
ENVIRONMENTAL SUSTAINABILITY IN INTERNATIONAL WATER LAWS - ANALYSING INDIA'S RESPONSE TO TRANSBOUNDARY WATER GOVERNANCE

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ABSTRACT

Freshwater resources are one of the most vital natural resources for the maintenance of human habitation, ecological balance, agricultural production, industrial development and economic growth. But the growing population, climate change, industrialisation, pollution and competing developmental needs have greatly increased the pressure on transboundary water resources globally as well. International river governance is an essential part of international environmental law and sustainable development, as almost half the world's population lives in basins of international watercourses shared by two or more sovereign States.

The modern international water law has been slowly developing from a system focused on equitable water resource allocation to one that has come to prioritise environment, ecosystem protection, intergenerational equity and cooperative management. India lies on an important strategic axis in South Asia and shares many international rivers with neighbouring nations such as *Bangladesh, Nepal, Bhutan, Pakistan, China* and *Myanmar*. The *Indus, Ganga, Brahmaputra, Teesta, Mahakali* and *Feni* have not only helped to shape the socio-economic development of the region but have also been the focus of diplomatic talks, environmental concerns and legal wrangling.

The Indian experience is a picture of the interplay of constitutional duty, international law, bilateral treaties, environmental policies, and national security concerns in the field of transboundary water governance. This research critically sheds light on the development of environmental sustainability in international water law and discusses India's legal, institutional and diplomatic approach to transboundary water governance. It analyses the extent of the impacts of international legal principles on India's water diplomacy and the country's water law, such as principles of equitable and reasonable utilisation, the duty to refrain from causing significant harm, sustainable development, the precautionary principle, and the protection of

the environment.

The study also highlights the existing challenges due to climate change, ecological degradation, fragmented institutional arrangements and geopolitical complexities. Lastly, it suggests policy recommendations to strengthen the cooperative management of the river basins, increase environmental sustainability and improve the governance of the water in South Asia.

Keywords: International Water Law, Environmental Sustainability, Transboundary Rivers, India, Water Governance, Sustainable Development, International Environmental Law, River Basin Management.

1. Introduction

Water has long been recognised as a key resource to the development of civilisation, public health, food security, biodiversity conservation, and economic prosperity. Unlike many natural resources, which are contained in national boundaries, freshwater systems often cross-national borders, which means that they present complex legal and institutional issues relating to their use, conservation and equitable management. World estimates indicate that there are *310 international river basins* and *more than 600 transboundary aquifers*, which together represent around *sixty per cent* of the flow of fresh water in the world and directly impact the wellbeing of billions of people in multiple jurisdictions.¹

International water resources law is therefore one of the most dynamic aspects of modern international law. The past legal strategies were primarily concerned with the issue of water rights and just distribution among the riparian States. Yet, the discourse on sustainable use of shared water resources has changed as a result of the growing degradation of the environment, biodiversity loss, climate change and climate variability, glacier retreat and pollution. Environmental sustainability is not just seen as an add-on issue, but is a fundamental principle in the international water governance framework.²

International environmental law has played a major role in this shift, with its role in embedding the ecological dimension in water governance principles and approaches. Doing the right thing by respecting sustainable development, precaution, ecosystem integrity, intergenerational

¹ Salman M.A. Salman & Laurence Boisson de Chazournes, *International Watercourses: Enhancing Cooperation and Managing Conflict* (World Bank, Washington DC, 1998).

² Stephen C. McCaffrey, *The Law of International Watercourses* (3rd edn., Oxford University Press, Oxford, 2019).

equity, public participation, and integrated water resources management, has increasingly formed part of treaty law and case law, as well as customary international law. This means that today international water law strives to reconcile aspirations related to development and security with the protection of the environment, and to protect the legitimate interests of present and future generations from being jeopardized by the use of shared water courses.³

India is a country that poses an interesting case study in this developing legal landscape. India shares over two dozen major transboundary rivers with its neighbouring countries with some of them located downstream and others upstream. The common river resources are used for *farming, drinking water supply, hydroelectric power generation, navigation, fishing, conservation of fisheries resources and protection of cultural heritage*. At the same time, they pose intricate legal and diplomatic challenges concerning the water allocation, flood prevention, environmental flows, dam construction, pollution control, sediment management, and disaster resilience.⁴

Despite the politics of the past, the *Indus Waters Treaty* between *India* and *Pakistan* remains one of the longest-lasting international river treaties. Similarly, cooperative practices on water-sharing arrangements for *Ganga, Teesta, Brahmaputra, Mahakali* and other river systems show varying level of cooperation, institutionalization, and legal uncertainty. Other transboundary relationships are complicated by increasing climate-induced variability in river flows, glacier melting within the Himalayan region, as well as rising domestic water demand.⁵

Thus, environmental sustainability has become a must in transboundary water policy in India. In addition to the traditional engineering-based approaches that prioritize infrastructure development and water allocation, interventions for ecological restoration, environmental impact assessment, biodiversity conservation, disaster risk reduction and climate adaptation are increasingly part of the mix. India's commitments under multilateral environmental agreements, constitutional provisions and directions to protect the environment, judicial interpretation of environmental principles and environmental laws, all play a role in the integration of sustainability in water governance.⁶

³ Patricia Wouters, "International Law—Facilitating Transboundary Water Cooperation" (2013) 27 *Water Policy* 1.

⁴ Ministry of Jal Shakti, Government of India, *Annual Report 2024–25*.

⁵ Surya P. Subedi, *International Watercourses Law and South Asian Cooperation* (Cambridge University Press, Cambridge, 2020).

⁶ Constitution of India, arts. 48A and 51A(g); see also *M.C. Mehta v. Union of India*.

However, there are still huge gaps. Many bilateral treaties include only a few provisions for addressing new environmental issues, such as: *climate change adaptation, ecosystem restoration, groundwater interactions, cumulative environmental impacts, and adaptive river basin management*. The lack of institutional coherence between environmental and water resource authorities, and diplomatic institutions, also has an impact on sustainable water governance.⁷

This study suggests that sustainability of the environment should be the core of the normative approach for transboundary water resources in India. International rivers should be considered as an integrated ecological system that needs a scientific cooperation approach, mutual trust, environmental justice, and shared responsibility, rather than simply as an economic asset or strategic resource. Improving ecological governance in transboundary river management will be important for regional stability but also for the Sustainable Development Goals, specifically *Goal 6 (clean water and sanitation), Goal 13 (climate action), Goal 15 (life on land) and Goal 17 (international partnerships)*.⁸

The present study therefore conducts a doctrinal and analytical analysis of transboundary waters doctrine, examines the Indian perspective in bilateral and multilateral water treaties, and analyses judicial trends, policy gaps and recommendations to enhance environmentally sustainable transboundary water governance.

2. Conceptual Framework on Environmental Sustainability and International Water Law

Environmental sustainability is the use, protection, enhancement and management of natural resources in a way that does not compromise the ecological integrity of the environment whilst meeting the development needs of current and future generations. In the international water law context, the concept of sustainability not only relates to a good allocation of water among States, but also to the protection of aquatic ecosystems, biodiversity, environmental flows, wetlands, interactions between groundwater resources and ecosystems, pollution prevention and resilience to climate induced disturbances.⁹

⁷ Philippe Cullet, *Water Law, Poverty and Development* (Oxford University Press, Oxford, 2009).

⁸ United Nations, *Transforming Our World: The 2030 Agenda for Sustainable Development* (2015).

