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River Rights - Pathways To Restoring Riverine Ecosystems

Anil Garg[1], Ashok K Singh[2*], Venkatesh Dutta[3]
[1]Principal Secretary, Irrigation and Water Resources Department, Uttar Pradesh, India-226001.
Email: *garganil1971@gmail.com*
[2*]Engineer-in-Chief (D. & P.), Irrigation and Water Resources Department, Uttar Pradesh, India-226001.
Email: *ashokarjav@gmail.com (corresponding author)*
[3]Head, Department of Environmental Science, School of Earth and Environmental Sciences (SEES), Babasaheb Bhimrao Ambedkar Central University. Lucknow, Uttar Pradesh, India-226025.
Email: *dvenks@gmail.com*

Abstract
Across the world, scholars, communities and courts are increasingly debating whether rivers should be recognized as 'legal entities' – entitled to rights and protection. Proponents argue that such recognition helps reframe river management and governance from sectoral and short-term to more holistic integrating hydrological processes, ecosystems, and socio-cultural relationships. Critics warn of legal uncertainty, enforcement difficulties and perverse administrative consequences. This paper surveys the historical and cultural roots of the rights-of-nature idea, reviews landmark legal instances where rivers or ecosystems have been granted rights or personhood, assesses the present state of practice and jurisprudence, identifies future challenges (legal, institutional, scientific and social), and proposes a pragmatic set of requirements and institutional pathways to establish resilient river rights that can improve river health while addressing concerns of governance, liability and social justice. The paper builds upon jurisprudence, statutory models and scholarly literature to propose eight set of river rights. Where legal examples are cited (Ecuador, Colombia, New Zealand, India), primary judgments and statutes and scholarly analyses have been examined to inform recommendations. The paper concludes that legal landscape of river rights is evolving and varies by jurisdiction; therefore, local constitutional and statutory constraints must be carefully analyzed when designing rights regimes.
Keywords: *rights of rivers (RoR), hydrological processes, riverine ecosystems, biodiversity, groundwater*

1. INTRODUCTION

Rivers are essential for the ecological security, cultural identity, economic prosperity, and long-term sustainability of the State, and are integral to the life, health, and wellbeing of its people. They possess inherent ecological properties such as natural variable flow regimes, sediment transport, floodplain connectivity, biodiversity functions, and self-purification capacity, which require legal protection.

The Constitutional and statutory provision protect a person's right to fresh air, clean water and pollution free environment, but the source of the right is the inalienable common law right of clean environment. The precautionary principle and the polluter pays principle have been accepted as part of the law of the land. Article 21 of the Constitution of India guarantees protection of life and personal liberty. The Constitution of India mandates protection and improvement of the environment (Article 48A) and imposes a fundamental duty upon citizens to protect and improve the natural environment including rivers (Article 51A(g) – "*to protect and improve the natural environment including forests, takes, rivers and wild life, and to have compassion for living creatures.*" The State recognizes the need for holistic, science-based, community-inclusive, and inter-departmental governance of rivers and for securing their right to flow, to remain unpolluted, to maintain ecological integrity, and to be restored where degraded. Though rivers are venerated as divine and pure, the everyday realities of urbanization, population growth, inadequate sanitation and waste disposal have led to serious pollution — a contradiction between religious reverence and environmental degradation (Dutta, 2019).

Apart from the constitutional mandate to protect and improve the environment there are plenty of post independence legislations on the subject but more relevant enactments for our purpose are: The Water (Prevention and Control of Pollution Act 1974 (the Water Act), The Air (Prevention and Control of Pollution) Act, 1981 (the Air Act) and the Environment Protection Act 1986 (the Environment Act). The Water Act provides for the constitution of the Central Pollution Control Board by the Central Government and the constitution of one State Pollution Control boards by various State Governments in the country.

The Boards function under the control of the Governments concerned. The Water Act prohibits the use or streams and wells for disposal of polluting matters. Also provides for restrictions on outlets and discharge of effluents without obtaining consent from the Board. Prosecution and penalties have been provided which include sentence of imprisonment.

River means any natural flowing watercourse, including main channel, tributaries, streams, natural drains, wetlands, floodplains, riverine lakes, and groundwater systems hydrologically connected thereto (Dutta, 2022). Rivers are central to human life: hydrologically, ecologically, economically and culturally. Yet modern development trajectories—dams and diversions, intensive water abstraction, channelization, pollution and floodplain encroachment—have dramatically altered river systems worldwide. Degradation includes pollution, encroachment, excessive extraction, physical alteration, loss of biodiversity, and any activity impairing natural river functions. Conventional regulatory regimes — enforcements, standards, and environmental impact assessments — have had partial success. The 'rights of nature' movement reframes the problem by seeking to recognize rivers (or ecosystems) as rights-bearing entities, and thereby to guarantee legal entitlements to their protection, restoration and ecological functioning.

This paper addresses four linked questions: (1) How did the idea of rights for rivers emerge and what cultural and legal antecedents exist? (2) What is the current state of affairs—jurisprudentially and practically—where river rights have been recognized or attempted? (3) What are the principal challenges in making river rights meaningful? (4) What institutional, legal and practical measures are required to create durable river-rights regimes that improve river health while remaining administratively functional and socially equitable?

2. HISTORICAL AND CONCEPTUAL CONTEXT

2.1 Cultural antecedents and ecological thinking

Indian scriptures contain numerous references to the personhood of nature, reflecting a worldview in which the natural world is seen as an extension of human consciousness and universal order. Nature was understood as a living presence, deserving of respect, protection, and reciprocity. Recognition of rivers as living entities or sacred beings is ancient and widespread. In many literatures and spiritual traditions, rivers are conceived as persons or goddesses (e.g., Ganga, Yamuna, Narmada, Kaveri and many rivers in India) and rituals, taboos and customary rules historically constrained extractive use. These cultural forms embodied obligations — duties of care and norms limiting harm — that functionally operated like proto-rights.The *Rig Veda* (1500 BCE and 1000 BCE) articulates a foundational ethic of environmental care, urging people to avoid actions that harm nature and its life-giving elements. It views Earth as a mother and humanity as her children, emphasizing a reciprocal relationship based on respect, protection, and responsibility. Vedic society understood the wellbeing of humans as inseparable from the health of the natural world, revering rivers, flora, atmosphere, and land as *sacred* entities. The prayer, "*Do not harm the water… earth is my mother, I am her son*," reflects an early form of nature personification, where elements of nature are seen as *living beings* deserving of protection. This holistic worldview highlights that environmental stewardship has ancient roots in Indian knowledge systems.

The Vedic tradition emphasizes that all forms of life possess an equal right to exist, and that human wellbeing is inseparable from the wellbeing of the Earth. The Rig Veda expresses this relationship through the principle of mutual nourishment — "*you give to me, and I give to you*" — highlighting a cycle of replenishment between humans and nature. The seers also describe an attitude of friendship toward all living beings, as reflected in the verse: "*With the eyes of friendship, I behold all creatures*."

