hydrological data. They also share climate forecasts. This helps everyone prepare for floods. It also helps with drought planning. The system is not perfect. But it is a step forward.

The Indus could adopt a similar approach. The Permanent Indus Commission could be upgraded. It could have a technical advisory unit. This unit would study climate impacts. It would provide early warnings. It would recommend joint actions. This would make the Treaty more responsive.

9.3 Guiding Principles from International Law

The 1997 UN Watercourses Convention provides useful principles [18]. India and Pakistan have not ratified it. But many of its rules are customary. They reflect international practice.

The first principle is equitable and reasonable utilisation. Article 5 of the Convention states this. It requires states to consider climate factors. It asks them to balance present and future needs. In a changing climate, this may mean flexible operations. During droughts, both sides may need to share the burden.

The second principle is the obligation to prevent significant harm. Article 7 states this. It requires states to cooperate. They must manage risks together. This includes flood and drought risks. Both sides should coordinate reservoir operations. This would reduce harm to each other.

The third principle is the duty to cooperate. Article 8 states this. It requires regular data exchange. It also requires consultation on planned measures. This duty becomes more important with climate change. Both sides need to plan together.

9.4 A Framework for Adaptive Reform

Based on these lessons, we propose four reforms. These are practical and achievable. They do not require changing the Treaty's core.

First, enhance the Permanent Indus Commission. Give it a climate adaptation mandate. It should develop a joint adaptation plan. It should establish a technical committee. This committee would include hydrologists and climate scientists. It would meet regularly. It would produce joint reports.

Second, modernise the data regime. Expand data exchange. Add climate model outputs. Add satellite-based snow cover data. Add seasonal forecasts. Make all data available in real time. This would help both sides prepare. It would also build trust.

Third, incorporate environmental flows. Add them to the Treaty's annexures. The flow requirement should be scientifically determined. It should be based on ecosystem needs. It should apply to all new projects. This would protect river health. It would also benefit both sides. Healthy rivers provide better water quality.

Fourth, establish crisis management protocols. Create formal communication lines. These should be used during political tensions. They should maintain minimum data exchange. They should keep the Commission active. They should include pre-agreed consultation procedures. This would prevent suspension crises.

These reforms are modest. They are not revolutionary. But they would make a big difference. They would transform the Treaty. It would become a dynamic framework. It would be ready for the future.

10. Conclusion

The Indus Waters Treaty is a remarkable document. It has kept the peace for over sixty years. It has survived wars and political hostility. It has provided a legal framework for water sharing. This is no small achievement. Both India and Pakistan deserve credit.

However, the Treaty was written for a different world. The world of 1960 was stable. Climate change was not a concern. Hydrological stationarity was assumed. The Treaty's architects did not see a need for flexibility. They thought they had solved the problem.

Today, that world is gone. The Indus Basin is changing rapidly. Glaciers are retreating. Snow is melting earlier. Monsoons are erratic. Floods and droughts are more extreme. These changes challenge the Treaty's assumptions. They also expose its gaps.

The Treaty does not mention climate adaptation. It does not protect ecosystems. It does not manage groundwater. It does not involve upstream neighbours. It has no crisis protocols. These are serious weaknesses. They must be addressed.

But we should not despair. The Treaty is not broken. It is still a strong foundation. We can build on it. Modernisation is possible. It does not require reopening the core bargain. That would be too risky. Instead, we can add protocols. We can strengthen the Permanent Indus Commission. We can improve data sharing. We can add environmental flow rules.

We can also learn from others. The Nile Basin Initiative shows the value of joint strategies. The Mekong River Commission shows the benefits of proactive planning. These examples are relevant to the Indus. They show that cooperation is possible.

The alternative is bleak. If the Treaty remains rigid, disputes will increase. Political tensions will worsen. Water scarcity will become a flashpoint. The 2025 suspension crisis showed how quickly things can collapse. We must not repeat that.

