



Rights-Based and Environmental Approaches to Water Scarcity Mitigation: A Comparative Analysis of Water Governance in Indonesia and India

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Abstract: This article examines the legal issue of water scarcity mitigation through rights-based and environment-based water governance in Indonesia and India. The central problem is how the normative recognition of the right to water and environmental protection can be translated into operational, measurable, and accountable public policy instruments, particularly for controlling groundwater extraction and preventing scarcity before crisis occurs. This study uses normative-conceptual legal research based on secondary legal materials, including legislation, constitutional provisions, policy documents, court-oriented doctrinal materials, and scholarly literature. The analysis applies statutory, conceptual, and comparative approaches, supported by the theory of the human right to water, ecological sustainability, accountability, and multi-level water governance. The findings show that Indonesia has a strong constitutional and statutory foundation for water governance, but its implementation remains constrained by fragmented authority, weak extraction data, administrative licensing, limited monitoring, inconsistent sanctions, and insufficient transparency. India, while also facing regulatory fragmentation, provides comparative lessons through rights-oriented jurisprudence, aquifer mapping, data-driven groundwater management, and community-based monitoring. The novelty of this article lies in proposing a binding reform framework that integrates three pillars: minimum water needs and protection of vulnerable groups, measurable ecological limits, and accountable governance through open data, licensing control, monitoring, participation, and enforceable sanctions. This framework contributes to debates on the policy-implementation gap, justiciability of water rights, and institutional design for sustainable water scarcity prevention.

Keywords: Water Scarcity, Governance, Right To Water, Environmental Law, Accountability.

Introduction

Water policy regulation in Indonesia and India constitutes the central background of this article because both countries recognise water not only as a natural resource, but also

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as an object of public governance, environmental protection, and rights-based state responsibility. In Indonesia, the regulatory framework for water policy is anchored in Article 33 paragraph (3) of the 1945 Constitution, which places water and other natural resources under state control for the greatest prosperity of the people, and Article 28H paragraph (1), which recognises the right to a good and healthy environment. These constitutional norms are operationalised through Law Number 17 of 2019 concerning Water Resources, which regulates the state's responsibility in water resource management, the priority of fulfilling minimum daily basic water needs, conservation, utilisation, control of water-related damage, and the integration of surface water and groundwater management. This framework is also linked to Law Number 32 of 2009 concerning Environmental Protection and Management, Law Number 23 of 2014 concerning Regional Government, Presidential Regulation Number 37 of 2023 concerning National Water Resources Policy, and Government Regulation Number 30 of 2024 concerning Water Resources Management.¹

India has a different regulatory structure. Water is generally positioned as a state-level matter, but the central government retains important authority through environmental legislation, national policy, pollution control, and groundwater regulation. At the constitutional level, Article 21 of the Constitution of India has been judicially developed in relation to the right to life, environmental quality, and access to clean water, while Article 48A directs the state to protect and improve the environment and Article 51A(g) imposes a duty on citizens to protect the natural environment. At the statutory and policy level, India's water governance is shaped by the Water (Prevention and Control of Pollution) Act 1974, the Environment (Protection) Act 1986, the National Water Policy 2012, and groundwater regulation through the Central Ground Water Authority, particularly in relation to groundwater extraction control and environmental compliance.²

Water scarcity is directly related to the fulfilment of the right to water and sanitation and impacts human life and health, as it has affected more than 40% of the global population and is projected to continue to increase.³ Water scarcity is a consequence of an imbalance between the availability of fresh water and human needs, which then has a wide range of impacts ranging from human health, economic stability (including industrial and agricultural production), to socio-political disturbances such as poverty and conflict; Therefore, this issue cannot be understood solely as an environmental issue, but also a public policy issue related to the fulfilment of basic needs/rights to water and sanitation.⁴ Indonesia and India are both facing water availability pressures driven by a combination of climate change, rapid urbanisation, growing industrial and agricultural needs, and the degradation of buffer ecosystems (watersheds and catchment areas). In that context, the law not only serves as a "rules of the game" but also as an instrument to direct behaviour, divide authority, ensure accountability, and protect vulnerable groups. Law does not stop at being a set of rules, but also plays an active role as a social order that regulates social relations: the