Buddha also laid down strict rules against polluting rivers, ponds, and wells, as recorded in the Sutta-Nipāta. He urged people to recognize and respect all forms of life: "*Know the grasses and the trees… Know the worms and the many kinds of ants… Know the four-footed animals, both small and great… the serpents… the fish that move through the waters… and the birds that glide on their wings through the air*." Through this teaching, he emphasized the interconnectedness of all living beings and the moral duty to protect the natural world.

A major intellectual milestone for Earth jurisprudence was Christopher Stone's 1972 essay '*Should Trees Have Standing?*' which laid the groundwork for recognizing legal rights for nature. Building on Stone's ideas, Cormac Cullinan's influential book *'Wild Law'* (2002; revised 2011) expanded the concept and provided practical pathways for applying rights-of-nature principles in governance and law. Since 2006, several countries—including Bolivia, Colombia, Ecuador, India, Mexico, New Zealand, and the United States—have

enacted laws or issued court rulings that recognize Nature as a rights-bearing entity with inalienable rights (Kauffman and Martin, 2018; Charpleix, 2018). Alongside these national developments, international efforts such as the UN Harmony with Nature Initiative (UN, 2024), the 2010 Declaration of the Rights of Mother Earth (Espinosa, 2014), and proposals for an International Environment Court reflect growing global momentum toward formalizing Rights of Nature at a broader scale.

Rights of Nature (RoN), particularly Rights of Rivers (RoR), has gained global attention particularly after 2005, as a new legal tool to protect river ecosystems, but growing scholarship highlights significant uncertainties and challenges in these approaches (Immovilli et al., 2022). The modern rights-of-nature (RoN) idea draws on several intellectual currents: deep ecology and ecological ethics, indigenous worldviews that regard land and water as relatives, and critical legal theory that questions the anthropocentric limits of rights. Rights for rivers are therefore not simply legal inventions: they are attempts to translate longstanding moral and social commitments into enforceable public law.India addresses river water pollution through four key legal pathways: a regulatory permit system under the Water (Prevention and Control of Pollution) Act, 1974; water-quality provisions in the Environment (Protection) Act, 1986; public-interest litigation against polluters, including municipal bodies; and common-law riparian rights to unpolluted water (Divan and Rosencranz, 2022). Alongside these laws, the Union Government has launched major river-rejuvenation programs such as the Ganga Action Plans and Namami Gange programme. The Hon'ble Supreme Court, High Court, and the National Green Tribunal (NGT) have strengthened enforcement by actively hearing petitions and directing compliance measures to curb pollution and protect water bodies. Some scholars argue that the institutional and regulatory frameworks for wastewater treatment and pollution control — created under laws such as the Water (Prevention and Control of Pollution) Act, 1974 and the Environment (Protection) Act, 1986 — have been relatively unsuccessful to prevent degradation, especially in highly urbanized river stretches (Alley, 2002; 2008; Wilson and Lee, 2019). "At the cost of repetition, it may be mentioned that in spite of the fact that Water (Prevention and Control of Pollution) Act, 1974 was enacted 47 years back, to give effect to the decision in Stockholm Conference in the year 1972, the water pollution remains rampant. Though water pollution is a serious criminal offence under the law of the land, the authorities have failed to take stringent action against the violators. In a way the major violators remain State-authorities, who are constitutionally under obligation to ensure treatment of sewage before the same is discharged into the rivers and drains connected thereto which is not fully happening.... The States continue to violate the directions of the Hon'ble Supreme Court and give their own convenient deadlines which are thereafter further relaxed at will. This can hardly be held to be conducive to the environmental rule of law". (p. 7).

2.2 Emergence of rights-of-nature in law

Ecuador's Vilcabamba River became the first ecosystem to have its rights upheld by a court (Kauffman and Martin 2017), followed by New Zealand's Whanganui River ((Te Awa Tupua), which was granted legal personhood (Charpleis, 2018; Cribb et al., 2024). Subsequent landmark rulings recognized the rights of Colombia's Atrato River in 2016 and India's Ganga and Yamuna Rivers in 2017 (Safi, 2017). At the global level, networks of lawyers and activists at the Earth Law Centre drafted a Universal Declaration of the Rights of Rivers to advance this emerging legal movement (Earth Law Centre, 2017; Wilson and Lee, 2019).

Immovilli et al, (2022) analyze RoR cases in New Zealand, Colombia, and India, focusing on how they interact with local political, social, and material contexts. Their analysis highlights the conflicts, negotiations, and power struggles that arise during the establishment and implementation of RoR frameworks. Drawing from fieldwork, they propose an analytical approach to better identify and understand the contestations embedded within RoR initiatives. Two principal legal pathways have emerged. The first is constitutional or statutory recognition of the rights of nature (e.g., Ecuador's constitution that explicitly recognizes nature's rights). The second is declaratory and common-law innovation by courts and legislatures that treat specific rivers as legal persons or grant them protection through bespoke institutional arrangements (e.g., New Zealand's Te Awa Tupua/Whanganui River settlement). These approaches reflect different philosophies: universal constitutional protection versus tailored, negotiated settlements acknowledging distinct cultural, ecological and governance contexts.

According to the NGT Order dated July 22, 2022 in Original Application No. 200/2014 (C.W.P. No. 3727/1985), "there is no lack of legislative/ administrative authority in the Central Government for any decision on the subject. There is also equal responsibility of the States under Articles 48A, 51 and 51A and

also of the Local Bodies and District Magistrates under Articles 243G and 243W read with 11th and 12th Schedules of the Constitutions. Further, obligations of public authorities also flow from 'Public Trust Doctrine' and the fact that clean environment is part of Right to Life under Article 21 of the Constitution."

3. WHY GRANT RIGHTS TO RIVERS: THE NORMATIVE AND PRAGMATIC ARGUMENTS

3.1 Normative rationale: Rights formalize moral claims that rivers have interests that ought to be respected, not merely instrumental value to humans. Rights can also institutionalize indigenous cosmologies and customary stewardship, advancing procedural and substantive justice. Rights protect the interests of future generations by constraining short-term exploitation.

3.2 Pragmatic rationale: Grants of rights can create standing for guardians to litigate, compelling governments and polluters to act.Rights oriented to ecological processes (flow, connectivity, biodiversity) shift attention from discrete pollutants or uses to system health.Rights can also trigger new governance structures that coordinate across agencies and jurisdictions, improving integrated basin management.