⁹ Edith Brown Weiss, *In Fairness to Future Generations* (United Nations University, Tokyo, 1989).

The concept is substantially supported by an overall historical trend of the evolution of international environmental law, especially after the 1972 *Stockholm Declaration*, the **1992 Rio Declaration on Environment and Development, Agenda 21**, the Convention on Biological Diversity and the *2030 Agenda* for Sustainable Development. These instruments all acknowledge that freshwater ecosystems are a vital element of environmental security and that they must be managed in a cooperative fashion across national borders.¹⁰

The concept of environmental sustainability has increasingly emerged as one of the key goals of international water law. The legal perspective in the past was mostly seeing the rivers as an economic resource that should be shared between the riparian States based on competing claims on a river's sovereignty or utilisation. The modern principles of international law, however, acknowledge that international rivers are living ecosystems, which directly affects the health of the ecosystems, including biodiversity, food security, public health, climate change and sustainable economic development. Modern transboundary water governance, therefore, strives for a balance between the developmental interest and ecological protection through cooperative legal arrangements and institutional structures.¹¹

Integrated Water Resources Management (IWRM) is closely connected with the idea of sustainability in the field of international water governance. This strategy promotes integrated water, land and natural resource development and management to optimise socio-economic welfare with full consideration of sustainability of key ecosystems. IWRM is not an approach that considers water allocation, environmental protection, agriculture, hydropower, navigation, fisheries and disaster management as separate activities; it is an approach that considers river basin planning as a whole, which involves scientific assessment, participation of stakeholders and adaptive governance.¹²

Another aspect of environmental sustainability is the awareness of ecosystem services that rivers provide. *Aquatic biodiversity, ground-water recharge, climate regulation, sediment transport, wetlands, estuarine ecosystems, and cultural landscapes* are all among the many other services provided by rivers. Water abstraction, dam construction without due

¹⁰ United Nations Conference on Environment and Development, *Rio Declaration on Environment and Development* (1992).

¹¹ Stephen C. McCaffrey, *The Law of International Watercourses* (3rd edn., Oxford University Press, Oxford, 2019).

¹² Global Water Partnership, *Integrated Water Resources Management* (Technical Advisory Committee Background Paper No. 4, Stockholm, 2000).

consideration to the effects, industrial pollution and wetland destruction disrupt these processes and cause long-term environmental consequences that often-cross-national borders. Indeed, modern international water law has increasingly begun to include environmental flows as a key factor in equitable use, rather than a consideration in itself.¹³

Furthermore, climate change has further highlighted the need for the sustainable management of watercourses of international interest. The changing climate has changed water governance globally in a fundamental way through the rise in temperatures, glacier retreat, modification of precipitation cycles, increase in flood and drought frequency, saline intrusion and modification of hydrological cycles. The Himalayan river systems that share water resources with neighbouring countries are very sensitive due to their reliance on glacial melt and monsoon precipitation. Research suggests that climate variability could significantly influence seasonal river flows, agricultural productivity, hydropower production and water security across South Asia by the end of the century.¹⁴

In order to ensure environmental sustainability, States should implement adaptive governance tools that can work with the uncertainty of hydrological conditions. Adaptive governance places emphasis on continual scientific monitoring, flexibility in treaty implementation, periodic review of water allocation arrangements, ecosystem restoration, disaster preparedness, collaboration in sharing information among riparian States. Fixed water allocation treaties, common in the past, are frequently not flexible enough to account for the shifts in climate. More flexible agreements are needed, incorporating environmental factors into transboundary water management.¹⁵

Water quality is another key issue with sustainability. A major focus of international water disputes has been on the allocation of water in terms of quantities. As more and more conflicts arise about the impacts of pollution from industrial waste, raw sewage, farm chemicals, mining operations, plastic debris and other pollutants, the issue is becoming more global in nature. Pollution from one State will often reach communities downstream, which may be located outside of State jurisdiction, thus touching on concepts of international environmental responsibility and State responsibility. Pollution prevention measures, therefore, must be

¹³ Patricia Wouters, *International Water Law* (Edward Elgar Publishing, Cheltenham, 2013).

¹⁴ Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2023: Synthesis Report* (Geneva, 2023).

¹⁵ Gabriel Eckstein, *Water Scarcity, Conflict, and Security in a Climate Change World* (Edward Elgar Publishing, Cheltenham, 2021).

comprehensive, with effective monitoring, environmental impact assessment, and cooperative enforcement mechanisms, for sustainable water governance.¹⁶

The concept of ecological justice is also related to environmental sustainability. Water governance needs to protect vulnerable communities, indigenous people, farmers, fisher people and future generations from unsustainable exploitation of shared water resources. The call for environmental protection and promotion of human rights is more and more gaining ground in the contemporary international legal discourse. Citizens' right to access clean water, healthy environments, sanitation, food security, and environmental health, are amongst the rights that come together to fulfil the realisation of basic human rights under international law.¹⁷

International judicial bodies have played a crucial role in enhancing the environmental aspect of international water law. The *International Court of Justice (ICJ)* and arbitral tribunals and regional courts have repeatedly focused on the need to strike a balance between sovereign rights and environmental responsibilities. These principles of cooperation, environmental due diligence, prior notification, scientific consultation and prevention of transboundary environmental harm have been progressively strengthened judicial interpretation. These developments illustrate that sustainability in the environment is not only a policy issue but also a new and emerging law, applicable to shared natural resources.¹⁸

The importance of sustainable water governance has also been repeatedly acknowledged by the United Nations in relation to the other development goals. The *Sustainable Development Goal 6* aims to ensure the availability and sustainable management of water and sanitation for all, and Target 6.5 promotes the implementation of water resources management, including through transboundary cooperation, where appropriate. The need for climate action, ecosystem conservation, biodiversity protection and international cooperation in shared freshwater resources is reinforced by complementary objectives in *Goals 13, 14, 15 and 17*.¹⁹

Environmental sustainability has a special constitutional and policy relevance for India. Both the government and citizens have duties to protect the environment as per the constitution.

¹⁶ Philippe Sands, Jacqueline Peel, Adriana Fabra and Ruth Mackenzie, *Principles of International Environmental Law* (4th edn., Cambridge University Press, Cambridge, 2018).

¹⁷ United Nations General Assembly Resolution 64/292, *The Human Right to Water and Sanitation* (28 July 2010).

¹⁸ Gabčíkovo–Nagymaros Project, Judgment, ICJ Reports 1997, p. 7.

¹⁹ United Nations, *Transforming Our World: The 2030 Agenda for Sustainable Development* (2015).

Article 48A says that it's the duty of the State to protect and improve the environment and *Article 51A(g)* states that it's the fundamental duty of every citizen to protect the environment including trees, forests, lakes, rivers, wildlife, etc. While these constitutional elements primarily work within the Indian administrative framework, they serve as a guiding moral framework for Indian relations with international environmental obligations for transboundary water resources.²⁰

In all its judgments, the Supreme Court of India has interpreted environmental protection as “life” in the sense of *Article 21*. Environmental jurisprudence has gained greater momentum and has indirectly affected policy approaches to river conservation and water governance since the recognition of sustainable development, precautionary principle, public trust doctrine, polluter pays principle, and intergenerational equity. These judicial principles are mostly relevant to the internal governance of nature in India, but they have some persuasive force in guiding the country to a more environmentally responsible governance of shared river systems.²¹

Therefore, environmental sustainability is a multi-dimensional phenomenon that includes ecological conservation, fair use of resources, climate resistance, pollution reduction, inter-institutional collaboration, scientific management, and social justice. These are interrelated and form the normative basis on which modern international water law has developed. A knowledge of this conceptual approach is crucial before analysing the historical evolution of the principles of law relating to international watercourses.