¹ Republic of Indonesia, Constitution of the Republic of Indonesia 1945, Article 33 paragraph (3) and Article 28H paragraph (1); Republic of Indonesia, Law Number 17 of 2019 concerning Water Resources, State Gazette of the Republic of Indonesia Year 2019 Number 190, Supplement to the State Gazette Number 6405; Republic of Indonesia, Law Number 32 of 2009 concerning Environmental Protection and Management, State Gazette of the Republic of Indonesia Year 2009 Number 140, Supplement to the State Gazette Number 5059; Republic of Indonesia, Law Number 23 of 2014 concerning Regional Government, State Gazette of the Republic of Indonesia Year 2014 Number 244, Supplement to the State Gazette Number 5587; Republic of Indonesia, Presidential Regulation Number 37 of 2023 concerning National Water Resources Policy, State Gazette of the Republic of Indonesia Year 2023 Number 88; Republic of Indonesia, Government Regulation Number 30 of 2024 concerning Water Resources Management, State Gazette of the Republic of Indonesia Year 2024 Number 167.

² Government of India, The Constitution of India, Article 21, Article 48A, and Article 51A(g); Government of India, The Water (Prevention and Control of Pollution) Act, 1974, Act Number 6 of 1974; Government of India, The Environment (Protection) Act, 1986, Act Number 29 of 1986, Section 3 and Section 5; Ministry of Water Resources, Government of India, National Water Policy 2012; Central Ground Water Authority, Ministry of Jal Shakti, Government of India, Guidelines to Regulate and Control Ground Water Extraction in India, issued under the authority constituted pursuant to Section 3(3) of the Environment (Protection) Act, 1986.

³ Bharat Bhushan, "Bioinspired Strategies for Water Collection and Water Purification," in *Springer Series in Materials Science*, vol. 279, 2018, 665, https://doi.org/10.1007/978-3-319-71676-3_17.

⁴ Peter H. Gleick and Heather Cooley, "Freshwater Scarcity," *Annual Review of Environment and Resources* 46, no. 1 (October 18, 2021): 319-320, 336, <https://doi.org/10.1146/annurev-environ-012220-101319>.

law directs and shapes behaviour, determines rights and obligations, and maintains order and certainty (legal security) so that social life is stable. The goal of justice can be realised.⁵

The water policy literature shows that water scarcity is generally born from two sources: (a) physical limitations (e.g., decreased rainfall, drought, seawater intrusion), and (b) scarcity that is "created" by governance (e.g., weak extraction permits, non-transparent data, tariffs that do not reflect service costs, poor inter-agency coordination, and inconsistent law enforcement). The rights-based approach emphasises that minimum access to safe and affordable water is part of the state's obligations.⁶ At the same time, the environment-based framework demands that ecological limits be respected so that water resources are not exploited beyond their carrying capacity. In practice, the two frameworks often meet on highly sensitive issues: controlling groundwater extraction, managing water quality, and prioritising water allocation when supplies drop.⁷

The main legal problem, therefore, lies in whether the Indonesian and Indian regulatory frameworks are capable of translating rights-based and environment-based principles into operational, measurable, and accountable water governance instruments. So far, many studies have affirmed normative recognition, such as the right to a good and healthy environment and the state's obligation to guarantee public services, but have not sufficiently explained how these recognitions work in day-to-day policy design, especially when dealing with concrete decisions such as the division of authority, licensing, supervision, sanctions, and financing.⁸ As a result, the gap between norms and implementation remains wide, and water scarcity prevention often proceeds without clear accountability standards or firm ecological indicators.