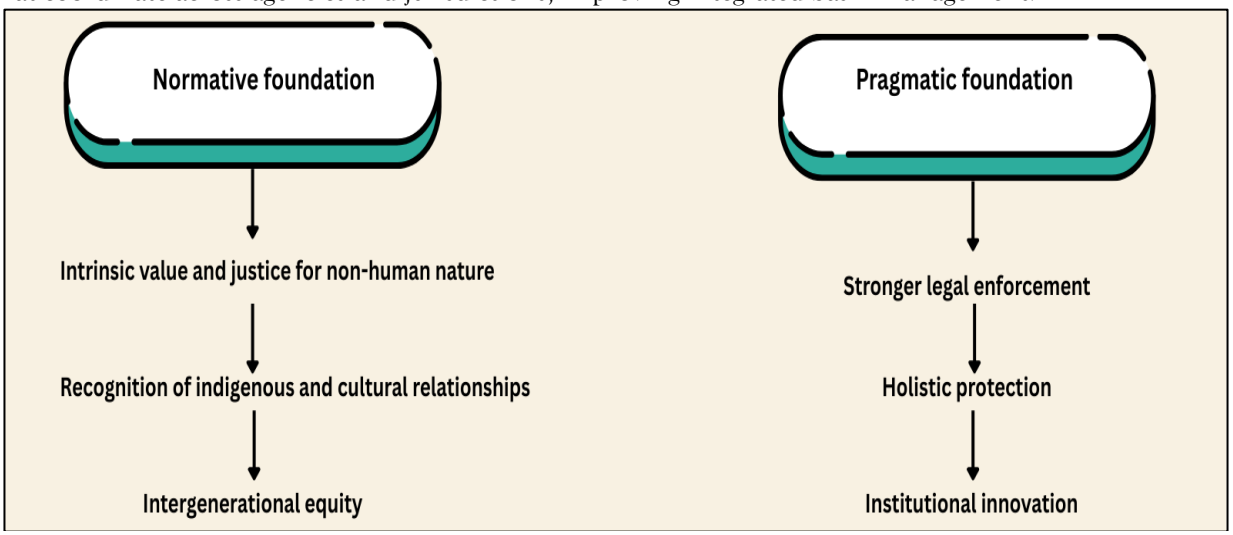

Figure 1: The normative and pragmatic foundation of river rights

4. LANDMARK CASES

A selective review of canonical cases and statutes illustrates the diversity of legal forms and practical arrangements.In many of these cases, judges have used innovative interpretations of constitutional and statutory provisions—often in response to severe ecological crises and governmental inaction—to justify granting rivers legal personhood and enforceable rights. They are briefly outlined below.

4.1 Constitutional recognition: Ecuador

Ecuador's 2008 constitution is often cited as the first modern constitutional recognition of the rights of nature (Kotzé and Calzadilla, 2017). Article 71 and related provisions grant nature the right to "exist, persist, maintain and regenerate its vital cycles, structure, functions, and evolutionary processes," and permit individuals and collectives to petition for enforcement of those rights. Ecuador's constitutional experiment created mechanisms for litigation and administrative enforcement grounded in broad ecological principles (Akchurin, 2015).

4.2 Judicial recognition and remedial mandates: Colombia's Atrato River (T-622/16)

In 2016 Colombia's Constitutional Court found that severe pollution and violence in the Atrato River basin violated fundamental human rights of the local communities, and it recognized the river as a subject of rights, ordering the State to create a protective governance regime and to take immediate remedial actions (Richardson and McNeish, 2021). The court combined human-rights reasoning with environmental precaution to create enforceable duties on the state and to adopt community-inclusive guardianship arrangements. The Atrato case is important because it links river protection to human rights remedies and prescriptive state obligations (Wesche, 2021).

4.3 Legislative personhood and negotiated governance: Whanganui / Te Awa Tupua (New Zealand)

In 2017 New Zealand enacted the Te Awa Tupua (Whanganui River Claims Settlement) Act, which recognizes the Whanganui River as "an indivisible and living whole." The Act is a negotiated settlement between the Crown and Māori iwi (tribes) and provides a bespoke institutional architecture, including guardians (representatives) and a strategy group to exercise rights on behalf of the river (Cribb et al., 2024). The statute's emphasis is less on abstract legal personhood and more on creating collaborative governance arrangements reflecting Māori relationships with the river. It has become a model for pluralistic, negotiated, culturally grounded legal arrangements (Reynecke, 2022).

4.4 Legal persons and appointed custodians: India (Uttarakhand)

In 2017 the Uttarakhand High Court declared the Ganga and Yamuna (and their tributaries) to be legal persons and appointed custodians. The order was stayed by India's Supreme Court later that year, citing complex legal and liability issues, and the legal status remains contested. The Uttarakhand episode is instructive: it shows political and jurisprudential enthusiasm for river personhood but also practical and constitutional challenges—questions of liability, administration, and compatibility with existing legal frameworks (Upadhyay and Nayak, 2024).

4.5 Other examples and diffusion

Since these early canonical developments, a variety of national, subnational and local experiments have proliferated: rights-of-nature clauses in constitutions and municipal ordinances, legal recognition of rivers or ecosystems in parts of India, recognition of guardianship structures in Bolivia and New Zealand, and litigation invoking rights-of-nature frameworks in multiple jurisdictions. Scholarly and practitioner networks continue to document and analyze the diffusion of these experiments. The Hon'ble Supreme Court, High Courts and NGT have repeatedly used PILs and tribunal powers to compel action on river pollution, floodplain protection and illegal physical alterations. Landmark principles (Precautionary Principle; Polluter Pays; environmental flows; floodplain demarcation) have been advanced by courts and applied to river matters.NGT and local litigations have been pivotal in securing floodplain demarcation and stopping encroachments — essential technical steps for river health and flood mitigation.

(a) M.C. Mehta v. Union of India — Ganga pollution (multiple orders; ongoing supervision): A long-running public interest litigation by M.C. Mehta (PIL first filed in 1988; many landmark orders since the late 1980s through present) seeking abatement of severe pollution in the River Ganga, with regard to the industries in which tanning was being carriedon near Kanpur on the banks of the River Ganga. The Court issued multiple directions for sewage interception/ treatment, set up supervisory mechanisms, and repeatedly directed floodplain demarcation and pollution-control measures for stretches of the Ganga.This casecreated a sustained judicial supervision model for river pollution, led to institutional measures (National River Conservation Directorate / Ganga programmes) and specific remedial orders (including floodplain demarcation directions).

(b) Indian Council for Enviro-Legal Action v. Union of India (Bichhri / "Polluter Pays") — 1989: It was PIL in 1989 by the Indian Council for Enviro-Legal Action (ICELA), citing severe environmental degradation by the reckless operations of chemical factories in Bichhri Village, Rajasthan. The Hon'ble Supreme Court delivered its judgment on 11th August, 1996 (subsequent enforcement orders followed in 2024) and ruled in favour of the petitioners.By recognising and enforcing the *Polluter Pays Principle*, the Supreme Court established a robust framework for holding industries accountable for environmental harm and pay for cleanup and restoration.

(c) Vellore Citizens Welfare Forum v. Union of India — 1996: (caused by enormous discharge of untreated effluent by the tanneries and other industries in Tamil Nadu, Palar river-basin), the Hon'ble Supreme Court upheld the Precautionary Principle and reinforced the Polluter-Pays principle, ordering closure/ relocation/ treatment measures. The judgment shaped modern environmental jurisprudence in India and has direct application to river pollution regulation.

(d) National Green Tribunal (NGT) orders on floodplain demarcation and encroachment: multiple matters, including Gomti/Yamuna cases, various orders (2014–present) on floodplain zoning, illegal construction and encroachment removal. The NGT has directed states and district administrations to demarcate floodplains, prevent encroachment, stop illegal solid-waste dumping and ensure sewage interception (examples include OA filings on Yamuna floodplain encroachments; orders touching Gomti floodplain issues).NGT vide its order/judgment dated 10.12.2015, in OA No 200 of 2014- M.C. Mehta vs

Union of India and ors. has inter-alia directed that as an interim measure, at least 100m from middle of the river would be treated and dealt with as 'Eco sensitive and prohibited zone'. No activity whether permanent or temporary in nature will be permitted to be carried on in this zone including camping.The area beyond 100 meters and less than 300 meters would be treated as regulatory zone in the hilly terrain, for which the State will comply with the above directions.