3. Development of International Water Law

International water law has changed over the years and has developed over time from a mindset of sovereign authority on land to a more cooperative approach to managing shared natural resources. Navigability on international rivers was a major aspect of international law in the nineteenth century, especially in Europe, where commercial affairs took precedence in diplomatic discussions. The environment was not given the attention it deserves, rather it was looked upon as being a connection for transportation and asset for economy.²²

²⁰ Constitution of India, arts. 48A and 51A(g).

²¹ *Vellore Citizens' Welfare Forum v. Union of India* (1996) 5 SCC 647; *M.C. Mehta v. Kamal Nath* (1997) 1 SCC 388.

²² Ludwik A. Teclaff, *The River Basin in History and Law* (Martinus Nijhoff Publishers, The Hague, 1967).

One of the first was the *Congress of Vienna in 1815*, which set out a principle in relation to the freedom of navigation on certain international rivers. It was a step forward in that it didn't cover as much ground, but it also noted that rivers that straddle several States would need coordinated regulation by multiple States.²³

International legal developments subsequently increasingly discussed non-navigational uses of shared watercourses as well. Disputes arose over irrigation, flood control, and allocation of water resources as the result of competing demands for water resources created by industrialisation, agricultural expansion, and hydroelectric development. A number of theories were developed by legal scholars, such as the absolute territorial sovereignty theory (linked to the *Harmon Doctrine*), the absolute territorial integrity theory, and the limited territorial sovereignty theory. This doctrine of limited territorial sovereignty evolved over time to be more in favour of the sovereign rights and obligations of co-riparian States.²⁴

In the twentieth century, there emerged a number of important codification projects, including the influential soft law instruments, the *Helsinki Rules on the Uses of the Waters of International Rivers (1966)*. These Rules were a milestone in the development of the principle of equitable and reasonable utilisation and acknowledgment of the need to balance multiple and competing factors impacting on shared river systems. The Helsinki Rules had a profound impact on future treaty negotiations, judicial decisions, and customary international law, despite their non-binding nature.²⁵

The historical development was continued with the growing introduction of environmental principles after the advent of modern international environmental law in the wake of the *Stockholm Conference of 1972*. From then on, sustainability, ecological protection, pollution prevention, environmental impact assessment and ecosystem conservation became essential elements of international water governance, and in turn led to the development of comprehensive legal instruments, including the *1997 United Nations Watercourses Convention* and the *2004 Berlin Rules*, that will be discussed in the following section.

²³ Final Act of the Congress of Vienna, 1815.

²⁴ Salman M.A. Salman, "The Helsinki Rules, the UN Watercourses Convention and the Berlin Rules: Perspectives on International Water Law" (2007) 23 *Water Resources Development* 625.

²⁵ International Law Association, *Helsinki Rules on the Uses of the Waters of International Rivers* (1966).

4. The four principles of international law related to water.

The current international legal system for water law is based on a set of interrelated principles of law governing the use, conservation and management of transboundary watercourses. The principles have been developed in customary international law, multilateral treaties, judicial decisions, resolutions of international organisations and State practice. The two work to balance the sovereign rights of States in natural resources with the responsibility to cooperate, prevent environmental degradation and ensure the sustainable use of shared freshwater ecosystems. The principles are of special importance for India, as it is an upper and lower riparian State in several major river basins.

4.1 Equitable and Reasonable Utilisation Principle

Equitable and reasonable utilisation is considered the bedrock of the modern water international law. It acknowledges that all riparian States have a legal right to use an international watercourse, but this use must be equitable, reasonable and compliant with the rights and interests of co-riparian States. Equitable utilisation is not about equality in numbers, but about a fair balance of the factors that are relevant in the geographical, hydrological, ecological, economic, social and demographic aspects.²⁶

Given the specific wording of *Article 5* of the *1997 United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses*, it is clear that watercourse States are required to apply an international watercourse in an equitable and reasonable way to achieve “optimal and sustainable utilisation” while respecting the interests of all watercourse States.²⁷ The Convention also mentions a range of relevant factors under *Article 6* such as: the natural characteristics of the watercourse; dependence on the watercourse by population; existing and potential uses; climate; conservation needs; and availability of alternative resources.

The equitable utilisation principle indicates a change from past rules like the *Harmon doctrine* where a State up stream would be allowed to use waters with complete freedom, irrespective of downstream effects. International experience has clearly shown that such an absolutist

²⁶ Stephen C. McCaffrey, *The Law of International Watercourses* (3rd edn., Oxford University Press, Oxford, 2019).

²⁷ United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses, 1997, arts. 5–6, available at: https://legal.un.org/ilc/texts/instruments/english/conventions/8_3_1997.pdf (last visited Aug. 2, 2026).

approach has been rejected overwhelmingly in favour of the cooperative and mutually beneficial management approach.²⁸

Equitable utilisation has largely been accepted as a principle in India's bilateral water treaties. *The Indus Waters Treaty (IWT)* between India and Pakistan has allocated the western rivers (Indus, Jhelum and Chenab) mainly to Pakistan and the eastern rivers (*Ravi, Beas and Sutlej*) mainly to India, with India being allowed certain uses of the western rivers. The Treaty is not a contemporary document with the 1997 Convention, but its terms show negotiation of an allocation based on an equitable consideration, rather than the assertion of exclusive sovereignty.²⁹

Likewise, negotiated and comprehensive principles for the sharing of river flows between India and Bangladesh are expressed in the *Ganga Water Sharing Treaty of 1996*. While implementation has faced hurdles at times of low water, the Treaty reflects India's willingness to pursue flexible water management schemes based on equity.³⁰

Environmental sustainability is also a part of equitable utilisation today. International legal scholarship is increasingly accepting the notion that without considering the issues of ecological integrity, environmental flows, biodiversity conservation and long-term sustainability, equitable use is not possible when evaluating reasonable use.³¹

4.2 A duty to avoid causing serious harm.

The responsibility of States to prevent significant transboundary harm from activities in their jurisdiction is closely linked to equitable utilisation. According to this principle, each riparian State should exercise 'due diligence' to ensure that its use of shared water resources will not result in a significant adverse environmental, economic or social impact on another riparian State.

²⁸ Salman M.A. Salman, "The Helsinki Rules, the UN Watercourses Convention and the Berlin Rules: Perspectives on International Water Law" (2007) 23 *Water Resources Development* 625, available at: <https://www.tandfonline.com/doi/full/10.1080/07900620701488562> (last visited Aug. 2, 2026).

²⁹ Indus Waters Treaty, 1960, Government of India, Ministry of External Affairs, available at: <https://mea.gov.in/bilateral-documents.htm?dtl/6439/Indus> (last visited Aug. 2, 2026).

³⁰ Treaty between the Government of the Republic of India and the Government of the People's Republic of Bangladesh on Sharing of the Ganga/Ganges Waters at Farakka, 1996, Ministry of External Affairs, Government of India, available at: <https://mea.gov.in/bilateral-documents.htm> (last visited Aug. 2, 2026).

³¹ Patricia Wouters, *International Water Law* (Edward Elgar Publishing, Cheltenham, 2013).