The weak points of water scarcity prevention in Indonesia are often rooted in policy designs that are not yet solid: the division of authority of the regional center that is not always clear and consistent, licensing that is sometimes more administrative than capacity-based, weak supervision due to limited data and capacity, sanctions that are rarely enforced so that they do not have a deterrent effect, and inadequate financing to ensure services, conservation, and enforcement are ongoing.⁹ In contrast, Indian practices, especially on groundwater issues, demonstrate efforts to build a more layered combination of instruments: regulations and policy programs that encourage extraction control, strengthen data-driven governance and aquifer mapping, and engage communities through participatory approaches that enable water users to plan, monitor, and maintain compliance

⁵ Hatice ALSAÇ, "İslâm Hukukunda Külli Kâidelerin Hukukun İşlevleri Arasındaki Antinomi/Çatışma Bağlamında Değerlendirilmesi," *Hitit İlahiyat Dergisi* 21, no. 2 (December 30, 2022): 1100, <https://doi.org/10.14395/hid.1156814>; Luc Robert, "Regulating Prison Life: A Case Study of the Inmate Disciplinary System," in *Facing the Limits of the Law* (Berlin, Heidelberg: Springer Berlin Heidelberg, 2009), 126, https://doi.org/10.1007/978-3-540-79856-9_8; Engin Deniz Akarlı, "Gedik: A Bundle of Rights and Obligations for Istanbul Artisans and Traders, 1750-1840," in *Law, Anthropology, and the Constitution of the Social* (Cambridge University Press, 2004), 166, 168-169, 172-173, <https://doi.org/10.1017/CBO9780511493751.006>.

⁶ Fuller, "Population Growth, Climate Change and Water Scarcity in the Southwestern United States," *American Journal of Environmental Sciences* 6, no. 3 (March 1, 2010): 249-251, <https://doi.org/10.3844/ajessp.2010.249.252>; Roger Patrick, "When the Well Runs Dry: The Slow Train Wreck of Global Water Scarcity," *Journal AWWA* 107, no. 3 (March 2015): 66, 68-69, <https://doi.org/10.5942/jawwa.2015.107.0042>; Horman Chitonge, "Urbanisation and the Water Challenge in Africa: Mapping out Orders of Water Scarcity," *African Studies* 79, no. 2 (April 2, 2020): 3-4, 12, 18, <https://doi.org/10.1080/00020184.2020.1793662>.

⁷ Pedro Arrojo Agudo, "Crisis Global Del Agua En El Planeta Agua, El Planeta Azul," *Revista Catalana de Dret Públic* 2024, no. 68 (June 19, 2024): 9, <https://doi.org/10.58992/rcdp.i68.2024.4258>; Calvin Sambo, Aidan Senzanje, and Onesimo Mutanga, "Assessing Inequalities in Sustainable Access to Improved Water Services Using Service Level Indicators in a Rural Municipality of South Africa," *Journal of Water Sanitation and Hygiene for Development* 11, no. 6 (2021): 887-888, 891, 896, 899-900, <https://doi.org/10.2166/washdev.2021.234>.

⁸ David R Boyd, "Catalyst for Change," in *The Human Right to a Healthy Environment*, vol. 11 (Cambridge University Press, 2018), 29-31, 33, <https://doi.org/10.1017/9781108367530.002>; Ioannis Panoussis, "L'émergence Progressive d'un Droit Subjectif à l'environnement Sain En Droit International Des Droits de l'Homme," *Revista de Estudos Constitucionais, Hermenêutica e Teoria Do Direito* 15, no. 1 (September 25, 2023): 23, 29-31, <https://doi.org/10.4013/rechtd.2023.151.02>.

⁹ Panoussis, "L'émergence Progressive d'un Droit Subjectif à l'environnement Sain En Droit International Des Droits de l'Homme", 1-2, 10, doi: 10.4013/rechtd.2023.151.02; Gabriela Garcia Batista Lima Moraes and Nathalia Peres Bernardes, "A Discrecionalidade Técnica Administrativa Limitada Pelos Estudos Técnicos Dos Impactos Hídricos Na Análise Com Base Em Casos De Mineração No Distrito Federal, Brasil," *Revista de Estudos Empíricos Em Direito* 11 (November 5, 2024), <https://doi.org/10.19092/reed.v11.801>.

locally.¹⁰ From this comparison, Indonesia can draw important lessons to strengthen accountability and protection of water rights through stricter structuring of authority, ecological evidence-based licensing and supervision, realistic and consistent sanctions, and financing schemes that cover conservation and enforcement costs without ignoring ecological boundaries as a "safe line" that should not be crossed.