The area upto 200 meters shall be the prohibited area in the plain terrain and more than 200 meters and less than 500 meters would be treated as regulatory zone. Further vide its order dated 15.12.2017, NGT has directed that no construction would be permitted in the Flood Plain in consonance with the judgement of the Tribunal in the case of Indian Council for Enviro-Legal Action Vs. National Ganga River Basin Authority & Ors. NGT reiterated that in the area falling within 50 mtrs from edge of the river in the hilly terrain, no construction would be permitted, nor any other activity carried out and it shall be treated as Prohibitory Zone. Beyond 50 mtrs andup to 100 mtrs in the hilly terrain it shall be treated as Regulatory Zone. Regulatory activity shall be notified by the State and till that time there shall be no construction activity permitted in that area. Once the river enters the plain or even hilly areas where width of the river is more than 70 mtrs, in that event area of 100 mtrs from the edge of the river shall be treated as Prohibitory Zone while 100 mtrs to 300 mtrs would be treated as Regulatory Zone and till the time the State notifies the restricted activities, there shall be no construction activity even in the Regulatory Zone.

5. ESTABLISHING RIVER RIGHTS THROUGH THE EXISTING PROVISIONS

Based upon the extensive review of literature, court judgments and needs of the riverine ecosystems, we outline eight river rights that can help in restoring and safeguarding the river's existence (Figure 2).

1. The right of rivers on the land of rivers *(riparian lands, floodplains and vegetation buffer zone).*
2. The right of rivers to flow naturally *(ecological flows).*

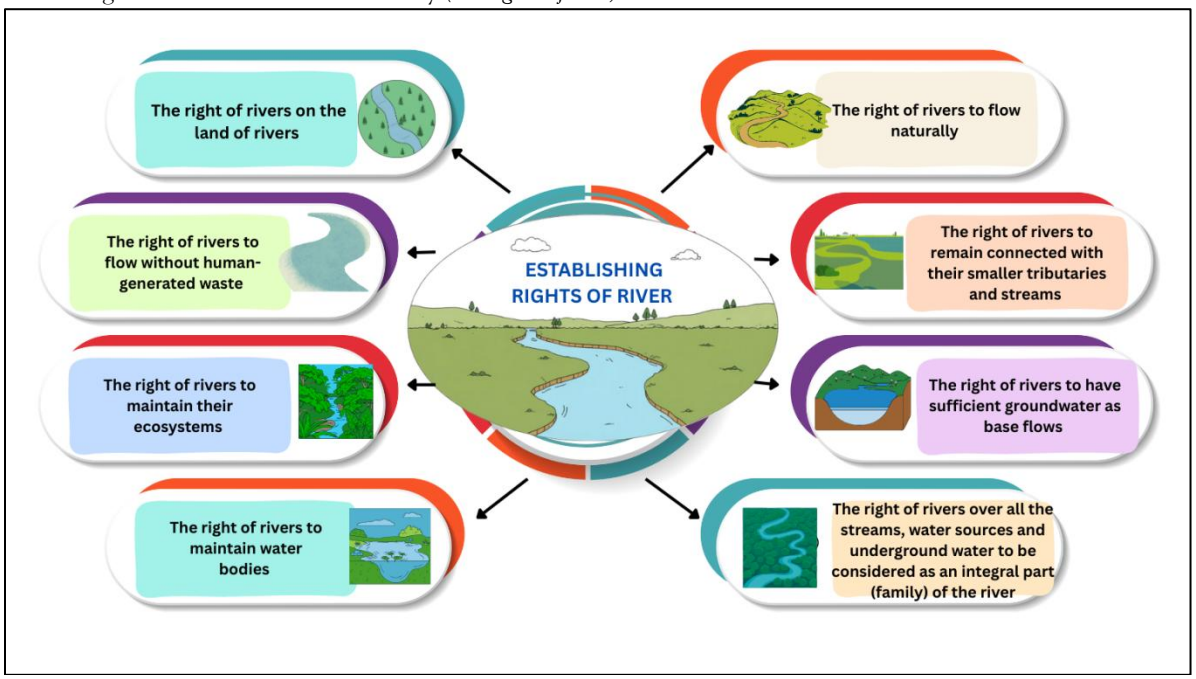

Figure 2: Establishing river rights through the existing provisions

3. The right of rivers to flow without human-generated waste *(quality and wholesomeness).*
4. The right of rivers to maintain their ecosystems *(ecological integrity).*
5. The right of rivers to remain connected with their smaller tributaries and streams *(stream connectivity).*
6. The right of rivers to maintain water bodies (lakes/ponds/other natural water sources) in their catchment *(connectivity with water bodies).*
7. The right of rivers to have sufficient groundwater as base flows *(floodplain aquifers).*
8. The right of rivers over all the streams, water sources and underground water to be considered as an integral part (family) of the river *(basin integrity).*

The argument regarding the above inherent rights is based upon the review of the various Acts, Rules and Notifications framed from time to time. The summary of these provisions are provided in Table 1 and Table 2 below:

Table 1: Acts and constitutional provisions that are invoked in matter related to protection of rivers in the state of Uttar Pradesh

Article 51a (g)	Duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wildlife, and to have compassion for living creatures
Article 21	Cornerstone of the fundamental rights guaranteed to citizens, often invoked to protect a wide range of individual liberties and human rights in India. Right to life is contingent upon healthy rivers and water bodies. Environmental rights have been linked to the right to a healthy and wholesome life.
Article 262	Distribution of powers between the Union and the States in relation to inter-state rivers and river valleys
Article 48a	The State shall endeavor to protect and improve the environment and to safeguard the forests and wildlife of the country.
Northern India Canal and Drainage Act, 1873	Construction and maintenance of canals and drainage works dependent on rivers
Uttar Pradesh (Regulation of Building Operations) Act, 1958	Designates certain areas as development areas, and different rules and regulations may apply to these areas concerning building operations, provisions related to zoning regulations, specifying the types of buildings that can be constructed in different zones
Uttar Pradesh Urban Planning and Development Act, 1973	Empowers development authorities to prepare master plans for urban areas, outlining land use, infrastructure development, and zoning regulations. These master plans serve as a blueprint for the development and growth of urban areas.
Uttar Pradesh Industrial Area Development Act, 1976	Master plans for industrial areas, outlining the intended land use, infrastructure development, and zoning regulations.
Environmental Protection Act, 1986	Provisions for the preparation of Environmental Impact Assessments (EIA) for certain projects, including those related to rivers. This is to assess potential environmental impacts before project approval. Industries that are potential sources of pollution to rivers are required to comply with standards and regulations set under the Act.
Uttar Pradesh Disaster Management Act, 2005	Provisions for preparing disaster mitigation plan including restricting habitation in the flood prone areas
River Ganga (Rejuvenation, Protection and Management) Authorities Order, 2016	Institutional structure for policy and implementation in fast track manner, provisions for floodplain zoning and prevention of encroachments
Wetland (Conservation and Management) Rules, 2017	Mandates the preparation of conservation and management plans of wetlands by the State Wetland Authority, classification of wetlands into different zones, such as the Core Zone and the Buffer Zone, with varying degrees of restrictions on activities. Certain activities are prohibited in

	wetlands without the approval of the State Wetland Authority. These may include reclamation, conversion, and setting up industries or disposal of solid waste.
UP Ground Water (Management and Regulation) Act, 2019	Preparation of Ground Water Security Plans, fixing ground water abstraction limit, empowers the state to notify areas where groundwater levels have depleted to critical or alarming levels and bans construction of new wells in such areas.