The *1997 United Nations Watercourses Convention (Watercourses Convention)* requires States to take all measures necessary to avoid causing significant harm to other watercourse States, and, if such harm is caused, consult with the other State with regard to measures for its mitigation and compensation where appropriate.³²

The duty is not to prevent at all, but to take reasonable precautions. States are to take appropriate legislative, administrative, scientific and technical measures which reasonably reduce potential environmental risks. Levels of due diligence will depend on the technological capability, scientific understanding and nature of the proposed activity.³³

In the *Gabcikovo–Nagymaros Project Case (Hungary v. Slovakia)*, the International Court of Justice affirmed this principle by acknowledging that the protection of the environment is one of the fundamental factors to take into account in the development and implementation of any project that affects international watercourses. The Court pointed out that the economic development must be balanced with environmental protection in accordance with the concept of sustainable development.³⁴

The implementation of preventive environmental obligations in India is illustrated with traditional legislation such as the *Environment (Protection) Act, 1986*, the *Water (Prevention and Control of Pollution) Act, 1974* and the Environmental Impact Assessment Notification. The statutes are mainly aimed at activities within India but also have indirect implications in terms of helping ensure compliance with international commitments as they diminish the chances of trans-boundary environmental harm.³⁵

Still, non-exclusive conflicts over dams, sediment control, pollution and more show that the issue of "significant harm" is a legally and scientifically complicated one. The risk assessment relies on facts, a growing body of environmental data, and science and is not based on specific legal formulas.

³² United Nations Watercourses Convention, 1997, art. 7, available at: https://legal.un.org/ilc/texts/instruments/english/conventions/8_3_1997.pdf (last visited Aug. 2, 2026).

³³ Philippe Sands, Jacqueline Peel, Adriana Fabra & Ruth Mackenzie, *Principles of International Environmental Law* (4th edn., Cambridge University Press, Cambridge, 2018).

³⁴ *Gabčíkovo–Nagymaros Project (Hungary/Slovakia)*, Judgment, ICJ Reports 1997, available at: <https://www.icj-cij.org/case/92> (last visited Aug. 2, 2026).

³⁵ Environment (Protection) Act, 1986; Water (Prevention and Control of Pollution) Act, 1974; Ministry of Environment, Forest and Climate Change, available at: <https://moef.gov.in> (last visited Aug. 2, 2026).

4.3 Prior Notification Principle, Consultation and Exchange of Information (Prior NECI)

The modern water governance regime is based on cooperation, not decision making alone. International law, therefore, obliges States considering development projects which could have a significant impact on shared watercourses to give notice to potentially affected riparian States, and to make available adequate technical information to enable meaningful consultation.

The *1997 United Nations Watercourses Convention* provides for detailed rules on notification of planned measures in its *articles 11-19*. These stipulations promote transparency, scientific collaboration and the avoidance of irreversible environmental damage through an amicable conflict.³⁶

The forewarning is of special importance for infrastructure projects such as dams, hydropower stations, diversion canals, inter-basin transfers, flood control structures or significant irrigation systems. Reliable exchange of hydrological data allows neighbouring States to assess the possible effects on water availability, the risk of flooding, sediment transport, aquatic ecosystems, shipping and biodiversity.

India has integrated data sharing provisions in a number of bilateral agreements. Under the Indus Waters Treaty, the Permanent Indus Commission allows for the exchange of hydrological data on a regular basis, yearly meetings, technical inspections and notice of engineering works. Similarly, during the monsoon season, India shares information about flood with Bangladesh and Nepal in order to improve the preparedness for disaster.³⁷

But more transparency, broader real-time hydrological monitoring, simultaneous scientific evaluations, and more cooperation in institutions between South Asian riparian States are still recommended by experts. Climate induced variability and a rise in extreme weather events further emphasize the importance of reliable information exchange as an integral part of water governance that is sustainable in the face of climate change.³⁸

³⁶ United Nations Watercourses Convention, 1997, arts. 11–19, available at: https://legal.un.org/ilc/texts/instruments/english/conventions/8_3_1997.pdf (last visited Aug. 2, 2026).

³⁷ Permanent Indus Commission, Ministry of Jal Shakti, Government of India, available at: <https://jalshakti-dowr.gov.in> (last visited Aug. 2, 2026).

³⁸ United Nations Economic Commission for Europe (UNECE), *Guide to Implementing the Water Convention*, available at: <https://unece.org/environment-policy/water> (last visited Aug. 2, 2026).

4.4 Principle of Cooperation

It has developed over time as one of the basic rules of international watercourses, to cooperate. Rivers are a unit of ecosystem and not a state boundary, and the management of rivers must be a continuous process, which requires communication, institutional coordination, scientific collaboration and mutual confidence among States of the river.

International cooperation goes beyond treaty negotiations and includes collaborative river commissions, joint monitoring of the environment, sharing scientific knowledge, emergency response systems, pollution control programmes, restoration of ecosystems, and joint adaptation strategies to climate change.³⁹

The *International Court of Justice* has offered time and time again the recognition that cooperation is an integral part of international environmental governance. Cooperative management helps to balance the development aspirations with ecological sustainability goals, and lowers the probability of political disagreement regarding limited water resources.

Cooperative engagement is especially significant in India in the context of the ***Ganga-Brahmaputra-Meghna basin***, where several sovereign States have linkages of their respective hydrological systems. Improving basin level institutions and scientific collaborations would go a long way towards ensuring long-term environmental sustainability across the region.⁴⁰

5. International Legal Framework governing Transboundary Watercourses

Transboundary water resources have developed their legal regime through a mix of multilateral treaties, non-binding legal instruments, customary international law, judicial decisions and institutional practice. Together, these provide a framework of normative principles for equitable use, environmental protection, prevention of conflict and collaborative management of shared watercourses. Not all of them are universally binding, but they have had a strong impact on State practice and the further evolution of international water law. These changing international norms have also influenced, either directly or indirectly, the approach that India

³⁹ Convention on the Protection and Use of Transboundary Watercourses and International Lakes (UNECE Water Convention), available at: <https://unece.org/environment-policy/water> (last visited Aug. 2, 2026).

⁴⁰ United Nations Educational, Scientific and Cultural Organization (UNESCO), *Transboundary Water Cooperation*, available at: <https://www.unesco.org/en/ihp/transboundary-water-cooperation> (last visited Aug. 2, 2026).

has adopted towards transboundary water governance.

5.1 Rules of Helsinki on the Use of the Waters of International Rivers, 1966

The *Helsinki Rules*, adopted in 1966 by the *International Law Association (ILA)*, were the first comprehensive set of rules to codify the principles of the non-navigational uses of international rivers. The Rules are not treaties per se, but they have had a significant impact on subsequent treaty negotiations, judicial rulings, and academic discussion.⁴¹

The key principle of the *Helsinki Rules* is the expression of the concept of equitable and reasonable utilisation. Article IV provides that each basin State has a right to a "*reasonable and equitable*" share of the beneficial uses of the waters of an international drainage basin. The Rules do not prescribe fixed definitions of allocation, but rather highlight a number of factors that should be taken into account when deciding how to use water in an equitable way, such as location, hydrology, climate, reliance, economic requirements, current use and alternative water resources.⁴²

The Helsinki Rules also promote negotiation, information and dispute settlement between the riparian States. While not as fully-developed as in subsequent instruments, the Rules made it clear that water resources conservation and rational use should be taken into account in river basin management. They have played a very influential role in the preparation of the *United Nations Watercourses Convention 1997*, which is a flexible and balanced Convention.