The gap between norms and implementation risks makes water policy reactive, moving only when a crisis has already occurred. The ratification of water policies/laws is often treated as if it has solved the problem, even though the rules are not automatically operational, enforced, or complied with; As a result, a real gap is formed between norms in policy and practice in the field, which risks making policy responses tend to emerge after the problem has been felt/has worsened.¹¹ The comparison with India is relevant because India combines rights-oriented constitutional jurisprudence with policy experience in groundwater control, aquifer mapping, data-based management, and community participation. The purpose of this article is to examine how rights and environment-based water governance designs can be formulated as more effective public policy instruments to prevent water scarcity. The conceptual hypothesis is that the clearer the justiciable guarantees, ecological limits, and accountability mechanisms (permits, monitoring, transparency, and sanctions), the higher the chance of policies to prevent water scarcity sustainably.

Research Methods

This research is normative (conceptual) legal research that relies on secondary legal materials to explain how the legal framework prevents water scarcity. Since the starting point is law as an authoritative text, the primary analysis is to read laws and regulations, court decisions, and doctrinal literature as the primary formal sources for understanding positive law, and then organise and analyse these sources to map the authority structure and water management instruments.¹² Furthermore, this study links the normative findings with the concepts of the right to water, equity of access, and ecological limits through a statute approach and a conceptual approach, with a typical working style of doctrinal research: (re)construction of concepts in specific contexts and drawing conclusions that can lead to recommendations for improvement of legal/policy designs.¹³

By design, this study is qualitative-normative with a comparative model (Indonesia-India), and its analysis unit includes legal norms, policies, and governance principles related to scarcity prevention (especially groundwater extraction control and strengthening accountability). The sample in this study comprises all relevant legal/policy documents. In contrast, the sample is selected purposively based on the weight of the regulation, the findings are then processed using document review protocols and comparative matrices to encode aspects of rights-obligations, ecological limits, division of authority, control instruments (permits/quotas/tariffs/monitoring/enforcement), and accountability (transparency/participation/access to justice) which are in line with the comparative literature that emphasises that comparability and synthesis will be hampered if the criteria

¹⁰ Y. Jadeja et al., "Managing Aquifer Recharge and Sustaining Groundwater Use: Developing a Capacity Building Program for Creating Local Groundwater Champions," *Sustainable Water Resources Management* 4, no. 2 (June 27, 2018): 2–3, 5, 8, 10–12, <https://doi.org/10.1007/s40899-018-0228-6>; Dhaval Joshi, Himanshu Kulkarni, and Uma Aslekar, "Bringing Aquifers and Communities Together: Decentralised Groundwater Governance in Rural India," in *Springer Water*, 2019, 163–164, 167, 178–179, https://doi.org/10.1007/978-981-13-2700-1_9; Himanshu Kulkarni, Mihir Shah, and P.S. Vijay Shankar, "Shaping the Contours of Groundwater Governance in India," *Journal of Hydrology: Regional Studies* 4 (September 2015): 11–12, 14–15, <https://doi.org/10.1016/j.ejrh.2014.11.004>.

¹¹ Claude Ménard, Alejandro Jimenez, and Hakan Tropp, "Addressing the Policy-Implementation Gaps in Water Services: The Key Role of Meso-Institutions," *Water International* 43, no. 1 (January 2, 2018): 3, <https://doi.org/10.1080/02508060.2017.1405696>; Raymond P. Motha, "Disaster Reduction Planning and Response: The Example of National Drought Policy in USA," in *Natural Disasters and Extreme Events in Agriculture* (Berlin/Heidelberg: Springer-Verlag, 2005), 180, 182, 184, https://doi.org/10.1007/3-540-28307-2_11.