Table 2: Various notifications issued since 2010 for conservation and rejuvenation of rivers in Uttar Pradesh

Date of Notification	**Issues pertaining to river rejuvenation and conservation**	**Issued by**	**Letter No.**
02.02.2007	Obtaining the consent of Irrigation Department before construction of check dam/road/drains by other departments/institutions	Chief Secretary, Uttar Pradesh	No. 5298/06-27-Sin-5
16.03.2010	Effective prevention of illegal construction/encroachments in flood plain zones of rivers	Chief Secretary, Uttar Pradesh	No. 1417/B/09-27-Sin-2-181Flood) /09
14.10.2014	Implementation of riverfront development projects in the cities situated on the banks of river Ganga under the NGRBA program through Urban Development Department, Uttar Pradesh Administration	Secretary, Uttar Pradesh Government, Irrigation and Water Resources Department	No. 5884/9-5- 2014-13/NGRBA/2014
04.09.2020	Declaration of floodplain zone in compliance with the order dated 13.07.2017 passed in M.C. Mehta vs. Union of India and others in NGT OA No. 200/2014	Secretary, UP Administration, Irrigation and Water Resources Department	No. 164/2020/2031/20-27-Sin-4-07/(NGT)/16TC
10.02.2022	Effective coordination of activities for restoration and rejuvenation of small rivers (lower order rivers/tributaries of large rivers) under MGNREGA, UP	Director General, National Mission for Clean Ganga, Ministry of Jal Shakti	No. TE-16015/43/2020-GKC NMCG/835
05.04.2022	Revitalization and rejuvenation of small and tributary rivers under the MGNREGA program	Chief Secretary, Uttar Pradesh	29 IAS/76-2-2022/05NG/2020TC
17.06.2022	Revitalization of 61 endangered rivers of Uttar Pradesh	Additional Commissioner, Rural Development, Uttar Pradesh Government	MNREGA/Letter No. 530/1248/2022
20.07.2022	Revitalization and rejuvenation of small and tributary rivers under the MNREGA program and other projects	Special Secretary, Namami Gange and Rural Water Supply, Uttar Pradesh Government	365/76-2-2022/05NG/2020TC
14.10.2022	Revitalization and rejuvenation of small and tributary rivers under the MNREGA program	Special Secretary, Namami Gange and Rural Water Supply,	No. 791/76-2-2022/06NG/2020TC

		Uttar Pradesh Government	

5.1 Rights of rivers on river land

Human settlements have historically developed along rivers and watercourses due to the availability of water resources for drinking, agriculture, transportation, and other needs. Urbanization significantly impacts natural streams and watercourses, altering their flow patterns and capacities. This has been particularly evident in cities and towns that have developed alongside rivers and watercourses. Urban expansion frequently leads to the encroachment on rivers, natural drains and floodplains. These areas are often developed for housing, commercial activities, and infrastructure, reducing the available space for water to flow and causing bottlenecks in the drainage system. Floodplains, which are natural buffers that absorb excess water during heavy rains, are diminished or eliminated, exacerbating the risk of flooding.

Rivers flow meandering and dissipating inherent energy in their floodplain zones[i]. It is necessary to give rights to the rivers to save their existence because during the regional development, the floodplains of the rivers have been encroached upon, a live example of which is the incident in Barabanki district on 10th and 11th September 2023. About 400 mm of rainfall occurred in 48 hours, which was the maximum rainfall recorded so far in the month of September in this area. As a result, flood like situation arose in the areas near Reth river (length 109 km) and its tributary Jamuria (length 22 km) passing through Barabanki district. Apart from heavy rains in the district, the main reason for prolonged inundation in urban areas is encroachment by illegal construction/other activities in the last 10-15 years on both sides of the flow area of Reth and Jamuria rivers. Encroachment and modification of natural watercourses disrupt local ecosystems. They reduce biodiversity and the natural functions of these systems, such as water purification and habitat provision. To prevent illegal encroachment in the meandering/floodplain zone of rivers due to urbanization and unplanned settlement, the Government has made various guidelines and constitutional arrangements. For example:

Chief Secretary, Uttar Pradesh Government's letter No. 1417B (1)/09-27-No. 2, dated March 16, 2010 has directed to stop illegal construction/encroachments in the floodplain of rivers. According to this order,

(a) Under the Master Plans, the floodplain zone along the rivers should be treated as a flood affected area and to ensure that no construction is allowed in it, the land use of these areas should be kept green. It should be ensured that any kind of construction under floodplains is banned in the zoning regulations of the Master Plans of the respective cities.

(b) Under the Uttar Pradesh (Regulation of Building Operations) Act, 1958, UP Urban Planning and Development Act, 1973 and Industrial Development Act, 1976, 'no objection' will not be given for any kind of construction work in the floodplain, nor will the map be approved. To stop any type of illegal construction, effective action should be taken under the provisions of the said Acts.

In such areas which are not covered by point (a) and (b), if found appropriate, the Irrigation Department will notify the areas under Section 55 of the Northern India Canal and Drainage Act, 1873 to remove illegal construction and effective action should be taken by the government.

According to the notification of the Government of India, Ministry of Water Resources, River Development and Ganga Rejuvenation dated October 7, 2016, Section 6(3), "No person shall construct any permanent or temporary structure for residential or commercial or industrial or any other purpose on the banks of the riverbank or in its active floodplains."

Further, the following instruction has been given in the order by Honorable National Green Tribunal, New Delhi on 13.07.2017 in OA No. 200/2014 M.C. Mehta vs. Union of India- "Till the demarcation of the floodplains and identification of permissible and non-permissible activities by the state government, we direct that 100 meters from the edge of the river would be treated as no development/construction zone in segment-B of Phase-I (Haridwar to Unnao, Kanpur)"

In relation to the above, by the Government Order No. 29BHS/76-2 2022/05NG/2022TC dated 05.04.2022 of Namami Ganga and Rural Water Supply Section-2 of Uttar Pradesh Government,

instructions to conduct the following activities through 'District Ganga Committees' have been given by the Chief Secretary, Uttar Pradesh Government -

- To prepare and monitor the identification, mapping and strategy of revitalization and rejuvenation of smaller streams and tributaries at the district level by the committee.

- The committee should identify the government land/river area located within a radius of 02 km of small and tributary rivers and ensure action to free it from encroachment.

In this regard, as per para 8 and 9 of the National Green Tribunal Principal Bench dated 23.11.2022 (in M.A. No. 23/2022 and M.A. No. 19/2021 in MLA Application No. 303/2020 S.N.