From India's perspective, the Helsinki Rules have persuasive authority for the interpretation of bilateral water-sharing agreements and help in the overall understanding of the customary principles governing shared watercourses. India is not a party to these Rules but a number of its principles are incorporated in the diplomatic practice and treaty negotiations with its neighbouring States.⁴³

⁴¹ International Law Association, *The Helsinki Rules on the Uses of the Waters of International Rivers* (1966), available at: https://www.internationalwaterlaw.org/documents/intldocs/helsinki_rules.html (last visited Aug. 2, 2026).

⁴² Ibid., arts. IV–V.

⁴³ Salman M.A. Salman, "The Helsinki Rules, the UN Watercourses Convention and the Berlin Rules: Perspectives on International Water Law" (2007) 23 *Water Resources Development* 625, available at: <https://doi.org/10.1080/07900620701488562> (last visited Aug. 2, 2026).

5.2 Non-Navigational uses of International Watercourses Convention (UN Convention) 1997

The adoption of the *United Nations Watercourses Convention (UNWC)* by the *United Nations General Assembly in 1997* was a milestone in the process of codifying international water law. The Convention came into force on 17 August 2014 and is the key international instrument for the utilisation, management and protection of international watercourses for uses other than navigation.⁴⁴

The Convention rests on a number of underlying legal principles. These include equitable and reasonable utilisation, the prohibition on causing significant harm, mutual watercourse States cooperation, sharing of data and information on a regular basis, prior notification of planned measures, environmental protection, and peaceful settlement of disputes. These provisions are meant to reconcile developmental interests and ecological sustainability in a concerted effort.

The principle of 'equitable and reasonable utilisation' applies to water allocation in Article 5, and the principle of 'due diligence' applies to the prevention of significant transboundary harm in Article 7. The articles (8 and 9) highlight the importance of cooperation and regular exchange of hydrological information. Articles 11–19 set out the detail of the procedures that would apply to this situation if measures are planned to have a negative effect on other riparian States. It is important to note that Article 20 makes a specific obligation to protect and preserve the ecosystems of international watercourses, thus explicitly including environmental sustainability in international water law.⁴⁵

The Convention itself has not been ratified by India but the Convention's provisions are generally considered to accord, to a significant degree, with the customary international law. Institutional cooperation, negotiated allocation, and information sharing are just some of the basic principles of the Convention that are clearly reflected in Indian treaty practice. However, India's inclination has been on bilateral instead of multilateral channels for solving transboundary water problems.⁴⁶

⁴⁴ United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses, 1997, available at: https://legal.un.org/ilc/texts/instruments/english/conventions/8_3_1997.pdf (last visited Aug. 2, 2026).

⁴⁵ Ibid., arts. 5, 7, 8, 9, 11–20.

⁴⁶ Stephen C. McCaffrey, *The Law of International Watercourses* (3rd edn., Oxford University Press, Oxford, 2019).

It has been noted that India's measured attitude is driven by geopolitical factors, fears of sovereignty issues and the distinct hydrology of South Asian river basins. Yet, the Convention remains a valuable interpretive guide to the international obligations and diplomacy of India, even in the absence of ratification.

5.3 Convention on the Protection and Use of Transboundary Watercourses and International Lakes (UNECE Water Convention), 1992

The Water Convention was originally drafted under the auspices of the *United Nations Economic Commission for Europe (UNECE)*, and after the Convention was amended and extended to allow for accession by States outside the UNECE region it has become a worldwide piece of legislation.⁴⁷

The Convention has a very environmental focused approach, calling for the prevention, control and reduction of transboundary pollution impacts from water pollution, hazardous activities and from unsustainable water utilisation. The Convention is different from the previous legal instruments, where water resources were considered the main issue, by highlighting the principle of ecosystem protection, integrated river basin management, joint monitoring programmes, environmental impact assessment and institutional cooperation.

The Convention has a significant focus on joint bodies. Riparian States are encouraged to develop permanent institutional arrangements for gathering scientific data, coordinating monitoring efforts, sharing information and implementing environmental protection measures. These institutional arrangements enable consistent dialogue and minimise disputes through evidence-based decision making.

India is not a Party to the UNECE Water Convention, but the institutional framework provides useful lessons to improve governance of transboundary rivers in South Asia. There is potential to significantly enhance environmental sustainability in shared river basins like Ganga, Brahmaputra and Indus through basin-wide scientific cooperation and permanent river commissions.⁴⁸

⁴⁷ United Nations Economic Commission for Europe, *Convention on the Protection and Use of Transboundary Watercourses and International Lakes*, available at: <https://unece.org/environment-policy/water> (last visited Aug. 2, 2026).

⁴⁸ UNECE, *Guide to Implementing the Water Convention*, available at: <https://unece.org/environment-policy/water/publications> (last visited Aug. 2, 2026).

5.4 The Berlin Rules on Water Resources were adopted in 2004.

Recognising developments in international environmental law since 1966, the *International Law Association* adopted the *Berlin Rules* on Water Resources in 2004. These Rules significantly went beyond previous codification initiatives, incorporating elements of environmental protection, human rights, public participation and sustainable development into water governance.⁴⁹

The Berlin Rules are applicable to national and international water resources, whereas the Helsinki Rules were mostly applicable to international rivers. They are aware that water governance ought not only to manage the distribution of water among States but also to protect the ecological, public health, biodiversity and rights of affected communities.

Many of the principles of the Berlin Rules are of modern origin, such as sustainable development, the precautionary principle, environmental impact assessment, polluter pays, public participation, access to environmental information and ecosystem conservation. They also appreciate that the right to safe water is a human right that must be legally protected.

The Berlin Rules are not legally binding but do constitute one of the most detailed declarations of contemporary rules concerning sustainable water management. Increasingly, their impact can be seen in the academic literature, climate change policies, and comparative analysis with legal frameworks.

5.5 The Rio Declaration on Environment and Development, 1992

The *Rio Declaration* was an important shift in international environmental governance and has established 27 principles which are still relevant in international water law. Some of these principles are directly applicable to transboundary water governance.

- **Principle 2**, it is stated that States have sovereignty over nature but also responsibility to prevent that their activities within their own borders do not result in environmental damage to other States. The principle further underlines the responsibility to take

⁴⁹ International Law Association, *Berlin Rules on Water Resources* (2004), available at: https://www.internationalwaterlaw.org/documents/intldocs/ILA_Berlin_Rules-2004.pdf (last visited Aug. 2, 2026).

measures to prevent transboundary environmental damage.

- **Principle 15** To implement the Precautionary Principle, Principle 15 states that preventive action should be taken even when the scientific evidence on environmental damage is not complete.
- **Principle 16** Polluter Pays Principle is highlighted in Principle 16, which states that those who pollute should pay for the environmental impact.
- **Principles 17** calls for environmental impact assessment of activities which are likely to have significant adverse environmental effects.

All of these principles have had an important impact on judicial interpretation, negotiation of treaties, and national environmental law, such as India's environmental jurisprudence.⁵⁰

5.6 Sustainable Development Goals and The Governance of Transboundary Water.

The *United Nations General Assembly's* adoption of the *2030 Agenda* for Sustainable Development underscored the pivotal role of cooperative water governance in the achievement of Sustainable Development.