¹² Philip Langbroek et al., "Editorial
Methodology of Legal Research: Challenges and Opportunities," *Utrecht Law Review* 13, no. 3 (December 13, 2017): 2, <https://doi.org/10.18352/ulr.411>.

¹³ Langbroek et al., 2.

of case inclusion, variable definition, coding scheme, and inter-coder reliability test are not made explicit.¹⁴ Therefore, this study positions comparative work as instrumental for mapping, norm coherence testing, and identification of implementation gaps, with an emphasis on the importance of coding protocols and manual coding (as a systematic procedure and a question/code guide to harmonise code interpretation).¹⁵

At the document selection and segmentation stage, this approach is also consistent with the recommendation to define and report inclusion/exclusion criteria and text segmentation to reduce bias, ambiguity, and missing data.¹⁶ Furthermore, the determination of categories/variables and the organisation of data into a comparison matrix reflect the importance of the definition of the coding schema (theoretical interpretation of categories and organisation of data) in comparative research/meta-analysis.¹⁷ Finally, the mapping and coding process is strengthened through the principles of sample coding, iterative refinement, and intercoder reliability testing, so that the comparison results are more transparent and replicable, including spot-checking practices to prevent coder drift and openly reporting assumptions and procedures in research outputs.¹⁸

Results and Discussion

Norm Gap–Implementation and Water Governance Challenges

Based on the normative provisions governing water policy, Indonesia and India both recognise water as a matter of basic needs, environmental protection, and public responsibility. However, the meaning of this recognition must be examined through the specific legal provisions that regulate rights, authority, conservation, licensing, monitoring, participation, and enforcement. Therefore, the main issue is not merely whether both countries have legal norms on water, but whether those norms are sufficiently operational to prevent water scarcity, particularly in relation to groundwater extraction and ecological limits.

In Indonesia, the normative basis of water governance is derived from Article 33 paragraph (3) of the 1945 Constitution, which places water and other natural resources under state control for the greatest prosperity of the people, and Article 28H paragraph (1), which recognises the right to a good and healthy environment. These constitutional provisions are operationalised through Law Number 17 of 2019 concerning Water Resources. Article 6 affirms the state's responsibility to guarantee the people's right to water for minimum daily basic needs, while Article 8 places daily basic needs as a priority in water resource utilisation. Article 8 paragraph (6) also recognises environmental needs as part of the priority structure in water fulfilment. These provisions show that Indonesian water policy is normatively constructed through two connected principles: the fulfilment of minimum human needs and the protection of ecological sustainability.¹⁹

The environmental dimension of Indonesian water governance is strengthened by Law Number 32 of 2009 concerning Environmental Protection and Management. Article 3 places environmental protection and management within the objectives of preserving environmental functions, preventing pollution and/or environmental damage, and guaranteeing justice for present and future generations. Article 65 paragraph (1) recognises the right to a good and healthy environment, while Article 65 paragraph (2) affirms the right to environmental information, participation, and access to justice. Article 70 also provides space for community participation in environmental protection and management,

¹⁴ Elicia Ratajczyk et al., "Challenges and Opportunities in Coding the Commons: Problems, Procedures, and Potential Solutions in Large-N Comparative Case Studies," *International Journal of the Commons* 10, no. 2 (September 9, 2016): 441, <https://doi.org/10.18352/ijc.652>.

¹⁵ Ratajczyk et al., 445.

¹⁶ Ratajczyk et al., 447.

¹⁷ Ratajczyk et al., 448–49.

¹⁸ Ratajczyk et al., 460–62.