"In terms of order of this Tribunal dated 25.07.2022, illegal construction was to be removed by the Ganga Committee in terms of para 6 of the River Ganga (Rejuvenation, Protection and Management) authorities order, 2016 which has not been done. Only action taken in under UP Development Act which is different from action directed by the Tribunal." "Thus, for protection of environment and consistent with the earlier orders, we have to reiterate our earlier direction for demolition of illegal construction as per Ganga order, issued under the Environment (Protection) Act, 1986..... Similar action may be taken against any other illegal structure in the floodplain areas."

In 2022, the Chief Secretary, Uttar Pradesh Government directed district magistrate of all the 75 districts to prepare and monitor revitalization and rejuvenation of smaller rivers and tributaries at the district level though the District Ganga Committee. A committee was also formed wherein it was directed to identify the government land/river area located within 02 km of small and tributary rivers and ensure action to free it from encroachment.

In addition to the above, the National Disaster Management Authority (NDMA) has issued guidelines for states for floodplain zoning in 2008 as an important 'non-structural measure' to mitigate floods. As per the guidelines, it is suggested that "that areas likely to be affected by floods in a frequency of 10 years should be reserved for green areas like parks, gardens and others while concrete structures should not be allowed there. It also talked about other zones in the floodplain like in areas of flooding in a 25 year frequency and asked states to make plans accordingly in those areas".

According to the NGT order of July 22, 2022 (M.C. Mehta vs. Union of India & Others, Original Application No. 200/2014, arising out of CWP No. 3727/1985 on the file of Hon'ble Supreme Court), "no construction zone distance on floodplains was to be measured from the Highest Flood Line (HFL) in the last 25 years and floodplains were to be identified with longitude and latitude".

As per the rules of Environment (Protection) Act, 1986 and EIA Notification, 2006 and amendments, Environmental Clearance is required before developing any colony, road, highways, and settlements near the buffer zone of any river, streams or a natural drain. At present many settlements are not being constructed under environmental impact assessment and other necessary rules/conditions.

5.2 Right of rivers to flow naturally

Rivers meander through the alluvial plain moving forward without any obstruction. People stop the flow of rivers, as a result the flow area and alignment of rivers changes. The natural flow of rivers is affected due to construction of bridges/roads in the floodplain zone without calculating the discharge of the river and illegal development of colonies or construction of factories in the floodplain zone of the river. Ensuring that river follows natural flow patterns and maintain sufficient quantity to support ecosystem health is crucial for the sustainability of river systems. This concept, often referred to as environmental or ecological flows, aims to balance human water needs with the ecological requirements of rivers. River flows should mimic the natural variability of the river, including seasonal changes, flood events, and low-flow periods. This variability is essential for maintaining the diverse habitats and biological processes that support the river's ecosystem (Dutta, 2021; Iqbal and Dutta, 2022).

The public trust doctrine requires the State (including the local bodies) act as a trustee and also to follow the mandate of section 24 of the Water Act to prevent obstruction of flow of water. The section 24(1)(b) of the Water Act prohibits any obstruction of the flow of water of a stream which may add to pollution. 'Stream' is defined under Section 2(j) to include a water course, whether flowing or dry. It is, thus, clear that storm water drain falls in the definition of 'stream', whether man made or natural[ii].

It is often seen that bridges are constructed by the Public Works Department/NHAI or other implementing agencies without taking technical advice from the Irrigation and Water Resources Department, due to which many times the width and height of the bridge remain inadequate as per the design discharge of that site. There is not enough passage for water to pass and a situation of water logging occurs. In this regard, the Chief Secretary, Uttar Pradesh Government's letter no. 5298/06-2-Sin-5, dated February 02, 2007, has directed as follows "With the construction of road/drain/check dam/private tube well drains, prior consent must be

obtained from the Irrigation Department. Regarding its design and consent of the site, prior technical consultation should be obtained with the Irrigation Department."

Therefore, as per the rules, it will be mandatory for all the implementing agencies to obtain technical advice from the Irrigation and Water Resources Department and no objection from the District/State Ganga Committee before carrying out any kind of construction on the rivers/drains.

According to the Clause 26-C of the Uttar Pradesh Urban Planning and Development Act, 1973 "The Authority or an officers authorized by it in this behalf may, without notice cause to be removed any wall, fence, rail, post. Step, both or other structure whether fixed or movable and whether of a permanent or temporary nature or any fixture which shall be erected, or set in or upon or over any street or upon or over any open channel, drain. Well or tank contrary to the provisions of this Act."

As per the rules of Environment (Protection) Act, 1986 and EIA Notification, 2006 and amendments Environmental Clearance is required before developing any colony, road, highways, and settlements near the buffer zone of any river, streams or a natural drain. No person without obtaining the consent of the state board can establish any industry, etc. which is likely to discharge sewage or trade effluents

5.3 The right of rivers to flow in full without human-generated wastes

Cities have come to existence and evolved on the banks of rivers. Along with urbanization, industrialization is also happening rapidly. All man-made and industrial waste from cities is discharged into rivers and their tributaries (now commonly called drains, even though they are natural units of all rivers). Therefore, almost all the rivers are no longer capable of carrying water and have become highly polluted.

According to the Gazette Notification of the Ministry of Water Resources, River Development and Ganga Rejuvenation of India, S.O. dated 7 October, 2016 , Section 3187(E) and Section 6(1) "No person shall directly or indirectly interfere with the Ganga River or its tributaries or on its banks, Shall not indirectly discharge untreated or treated sewage or sewage sludge". And according to 6(2), "No person shall, directly or indirectly, discharge untreated or treated commercial effluent, industrial effluent into the river Ganga or its tributaries or on its banks". Local bodies cannot discharge sewage in Ganga or its tributaries.

The natural drains which bring freshwater to the rivers are required to be maintained exclusively for storm water. The NGT in its order February 10, 2023 (Original Application No. 16/2014, M.A. No. 63/2022) has mentioned that pollution of the drain should be prevented by stopping discharge of untreated sewage, and by maintaining drains as exclusively for storm water[iii].

5.4 Right of rivers to maintain their ecosystem

The ecosystem of a river is the entire area, comprising of all the biotic components present in its natural environment such as forests, plants, aquatic organisms and micro-organisms along the banks of the river; and all the abiotic components, along with biological, physical and chemical reactions take place. The river ecosystem has been affected by structural controls and ever-increasing demands for freshwater from urban, economic and industrial sectors.

Gazette of India, Notification of the Ministry of Water Resources, River Development and Ganga Rejuvenation dated 7 October, 2016 S.O. According to section 5 of 3187(E):

(1) Every State Government shall endeavor to ensure that "the flow of water in the river Ganga is maintained without altering the natural seasonal variations in the river Ganga".

(2) Every State Government shall also endeavor to maintain adequate flow of water in the river Ganga in different seasons to maintain its ecological integrity and to achieve this goal, all concerned authorities shall take appropriate action in a time bound manner.

Under Section 41 of the Gazette of India, Notification dated October 7, 2016 of the Ministry of Water Resources, River Development and Ganga Rejuvenation, any person or authority to take measures consistent with the restoration of the ecology of the river and the management of the River Ganga Basin States. The right to direct is vested in the powers of 'National Mission for Clean Ganga'.