Water is essential for life. It is essential for agriculture. It is essential for industry. It is essential for peace. The Indus Basin sustains over 300 million people. Their future depends on cooperation. India and Pakistan must work together.

Modernising the Treaty is an investment. It is an investment in shared prosperity. It is an investment in regional stability. It is an investment in the future. The time to act is now. We cannot wait for the next crisis.

In conclusion, the Treaty must evolve. It must adapt to climate change. It must adapt to geopolitical realities. It must adapt to scientific understanding. This is not a weakness. It is a strength. Great institutions are those that learn. They change with the times. The Indus Waters Treaty should be one of them.

References

1. Milly P.C.D., Betancourt J., Falkenmark M., Hirsch R.M., Kundzewicz Z.W., Lettenmaier D.P., Stouffer R.J., "Stationarity Is Dead: Whither Water Management?", Science, 2008, 319 (5863), 573-574.
2. Government of India, Ministry of External Affairs, "Weekly Media Briefing by Official Spokesperson Shri Randhir Jaiswal on the Status of the Indus Waters Treaty", New Delhi, 13 May 2025.
3. World Bank, "World Bank Statement on the Indus Waters Treaty", Press Release, 12 December 2016.
4. Biswas A.K., "Indus Water Treaty: The Negotiating Process", Water International, 1992, 17 (4), 201-209.
5. Salman M.A., "The Baglihar Difference and its Resolution Process: A Triumph for the Indus Waters Treaty?", Water Policy, 2008, 10 (4), 359-372.
6. Wolf A.T., Newton J.T., "Case Studies of Transboundary Dispute Resolution", in Delli Priscoli J., Wolf A.T. (Eds.), Managing and Transforming Water Conflicts, Cambridge University Press, Cambridge, 2009, 145-178.
7. Wester P., Mishra A., Mukherji A., Shrestha A.B. (Eds.), The Hindu Kush Himalaya Assessment: Mountains, Climate Change, Sustainability and People, Springer, Cham, 2019.
8. Immerzeel W.W., Lutz A.F., Andrade M., Bahl A., Biemans H., Bolch T., ... Baillie J.E.M., "Importance of Snow and Glacier Meltwater for Agriculture on the Indo-Gangetic Plain", Nature Sustainability, 2020, 3, 594-601.
9. Khan A.J., Koch M., Tahir A.A., "Impacts of Climate Change on the Water Availability, Seasonality and Extremes in the Upper Indus Basin (UIB)", Sustainability, 2020, 12 (4), 1283.
10. Huss M., Hock R., "Global-Scale Hydrological Response to Future Glacier Mass Loss", Nature Climate Change, 2018, 8, 135-140.
11. Nahar A., "Waters of Reconciliation: Modernizing the Indus Waters Treaty for Climate Resilience and Cooperation", New York University Journal of International Law and Politics, 2025, 57.
12. Government of India & Government of Pakistan, Indus Waters Treaty, Signed at Karachi, 19 September 1960.
13. Permanent Court of Arbitration, "Indus Waters Kishenganga Arbitration (Pakistan v. India), Final Award", 20 December 2013.

14. Permanent Court of Arbitration, "Indus Waters Kishenganga Arbitration (Pakistan v. India), Supplemental Award", 27 June 2025.
15. World Bank, "World Bank Declares Pause to Protect Indus Waters Treaty", Press Release No. 2017/128/SAR, Washington D.C., 12 December 2016.
16. World Bank, "World Bank Statement on the Indus Waters Treaty", Press Release, 12 December 2016.
17. World Bank, "World Bank Resumes Processes Under the Indus Waters Treaty", Washington D.C., 6 April 2022.
18. United Nations, "Convention on the Law of the Non-Navigational Uses of International Watercourses", Adopted 21 May 1997, Articles 5, 7, 8.
19. Nile Basin Initiative, "Nile Basin Climate Change Strategy", Entebbe, 2013.
20. Mekong River Commission, "MRC Climate Change Adaptation Initiative: 2011-2015", Vientiane, 2011.