¹⁹ Republic of Indonesia, "Constitution of the Republic of Indonesia 1945" Article 28 H(1), Article 33 (3); "Law Number 32 of 2009 concerning Environmental Protection and Management", Article 3, Article 65 (1).

including social supervision, suggestions, objections, complaints, and reports. These provisions are relevant to water governance because scarcity prevention requires not only water allocation rules, but also public access to data, participatory supervision, and enforceable environmental accountability.²⁰

Nevertheless, the implementation gap in Indonesia appears when these constitutional and statutory guarantees are translated into concrete governance instruments. Law Number 17 of 2019 and its related regulations provide the basis for water resources management, yet the effectiveness of scarcity prevention depends on whether the state can produce reliable water availability data, transparent groundwater extraction records, capacity-based licensing, regular monitoring, and consistent sanctions. The main challenge is that water governance often remains administrative rather than ecological. Licensing may operate as a formal approval mechanism without being fully connected to aquifer capacity, river basin conditions, conservation needs, and cumulative extraction impacts. As a result, the legal recognition of the right to water and environmental protection risks becoming declaratory if it is not supported by measurable standards and accountable enforcement.

In India, the normative framework is structured differently. Article 21 of the Constitution of India, which protects the right to life and personal liberty, has been interpreted in legal discourse and judicial practice as including the right to live with dignity, environmental quality, and access to clean water. This constitutional foundation is supported by Article 48A, which directs the state to protect and improve the environment, and Article 51A(g), which imposes a fundamental duty on citizens to protect and improve the natural environment. These provisions indicate that India's rights-based water governance is not built solely through statutory water law, but also through constitutional interpretation linking life, health, environment, and access to water.²¹

At the statutory level, India's water governance is shaped by the Water (Prevention and Control of Pollution) Act 1974 and the Environment (Protection) Act 1986. The Water Act 1974 establishes a pollution-control framework through central and state pollution control boards and consent mechanisms for activities that may affect water quality. Meanwhile, the Environment Protection Act 1986 grants broad authority to the central government to take measures for environmental protection and to issue binding directions, including directions related to the regulation or closure of activities that may cause environmental harm. Groundwater regulation is further developed through the Central Ground Water Authority, which operates under the authority of the Environment Protection Act 1986 and regulates groundwater extraction through guidelines, no-objection certificate mechanisms, and compliance requirements. India's National Water Policy 2012 also emphasises integrated water resources management, demand management, aquifer mapping, water-use efficiency, and participatory approaches.²²

Based on these provisions, the comparative meaning of the Indonesia–India analysis is clear. Indonesia has a relatively integrated statutory framework through Law Number 17 of 2019, Law Number 32 of 2009, and related water policy regulations, but its main weakness lies in operational implementation, especially in data transparency, extraction control, licensing supervision, and enforcement. India has a more fragmented regulatory structure because water governance depends strongly on state-level authority, but it offers important lessons through constitutional rights reasoning, pollution control mechanisms, central environmental powers, groundwater extraction regulation, aquifer mapping, and community-based monitoring. Therefore, the policy-implementation gap in both countries

²⁰ Republic of Indonesia, Law Number 32 of 2009 concerning Environmental Protection and Management, Article 3, Article 65 paragraph (1), Article 65 paragraph (2), and Article 70.

²¹ Government of India, The Constitution of India, Article 21, Article 48A, and Article 51A(g).

²² Government of India, The Water (Prevention and Control of Pollution) Act, 1974, Act Number 6 of 1974; Government of India, The Environment (Protection) Act, 1986, Act Number 29 of 1986, Section 3 and Section 5; Ministry of Water Resources, Government of India, National Water Policy 2012; Central Ground Water Authority, Ministry of Jal Shakti, Government of India, Guidelines to Regulate and Control Ground Water Extraction in India.

does not arise from the absence of legal norms, but from the incomplete translation of those norms into binding, measurable, and enforceable governance instruments.

The principal finding of this section is that rights-based and environment-based water governance must be presented as a chain of legal instruments rather than as abstract principles. Minimum water needs require service standards and priority rules; ecological limits require data on water availability, groundwater extraction, aquifer capacity, and environmental carrying capacity; and accountability requires transparency, participation, monitoring, complaints mechanisms, and enforceable sanctions. In this sense, the prevention of water scarcity depends on the ability of legal provisions to operate as practical governance tools. The stronger the connection between rights, ecological limits, and accountability instruments, the greater the possibility that water policy can move from reactive crisis response toward preventive and sustainable scarcity mitigation.