Additional Commissioner MNREGA, Rural Development, Uttar Pradesh, through his letter No. MNREGA/Letter No. 530/ 1248/2022 dated 17.06.2022, under the restoration of smaller and threatened rivers, plantation and ponds within a radius of 1 km on the banks of endangered rivers. Suggestions have been given for work related to construction, revitalization of drains, water harvesting and conservation.

According to section 3(U) and 3(Z.E) of the Gazette of India, notification of the Ministry of Water Resources, River Development and Ganga Rejuvenation dated 7 October, 2016, it applies to all the sub-rivers or streams of the river Ganga which flows into the river Ganga.

The National Green Tribunal (NGT) in its order OA 498 of 2015 mandated that all states maintain a minimum environmental flow (e-flow) of 15-20% of the average lean season flow in their rivers. Additionally, on October 9, 2018, the Government of India issued a notification specifying the minimum environmental flows to be maintained in the river Ganga from its origin to Unnao in Uttar Pradesh. The Central Water Commission (CWC) is responsible for monitoring and supervising the implementation of this e-flow regime.

5.5 Rivers have the right to be connected with their smaller tributaries and water streams (stream connectivity)

Rivers start from their sequential first order stream and transform into successive order streams into a major stream/main river. Due to urbanization and industrialization, the initial chain of rivers is disrupted, due to which stream connectivity is affected and a situation of flood occurs during the rainy season. For the revitalization of rivers, stream connectivity of rivers with their small tributaries and water streams is always necessary so that continuity and continuity of adequate water in the rivers is maintained. Maintaining connectivity within the river system, including between the river and its floodplains, is also essential for nutrient cycling, sediment transport, and habitat availability.

The natural drainage systems were formed over thousands of years and were adapted to the natural hydrology of the watershed. However, urbanization has increased stormwater flows, often exceeding the capacity of these natural systems.

Chief Secretary, Uttar Pradesh Government in his letter no. 29 BHS/76-2-2022/05NG/2020 TC dated 05.04.2022, instructions have been given to get 50 small and tributary rivers of Uttar Pradesh rejuvenated under MNREGA program through "District Ganga Committee" formed at the district level under SMCG. Later, the number of smaller rivers was increased to 75. For the first time, the smaller tributaries of the Ganga River were considered through a formal order by the Chief Secretary of Uttar Pradesh.

5.6 Water bodies (lakes/ponds/other natural water sources) in the catchment of rivers have the right to remain in their natural form

Along with the gradual evolution of rivers in nature, water bodies came into existence, often created by the rivers themselves in the catchments of the rivers. Over time, the connectivity of the rivers and their water areas got fragmented with the development of roads, highways, residential colonies on the surface. The reason was eliminated but connectivity with the river remained through groundwater at sub-surface level. Rivers and ponds on the surface got fragmented and due to continuous encroachment in the ponds, unplanned construction and change in their land use, the existence of wetlands has been ended. In the last 5 decades, about 70 percent of the water catchment area of wetland has deteriorated. This indicates irreparable damage. Necessary action will have to be taken to prevent encroachments on water bodies (lakes/ponds/other natural water bodies) in the catchment area of rivers and restore them to their natural form.

5.7 Right to maintain ground water

Due to urbanization, groundwater has been exploited the most. Maintaining groundwater level is essential for human civilization. This groundwater maintains the continuity of the water level of rivers/ponds during dry season. Most of the rivers which do not originate in snow covered mountains are based on rainwater and their flow depends on groundwater/artesian wells.

Due to decline in groundwater level there has been a huge reduction in the baseflow, due to which the artisan well has ceased to exist. Ensuring a minimum base flow is critical to sustain aquatic life during dry periods. Base flows maintain water quality, habitat availability, and the overall health of the ecosystem. All the natural water bodies/water sources in the catchment area of the rivers will have to be revived so that groundwater level can be recharged from these water bodies during the rainy season and minimum water flow in the rivers due to activation of artesian wells from groundwater during the non-monsoon period.

5.8 Right to consider the water streams, water sources and underground water of the river and its catchment area as an integral part (family) of the river

Often the water streams, springs and underground water of the river and its catchment area are being defined as separate units whereas all of them are integral, indivisible and members of the river family. For the revival of the river, the river, its catchment area's water streams, its sources and groundwater will have to work as an integrated unit/plan and all the units will have to be revitalized, only then the revival and survival of the rivers is possible. The intrinsic connection between rivers and their floodplains, waterbodies, and aquifers is essential for maintaining the natural balance and functionality of these ecosystems. However, this interconnectedness is frequently disregarded in rejuvenation plans, leading to a fragmented and incomplete restoration.

6. THE MAJOR CHALLENGES TO ESTABLISHING MEANINGFUL RIVER RIGHTS

Establishing river rights in law is only a first step; operationalizing them faces multiple, interlinked challenges. There are multiple legal and doctrine challenges such as standing and representation. Who may act for the river? Guardianship models vary and must be accountable and capable. Courts and legislatures must specify who has locus to sue and how conflicts of interest are avoided. There are issues of liability and compensation as well. When a river is declared a legal person, questions arise: can the river sue? can it be sued? Who bears responsibility for harms (e.g., infrastructure damage during floods)? Unclear liabilities create administrative and fiscal anxieties. The Uttarakhand stay reflects such concerns. There might be some incompatibility with the existing rights and sectoral laws which may have to be resolved. Water rights, property rights, and sectoral laws (irrigation, hydropower, municipal water) often conflict with sweeping river rights. Reconciliation is legally and politically complex.

River basins are administratively fragmented across departments, states and national boundaries. Rights require unified, accountable institutions capable of integrated action.Guardians, local institutions and agencies need scientific, legal and administrative capacity to translate rights into monitoring, enforcement and restoration programs.Restoration, e-flow releases, pollution abatement and compensation mechanisms require sustained finance. Rights without resources produce symbolic victories only.

There are several scientific and evidentiary challenges such as defining durable ecological baselines and rights content.Rights references (e.g., “right to flow with quality, quantity and biodiversity”) require operational definitions—e.g., environmental flows, biodiversity baselines, pollution thresholds—based on solid hydrological and ecological science.Effective rights enforcement demands robust monitoring systems and protocols that can relate legal standards to measurable indicators.

Many riparian peoples and upstream communities depend on regulated flows for livelihoods. Rights must account for human water needs, distributive justice and transitional arrangements.Powerful economic interests (energy, irrigation, real estate) may oppose measures that curtail extractive uses; political will is essential.Rights regimes must balance indigenous cosmologies and plural claimant groups without privileging one set of beliefs inequitably.

7. WHAT IS REQUIRED TO MAKE RIVER RIGHTS EFFECTIVE? — A PRAGMATIC APPROACH

Establishing river rights that are meaningful, equitable and implementable requires synchronized legal, institutional, scientific and social measures. The following blueprint outlines essential elements.