One of the aims of **Sustainable Development Goal 6** is to "ensure availability and sustainable management of water and sanitation for all. Target 6.5 urges States to implement water resources management at all levels, including in a transboundary manner as appropriate. One way this target is assessed is the degree to which the water resources are under an operational arrangement."⁵¹

The other *Sustainable Development Goals*, such as *Goal 13 (Climate Action)*, *Goal 14 (Life Below Water)*, *Goal 15 (Life on Land)*, and *Goal 17 (Partnerships for the Goals)*, all emphasize the importance of environmental sustainability, ecosystem conservation, climate resilience, and international cooperation.

⁵⁰ United Nations, *Rio Declaration on Environment and Development* (1992), available at: https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_CONF.151_26_Vol.I_Declaration.pdf (last visited Aug. 2, 2026).

⁵¹ United Nations, *Sustainable Development Goal 6*, available at: <https://sdgs.un.org/goals/goal6> (last visited Aug. 2, 2026).

The SDGs are a valuable policy guidance for India, which promotes regional cooperation in South Asia, pollution control, ecological restoration and integrated river basin management.

5.7 International Judicial Decisions and their Contribution

International courts and tribunals have been very influential in helping to define the scope of international water law.

In the *Gabcikovo–Nagymaros Project Case 1997*, the International Court of Justice has already defined sustainable development as a principle that must be balanced between the aspects of economic development and protection of the environment. The Court emphasised that new environmental norms must be considered when implementing treaties relating to shared water resources.⁵²

Another example of the importance of EIA in international law is the Pulp Mills on the *River Uruguay Case (Argentina v. Uruguay)*, where the Court acknowledged the importance of EIA when an activity is likely to have significant transboundary environmental effects.⁵³

These judicial decisions have reinforced the legal basis for the environmental sustainability of international watercourses, and remain relevant to the interpretation of treaties and State practice.

6. India's constitutional, statutory and institutional mechanisms on environmental sustainability and transboundary water management.

The governance of transboundary water in India is influenced by a complex mix of constitutional provisions, statutory texts, judicial rulings, environmental policies, institutional mechanisms and bilateral treaties. Contrary to a number of nations that have adopted a national water law that covers the whole of water management, India has a piecemeal water law, with legislative authority split between the Union and the States according to the Constitution. However, there is a normative foundation for sustainable management of transboundary water resources in the form of constitutional requirements, judicial principles and sector legislation.

⁵² *Gabčíkovo–Nagymaros Project (Hungary/Slovakia)*, Judgment, ICJ Reports 1997, available at: <https://www.icj-cij.org/case/92> (last visited Aug. 2, 2026).

⁵³ *Pulp Mills on the River Uruguay (Argentina v. Uruguay)*, Judgment, ICJ Reports 2010, available at: <https://www.icj-cij.org/case/135> (last visited Aug. 2, 2026).

6.1 Constitutional Framework

While the Constitution of India does not explicitly mention a fundamental right to water, it provides a detailed framework that promotes environmental protection and sustainable management of water resources.

6.1.1 Right to Life (Article 21)

In all decisions, the Supreme Court of India, has read the right to personal liberty and right to life under Article 21 to include the right to a clean and healthy environment, to safe drinking water, to ecological security, etc. Judicial interpretation has given article 21 beyond mere physical survival the right to live in a pollution free environment with dignity.⁵⁴

Supreme Court in *Subhash Kumar v. State of Bihar* had concluded that the right to pollution-free water is a constituent part of the guarantee of right to life under Article 21 of the Constitution.⁵⁵ The interpretation has a strong impact on improving environmental governance since it imposes constitutional responsibilities on public bodies to prevent water pollution and safeguard freshwater ecosystems.

These judicial statements, while relating to the protection of the domestic environment, have a greater significance in the context of India's international commitments relating to the protection of transboundary rivers. Environmental degradation taking place on Indian territory that has an impact on neighbouring States can also jeopardize the constitutional commitment to sustainable development and environmental protection.

6.1.2 Directive Principles of State Policy

The environment obligations are also included in the Constitution in the form of the Directive Principles of State Policy.

The *Forty-second Constitutional Amendment* added *Article 48A*, in 1976, which mandates the State to protect and improve the environment and to safeguard forests and wildlife. Article 48A has not been justiciable but has been liberally invoked by courts when they have been

⁵⁴ Constitution of India, art. 21, available at: <https://legislative.gov.in/constitution-of-india/> (last visited Aug. 2, 2026).

⁵⁵ *Subhash Kumar v. State of Bihar*, (1991) 1 SCC 598, available at: <https://indiankanoon.org/doc/1693234/> (last visited Aug. 2, 2026).

interpreting the environmental laws and the constitutional rights.⁵⁶

The constitutional goal of environmental sustainability is consistent with the goal of transboundary river governance as this protection of river ecosystems must be undertaken in a coordinated way across political jurisdictions.

6.1.3 Fundamental Duties

The Forty-second Amendment also added the **Article 51A(g)** which is a fundamental duty of all citizens to protect and improve the natural environment, including forests, lakes, rivers and wildlife.

This is an attempt to implement the constitution in providing for the conservation of the environment, which is a shared responsibility of government and the public. Consequently, river conservation, prevention of pollution, watershed management and sustainable use of freshwater resources are all constitutional duties shared by all.⁵⁷

6.1.4 Distribution of Legislative Powers

According to the Seventh schedule of the Constitution, the powers related to water are divided between the Union and the States.

The State List gives water, irrigation, canals, drainage, embankments, water storage and water power powers to the State Legislatures in entry 17.

But Parliament is given the power to control and develop inter-State rivers and river valleys in which the parliament deems such action to be in the public interest through *Entry 56* of the Union List.

This is a federal system with the need for coordination between central and state governments. International rivers often flow through several Indian States before entering international boundaries and thus a key aspect of transboundary governance requires cooperative federalism. Sometimes, differences between the States make India's diplomacy with neighbouring

⁵⁶ Constitution of India, art. 48A, available at: <https://legislative.gov.in/constitution-of-india/> (last visited Aug. 2, 2026).

⁵⁷ Constitution of India, art. 51A(g), available at: <https://legislative.gov.in/constitution-of-india/> (last visited Aug. 2, 2026).

countries difficult, especially in the context of domestic political considerations and implementation of international treaties.⁵⁸

6.2 Statutory Framework

India has a number of environmental laws which all contribute indirectly to environmentally sustainable transboundary water governance.

6.2.1 Water (Prevention and Control of Pollution) Act, 1974

India's main legislation relating to water pollution is *The Water (Prevention and Control of Pollution) Act, 1974*. It formed *Central Pollution Control Board (CPCB)* and *State Pollution Control Board* to monitor water quality, give consent for discharge by industries, enforce standards for preventing pollution, and to encourage pollution prevention.

The Act was originally passed to control domestic water pollution, but is indirectly useful for India in implementing its international commitments as it can minimize pollution which may cause problems for downstream neighbouring countries which share the river. Good implementation is thus a factor in minimising transboundary environmental damage in accordance with international law principles.⁵⁹

6.2.2 Environment (Protection) Act, 1986

Parliament passed the *Environment (Protection) Act, 1986* to mark the *Bhopal Gas Disaster* which gave wide powers to the Central Government to protect and improve the environmental quality.

The Act empowers the Central Government to set environmental standards, control hazardous activities, provide directions for protection of environment and to coordinate actions by governmental agencies.