Reform of Rights-Based and Environment-Based Water Governance: Recommendations for Institutional Instruments and Designs

The above findings fill the gap in the introduction by "downgrading" the rights and environment-based approach from the level of abstract recognition to an operational package of instrument reforms. The right to water does not stop at the declaration; it requires a clear justification of minimum essential needs and of who should be prioritised when resources are limited, especially vulnerable groups. In the framework of the sustainable right to water, Spijkers' explanation emphasised that the realisation of rights "must also be sustainable, ensuring that the right can be realised for present and future generations".²³ The principle of "priority for vulnerable groups" is also affirmed in the reference to policy practice, which Spijkers explains that "priority for vulnerable and marginalised groups... water available for domestic and personal use for all people, including vulnerable groups".²⁴ In Indonesia, the normative basis meets between the constitutional mandate for water and the environment, for example, the 1945 Constitution Article 33 paragraph (3) (the state controls land and water for the greatest prosperity of the people) and Article 28H paragraph (1) (the right to a good and healthy environment).²⁵ The operational framework can be seen in Law 17/2019. Article 6 emphasises that the state guarantees the people's right to water to meet minimum daily basic needs. In contrast, Article 8 establishes the order of priority for meeting needs (starting with daily basic needs).²⁶ At the international level, state obligations can be locked in through relevant human rights instruments such as ICESCR Article 11(1) (right to a decent standard of living) and Article 12(1)–(2) (right to health and improvement of environmental hygiene aspects), CRC Article 24(2)(c) (provision of clean drinking water and consideration of environmental pollution hazards),²⁷ and CEDAW Article 14(2)(h) (decent living conditions for rural women, including *water supply*).²⁸

The second and third pillars of *measurable ecological boundaries* and *accountable governance* make the scarcity prevention agenda "binding" (not just an appeal). Internationally, the *UN Watercourses Convention 1997* provides legal language that is close to ecological *limits* as in the provisions of Article 5(1) requires equitable and reasonable utilisation with the aim of "optimal and sustainable utilisation" consistent with "adequate protection of the watercourse", Article 6(1) even forces the state to consider the factor of "hydrological... climatic, ecological"; and Article 7 contains the obligation "not to cause significant harm". This convention also affirms the protection of ecosystems as stipulated in

²³ Otto Spijkers, "The Sustainable Human Right to Water as Reflected in the Sustainable Development Goals," *Utrecht Law Review* 16, no. 2 (October 30, 2020): 19, <https://doi.org/10.36633/ulr.560>.

²⁴ Spijkers, 26.

²⁵ Republic of Indonesia, "Constitution of the Republic of Indonesia 1945", Article 33 paragraph (3), 28H paragraph (1).

²⁶ Law of the Republic of Indonesia No. 17 of 2019, "Law (Law) No. 17 of 2019 concerning Water Resources, Article 6, Article 8.

²⁷ Nations, International Covenant on Economic, Social and Cultural Rights, Articles 12(1)–(2), 24 (2)(c).

²⁸ The Office of the United Nations High Commissioner for Human Rights, "Convention on the Elimination of All Forms of Discrimination against Women Adopted and Opened for Signature, Ratification and Accession by General Assembly Resolution 34/180 of 18 December 1979.", Article 14(2)(h).

Article 20 and pollution control, including the determination of *water quality objectives/criteria* specified in Article 21.²⁹

Indonesia itself determines the ecological floor, emphasised in Law 17/2019, Article 8, paragraph (6), which includes "environmental needs" as a priority in water fulfilment.³⁰ Then, for the accountability pillar, the groundwater governance literature emphasises that the instrument's design should be a combination of (permits/quotas/tariffs, data/monitoring, participation, enforcement), because "There are many institutional tools and combinations for managing groundwater sustainably, but no panaceas".³¹ An example from India shows how data reinforcement and monitoring can be made cheaper and *more legible* through participation: "citizen scientists who monitor groundwater quantity and quality... reducing the transaction costs of monitoring, regulation and enforcement".³²