7.1 Clear legal architecture

- **Define the legal subject and scope:** Decide whether the recognition is constitutional (broad, general rights), statutory (tailored rights for specific rivers), or judicial (case-law driven). Each choice has trade-offs: constitutional rights give breadth; statutory arrangements allow tailoring and negotiated governance. Guided by precedents (Ecuador, New Zealand), statute-based negotiated settlements can combine cultural recognition with institutional clarity.
- **Specify guardianship and standing:** Create multi-stakeholder guardian bodies with legal standing to act (sue, be sued, enter agreements), subject to clear accountability, transparency and fiduciary duties. Guardians should include indigenous/community representatives, scientific advisory panels and government appointees.
- **Articulate rights content and limits:** Rights should be translated into operational entitlements: e-flows (quantity and timing), water quality standards, habitat connectivity requirements, sediment/nutrient regimes,

and biodiversity protection obligations. These must be specified, or at least a transparent process for specification must be defined in law/regulation.

7.2 Institutional innovation and capacity

- **River Guardianship Institutions:** Create river authorities or guardians with cross-sectoral powers — coordinating water, environment, land, and infrastructure agencies. Institutional design should define decision-making, dispute resolution, finance and enforcement powers (permits, injunctions, restoration orders). New Zealand's Te Awa Tupua model shows how negotiated institutional arrangements can operationalize rights.
- **Nested governance and subsidiarity:** Rights implementation should be nested: basin-level authorities set strategic standards and oversee coordination; local river forums and panchayats implement measures and monitor compliance.
- **Judicial and administrative remedies:** Provide fast-track remedies and specialized tribunals or benches for river rights violations to ensure timely enforcement.

7.3 Scientific underpinning and adaptive management

- **Environmental-flow science and baseline setting:** Rights must anchor on scientifically defensible e-flow recommendations, derived through hydrology, morphometry, bathymetry and ecological studies. (Many jurisdictions now require e-flow assessments as part of rights regimes.)
- **Monitoring, indicators and open data:** Establish basin observatories with real-time monitoring (flow, water quality, biodiversity indices), with data openly available to civil society. Monitoring must be linked to legally binding thresholds and management triggers.
- **Adaptive management procedures:** Rights regimes must embed formal adaptive mechanisms—periodic review, scientific advisory cycles and contingency management for droughts, floods and climate shifts.

7.4 Social design and equity protections

- **Participatory design and recognition of customary rights:** Design processes must include affected communities, fisherfolk, farmers and indigenous groups in co-producing guardian bodies and restoration plans. Formal recognition of customary water entitlements and transitional support for livelihood adjustments is essential.
- **Transparent compensation and transition pathways:** Where rights entail curtailing existing uses (e.g., reduced abstraction, altered dam operations), provide compensation, alternative livelihoods and staged transitions to avoid social harm.
- **Public education and legal literacy:** Build public understanding of river rights, duties and processes; create legal aid and community paralegal networks for enforcement.

7.5 Funding and economic instruments

- **Dedicated river restoration funds:** Create ring-fenced financing (public, donor, PES—Payments for Ecosystem Services) for restoration, guardians' operations and community incentives.
- **Economic instruments:** Use water pricing, pollution fines, conservation subsidies and PES schemes to align incentives with rights compliance. Revenue from fines and fees can help sustain guardianship operations.
- **Private-public partnerships:** Where appropriate, PPPs can finance restoration and eco-tourism but must be tightly regulated to avoid commodification of rights.

7.6 Legal safeguards and clarity on liability

- **Clarify liability regimes:** Statute should clarify that declaring a river a rights-bearing entity does not impose unmanageable liabilities on the state; rather, it creates duties to protect and restore. Where liabilities exist (e.g., in flood damage), clear rules about state responsibility, indemnity and compensation must be set to avoid legal paralysis. The Uttarakhand stay demonstrates how liability concerns can derail rights advances if left unaddressed.

8. CONCLUSION: RIVER RIGHTS AS A TRANSFORMATIVE RESTORATION TOOL

Rivers have right to flow naturally — with maintenance of ecological flows sufficient for ecological integrity. All rivers within the State must be recognized as 'living and indivisible ecological entities' with safeguarding riverbeds, floodplains, and riparian buffers. Recognition of river rights can be a transformative restoration tool — redirecting law and policy toward ecological processes and long-term resilience. However, rights are

not automatic cures. They must be embedded within clear legal architectures, pragmatic institutional designs, robust science and equitable social arrangements. The river-rights framework introduces new possibilities, its real-world impact depends on institutional capacity, social legitimacy, and effective enforcement mechanisms. Purely technological or regulatory interventions are often insufficient to protect rivers — because they ignore cultural meanings, social behavior, and institutional gaps.

As water stress intensifies, granting rivers legal personality has emerged as an innovative method to curb overuse and protect ecosystem health. An examination of cases from Australia, New Zealand, and India shows that while this approach holds promise, its effectiveness depends on strong enforcement and meaningful institutional support (O'Donnell and Talbot-Jones, 2018). The case studies from Australia, New Zealand, and India show that legal rights for rivers can be created in diverse legal and institutional contexts to address environmental, cultural, and economic challenges. These rights can emerge through both legislative and judicial processes, with legislation offering stability and judicial rulings offering speed but also greater vulnerability, as seen in India. While Australia and New Zealand embedded river rights within strong institutional and governance frameworks, the Indian example revealed limitations due to weak institutional support, lack of resources, and subsequent legal uncertainty. The analysis demonstrates that granting rights to nature is emerging as a mainstream development in environmental law, with recent models improving on earlier shortcomings in countries like Ecuador and Bolivia. Overall, various cases highlight that legal rights for rivers can support more adaptive water governance, but their effectiveness depends on context-specific institutional strength and enforcement capacity.

Legal activism (lawsuits, public interest litigation) and a recognition of rivers as rights-bearing entities can bridge the gap, by combining moral, ecological, and legal imperatives. Successful examples (Ecuador's constitutional recognition, Colombia's Atrato judgment and New Zealand's Te Awa Tupua settlement) reveal the potential and the diversity of workable models: constitutional guarantees, judicial mandates tied to human rights, and negotiated statutory personhood combined with guardianship institutions.

To move from rhetoric to impact, three priorities stand out: (1) translate rights into concrete, measurable ecological entitlements (flows, quality, connectivity); (2) create accountable guardians and basin institutions with technical and financial capacity; and (3) ensure social equity through participatory design and just transition mechanisms. If these elements are aligned, river rights can help restore both the hydrological functioning and the cultural integrity of rivers—protecting them as living systems for present and future generations.

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[i] According to the Notification dated 07.10.2016 issued by the Ministry of Water Resources, River Development, and Ganga Rejuvenation under the Environment (Protection) Act, 1986, "floodplain" means such area of River Ganga or its tributaries which comes under water on either side of it due to floods corresponding to its greatest flow or with a flood of frequency once in hundred years" (quoted in the NGT Order dated July 22, 2022 in Original Application No. 200/2014 (C.W.P. No. 3727/1985).

[ii] quoted in the NGT Order dated February 10, 2023 (Original Application No. 16/2014, M.A. No. 63/2022).

[iii] "the intercepted and diverted sewage needs to be treated and treated water utilized for secondary purposes such as agriculture, horticulture, industrial, parks, gardens or any other such non-contact purposes" (quoted in the NGT Order dated February 10, 2023 (Original Application No. 16/2014, M.A. No. 63/2022).