The Act contains a number of notifications, which are crucial in assessing infrastructure projects, like dams, hydropower stations, river interlinking schemes and irrigation projects, that could impact transboundary river systems. Environmental assessment helps to identify

⁵⁸ M.P. Jain, *Indian Constitutional Law* (9th edn., LexisNexis, Gurugram, 2023).

⁵⁹ Water (Prevention and Control of Pollution) Act, 1974, available at: <https://cpcb.nic.in/water-pollution/> (last visited Aug. 2, 2026).

ecological risks before a project is implemented and helps to make decisions.⁶⁰

6.2.3 Biological Diversity Act, 2002

Good river health allows for a rich array of biodiversity. The *Biological Diversity Act, 2002* aims at conservation of biological diversity, sustainable use of biological diversity and equitable sharing of benefits derived from the utilisation of biological diversity.

Aquatically important species, migratory fish, wetlands, and ecologically sensitive habitats are found in the transboundary rivers like Ganga and Brahmaputra in both countries. Conservation of biodiversity in water governance is thus an integral part of water governance towards environmental sustainability.

The Act enhances the capability of India to incorporate ecosystem protection in the management of river basins, and to meet its responsibilities under the Convention on Biological Diversity.⁶¹

6.2.4 National Green Tribunal Act, 2010

The introduction of *NGTs (National Green Tribunal)* lent a great boost to environmental adjudication in India.

The Tribunal will have specific jurisdiction over environmental disputes in the context of the implementation of the major environmental laws. It has rendered many decisions on river pollution, industrial discharge, ecological restoration, ground water protection and conservation of wetlands.

While the Tribunal has no mandate to directly resolve international water disputes, it has helped in creating an atmosphere of enhanced environmental governance in India, which would have indirect beneficial impacts on the sustainable management of transboundary rivers.⁶²

⁶⁰ Environment (Protection) Act, 1986 and Environmental Impact Assessment Notification, Ministry of Environment, Forest and Climate Change, available at: <https://moef.gov.in/en/division/environment-impact-assessment/> (last visited Aug. 2, 2026).

⁶¹ Biological Diversity Act, 2002, National Biodiversity Authority, available at: <https://nbaindia.org/> (last visited Aug. 2, 2026).

⁶² National Green Tribunal Act, 2010, National Green Tribunal, available at: <https://greentribunal.gov.in/> (last visited Aug. 2, 2026).

6.3 Institutional Framework

However, efficient institutions, which form policy, assess the environment, implement policy, and work with international institutions are as crucial as legislation in ensuring effective environmental governance.

6.3.1 Ministry of Jal Shakti

The *Ministry of Jal Shakti*, formed in 2019 by the merging of the Ministry of Water Resources and River Development, Ganga Rejuvenation with Ministry of Drinking Water and Sanitation, is the main body of government for water policy in India.

It has various duties such as transboundary water negotiations, river basin planning, groundwater management, flood management, hydrological data collection, implementation of international treaties and coordination with neighbouring countries.

The Ministry also supervises various organisations like Central Water Commission, Central Ground Water Board, National Water Development Agency and National Mission for Clean Ganga.⁶³

6.3.2 Central Water Commission

Central Water Commission (CWC) is the top technical body in water resources in India. It conducts hydrological investigations, flood forecasting, dam safety, river basin planning, conducts environmental studies, provides technical assistance during international negotiations on shared rivers.

The Commission shares hydrological information with neighbouring countries regularly through different bilateral agreements, promoting cooperation in water governance.⁶⁴

6.3.3 National Mission for Clean Ganga

Considering the importance of ecology of Ganga, the Government of India has created *National Mission for Clean Ganga (NMCG)* as an implementing body under *Namami Gange*

⁶³ Ministry of Jal Shakti, Government of India, available at: <https://jalshakti-dowr.gov.in/> (last visited Aug. 2, 2026).

⁶⁴ Central Water Commission, Government of India, available at: <https://cwc.gov.in/> (last visited Aug. 2, 2026).

Programme.

The Mission's strategy is an integrated river basin approach that integrates sewage treatment, industrial pollution control, conservation of biodiversity, restoration of wetlands, afforestation, environmental flow management and public participation.

While the main focus is on river rejuvenation for the domestic use, any upstream improvement in water quality has trans-boundary environmental importance since the river finally drains in Bangladesh. This means that domestic ecological restoration makes a contribution to environmental sustainability at the regional level.⁶⁵

6.3.4 Ministry of Environment, Forest and Climate Change

The Ministry of Environment, Forest and Climate Change (MoEFCC) is complementary in its operations to the environment and executes functions related to environmental laws, biodiversity conservation, climate change policy, environmental impact assessment, wildlife protection and ecological restoration.

Co-ordination between the *Ministry of Jal Shakti* and *MoEFCC* has become more critical than ever before in the context of climate change and transboundary water governance given the increasing linkage between the two.

6.4 Need for Institutional Integration

Despite numerous government institutions, the governance of water in India still suffers from poor coordination between various environmental authorities, water resource agencies, disaster management bodies and state government, and from inconsistent data collection, poor coordination and overlapping jurisdictions.

7. India's Experience on Transboundary Water Governance: An Environmental Sustainability Point of View

India's water management has traditionally been a bilateral game, cooperative, and guided by principles of peaceful dispute resolution. India has thus generally preferred multilateral basin-level agreements to bilateral agreements with neighbouring States, reflecting the distinct

⁶⁵ National Mission for Clean Ganga, available at: <https://nmcg.nic.in/> (last visited Aug. 2, 2026).

geographical, political and hydrological characteristics of each basin of shared rivers. This has helped to maintain continuity in the water-sharing framework, but modern issues such as climate change, decreasing river flows, biodiversity loss, pollution and melting glaciers demand more incorporation of environmental sustainability into current legal frameworks.

Despite ongoing political tensions between India and Pakistan, the *Indus Waters Treaty (1960)* between the two nations is one of the most lasting international agreements on sharing water from a river. The Treaty, brokered with the World Bank's help, gives ownership of the eastern rivers (*Ravi, Beas and Sutlej*) to India, and of the western rivers (*Indus, Jhelum and Chenab*) to Pakistan, but allows certain non-consumptive and hydroelectric uses in India. The set-up of Permanent Indus Commission has made it easier to exchange technical information and created an institutional forum for resolving disputes.

However, the Treaty is largely about water allocation and engineering control of water, and comparatively little about conserving ecosystems, adapting to climate change, flows in the water, or protecting biodiversity. In the current reality of the environment, it is therefore crucial to implement greater cooperation with the environment while maintaining the stability of the Treaty.⁶⁶

India's cooperation is being seen in *Ganga Water Sharing Treaty (1996)* which outlines the sharing of dry season flow at Farakka. The Treaty has helped to strengthen bilateral cooperation, as it has helped to alleviate uncertainty over water use during dry seasons, and has promoted regular meetings. But the existing framework has come under strain due to changes in hydrological conditions, growing water demand, sedimentation and the variability of climate. The quality of the water shared and ecological flows, wetland conservation and pollution control in the basin need to be addressed, in addition to water quantity.⁶⁷

The *Teesta River controversy* serves as a good example of how transboundary water flows are governed in a federal constitution. India and Bangladesh have negotiated several draft agreements, but a full agreement has yet to be finalised, primarily because of issues concerning

⁶⁶ Indus Waters Treaty, 1960, Ministry of External Affairs, Government of India, available at: <https://mea.gov.in/bilateral-documents.htm?dtl/6439/Indus> (last visited Aug. 2, 2026); The World Bank, *Indus Waters Treaty*, available at: <https://www.worldbank.org/en/region/sar/brief/indus-waters-treaty> (last visited Aug. 2, 2026).

⁶⁷ Treaty between the Government of India and the Government of Bangladesh on Sharing of the Ganga/Ganges Waters at Farakka, 1996, Ministry of External Affairs, available at: <https://mea.gov.in/bilateral-documents.htm> (last visited Aug. 2, 2026).

water availability and the interests of the State of West Bengal. The Teesta example shows how to combine the domestic federal interest with the international responsibilities for effective transboundary governance. A cooperative basin-management approach with scientific evaluations and seasonal flow monitoring might help to realize a more sustainable and mutually beneficial approach.⁶⁸

The *Brahmaputra River* poses other challenges due to its transboundary nature with China, India and Bangladesh. The development of infrastructure, hydropower projects, glacier change, and the lack of real-time hydrological data have raised concerns about water security at regional levels. While there are agreements in place for exchanging hydrological information during the flood season, there is not an extensive cooperation on issues of ecological conservation, sediment transport, climate adaptation or cumulative environmental assessment. Improving scientific cooperation and institutional dialogue would contribute to regional resilience to climate risks.⁶⁹

The *Mahakali Treaty (1996)* between India and Nepal is a case in point of integrated management of shared rivers, and the cooperation among them resulted in the successful use of the river for irrigation, electricity generation, flood control, and water use. The implementation, however, has faced several challenges, including institutional delays, varied technical evaluations and a lack of achieving the Treaty's full objectives. The developmental goals should also be complemented by ecosystem restoration, environmental flow requirements, biodiversity and climate change resilience in future cooperation.⁷⁰

8. Environmental Sustainability Challenges

Although South Asian environmental cooperation in the form of treaties has made great strides, there are still challenges to transboundary water governance. The changes in rainfall, the retreat of Himalayan glaciers, the amplification of flood/drought cycles and the shock from climate change in the river flows have been observed. These changes have led to a weakening of the

⁶⁸ Ministry of External Affairs, Government of India, *India–Bangladesh Joint Consultative Commission Documents*, available at: <https://mea.gov.in> (last visited Aug. 2, 2026).

⁶⁹ Ministry of External Affairs, Government of India, *India–China Agreements on Hydrological Data Sharing*, available at: <https://mea.gov.in> (last visited Aug. 2, 2026); Ministry of Jal Shakti, Government of India, available at: <https://jalshakti-dowr.gov.in/> (last visited Aug. 2, 2026).

⁷⁰ Mahakali Treaty (Treaty Concerning the Integrated Development of the Mahakali River), Ministry of External Affairs, Government of India, available at: <https://mea.gov.in/bilateral-documents.htm> (last visited Aug. 2, 2026).

traditional water-sharing systems that had been negotiated under fairly stable hydrological circumstances.⁷¹

Another issue of concern is pollution. The pollution of river ecosystems by raw sewage, industrial effluent, agricultural run-off, plastic waste and sand mining negatively impact on the quality of river water and reduce access to clean water for communities downstream from the pollution sources. The problem is that sustainable governance depends on joint cross-border actions on pollution control instead of fragmented national actions.⁷²

Limited to effective implementation by institutional fragmentation. The responsibilities of various government agencies covering water resources, environmental protection, disaster management, biodiversity conservation and international negotiations are fragmented, with duplication of efforts and policy conflicts. There is a need to strengthen the coordination between national institutions and neighbouring States in order to ensure integrated river basin management.⁷³

9. Critical Analysis

India has strongly shown its resolve on the issue of peaceful settlement of water disputes between the two countries with bilateral treaties and institutional discussion. India's negotiating power over confrontation is reflected in the accord with Pakistan on the sharing of the Indus waters and the *Ganga Water Sharing Treaty*. Moreover, the constitutional duty to protect the environment, judicial recognition of sustainable development and the growing of environmental laws have reinforced the national legal context for water governance that is responsible for the environment.

Presently, however, arrangements are mostly allocation oriented and still fail to consider modern environmental concepts like ecosystem-based management, environmental flow assessment, climate adaptation, environmental protection of groundwater, conservation of biodiversity and cumulative environmental impact assessment. Climate change is not a new reality in international water governance; there were many treaties that were negotiated before

⁷¹ Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2023: Synthesis Report*, available at: <https://www.ipcc.ch/report/ar6/syr/> (last visited Aug. 2, 2026).

⁷² United Nations Environment Programme, *Freshwater Ecosystems*, available at: <https://www.unep.org/topics/freshwater> (last visited Aug. 2, 2026).

⁷³ United Nations Sustainable Development Goal 6, available at: <https://sdgs.un.org/goals/goal6> (last visited Aug. 2, 2026).

the onset of climate change. Thus, periodic review processes and adaptive management approaches are now becoming more common.

The formulation of river basin projects through multilateralism in India has been restricted, but bilateral cooperation has given India a diplomatic flexibility. Hence, future governance needs to include a more balanced approach of bilateral diplomacy, strengthening regional scientific cooperation, providing clear data sharing, and planning based on ecosystems.

10. Recommendations

In order to improve environmental sustainability in transboundary water governance, the following measures are recommended:

1. Old bilateral water agreements should be regularly reviewed to include ecosystem restoration, environmental flows, biodiversity conservation and water climate change adaptation.
2. Regular scientific monitoring, data exchange, and joint environmental assessment of permanent joint river basin commissions should be enhanced.
3. The environmental impacts of large dams and river development schemes shall explicitly consider the transboundary ecological impacts.
4. India should further share hydrological data with neighbouring States, including the sharing of information on glaciers, water quality, sediment transport, and flood forecasting.
5. More coordination of institutional mechanisms between the Ministry of Jal Shakti, the Ministry of Environment, Forest and Climate Change, State Governments and neighbouring countries should be encouraged.
6. Governance of river basins should be more ecosystem based and *Integrated Water Resources Management (IWRM)* oriented in line with *Sustainable Development Goal 6*.
7. Public involvement, academic cooperation and scientific studies should be encouraged to enhance the formulation of evidence-based policies and regional environmental

cooperation.

11. Conclusion

Environmental sustainability has become an essential part of the current international water law. This move from absolute territorial sovereignty to equitable utilisation, the prevention of significant harm, cooperation, ecosystem protection, sustainable development and others demonstrates the shift in legal principles to an understanding that shared rivers are ecological systems and that they should be managed jointly instead of nationally.

India's position is unique in South Asia as it has a long chain of international rivers and has close linkages with some of its neighbouring riparian States. The country has created a significant framework for sustainable water governance, through bilateral treaties, environmental commitments in its constitution, judicial innovation, and environmental law. Yet, under these increasing pressures, from climate change to population growth, pollution, biodiversity loss and geopolitical complexity, it is becoming necessary to move towards an approach more adaptable, science-based and ecosystem-oriented.

Water governance between countries needs to shift from the current framework of water allocation to integrated water resources management, which takes into account development and ecological aspects. Achieving institutional cooperation, sharing of scientific data, integration of environmental sustainability in the implementation of these treaties, and regional collaboration will not only benefit freshwater ecosystems but also help in South Asia to build enduring peace, environmental security, and sustainable development. In this regard, India will continue to play a pivotal role in fostering cooperative, environmentally responsible water governance and development, which will be crucial for the proper development of international water law.