At the *hard law* level, India provides *enabling powers* for the enforcement of instruments: *Environment (Protection) Act 1986* Section 3 gives the central Government broad powers to "protect and improve" the environment and prevent/control pollution, and Section 5 allows the Government to issue *directions* (including the cessation/regulation of industrial or *stoppage/regulation* of electricity/water supply).³³ while the *Water (Prevention and Control of Pollution) Act 1974* operates a *consent/permission model* through a consent and condition mechanism.³⁴ Thus, the comparative lesson is clear that the prevention of scarcity is not enough with "rights" and "environment" as slogans, but must be realised as an *architecture of instruments* that link rights-minima, ecological thresholds, and accountability (permissions–data–monitoring–participation–enforcement) in a single policy chain.

Conceptually, the policy framework proposed in this study can be "locked" first to minimum service standards and recovery mechanisms when supply is disrupted. It is crucial that the rights-based approach does not stop at the declaration but becomes a measurable operational obligation, including the minimum quantity/quality/affordability that must be guaranteed, who is prioritised, and the consequences if it fails.

Water rights literature emphasises the cross-generational dimension of sustainability "the manner of the realisation of the water right must ... be sustainable, ensuring that the right can be realised for present and future generations",³⁵ In addition, the recognition of rights needs to be made explicit so that the targeting of vulnerable groups actually occurs, as referencing Spijkers' statement that "must be explicitly recognised... ensure that vulnerable and marginalised groups are targeted and that inequalities are addressed".³⁶ In Indonesia, the legal anchor can be assembled through the provisions of Article 6 of Law 17/2019 which affirms the right of everyone to "get water for their minimum daily basic needs" and access to clean water, as well as stipulating the fulfilment of minimum daily basic needs as the main priority in the business/use of natural resources as determined in Article 8.³⁷ For this right to become a *service obligation*, the provisions in Article 21 of the Law of the Republic of Indonesia Number 25 of 2009 concerning Public Services (Law 25/2009) require service providers to compile and implement *service standards* and Article 37 provides a complaint mechanism until opening a lawsuit channel

²⁹ United Nations, "Convention on the Law of the Non-Navigational Uses of International Watercourses 1997," General Assembly of the United Nations on 21 May 1997, Article 5(1), 6(1), 20, and 21.

³⁰ Law of the Republic of Indonesia No. 17 of 2019, Law No. 17 of 2019 concerning Water Resources, Article 8(6).

³¹ Ruth Meinzen-Dick and Bryan Bruns, "Crafting Combinations to Govern Groundwater: Knowledge, Motivation, and Agency," *International Journal of the Commons* 18, no. 1 (October 7, 2024): 587, <https://doi.org/10.5334/ijc.1473>.

³² Shuchi Vora, "Learning Together for Groundwater Management: A Case of the Devnadi Basin, Nashik, Maharashtra, India," *International Journal of the Commons* 18, no. 1 (August 6, 2024): 509–10, <https://doi.org/10.5334/ijc.1323>.

³³ Government Of India, "The Environment (Protection) Act, 1986 (Act No.29 of 1986)", Sections 5.

³⁴ Government of India, "The Water (Prevention and Control of Pollution) Act Nomor 6 of 1974".

³⁵ Spijkers, "The Sustainable Human Right to Water as Reflected in the Sustainable Development Goals," 20.

³⁶ Spijkers, 26.

³⁷ Law of the Republic of Indonesia No. 17 of 2019, Law No. 17 of 2019 concerning Water Resources, Articles 6 and 8.

when the service is detrimental to the community, where this is expressly stated in Articles 51-52.³⁸

As an international reference that strengthens the basis of rights, the ICESCR mandates the fulfillment of a decent standard of living (see Article 11) and the right to health (see Article 12), the CRC affirms the state's obligation to ensure "clean drinking-water" within the framework of children's health (see Article 24(2)(c)),³⁹ and CEDAW links "water supply" as part of women's decent living conditions in rural areas (see Article 14(2)(h)) which can all be translated into the design of minimum service thresholds, emergency protocols in the event of disruption, public notification obligations, and complaint-based compensation/remedy and/or litigation.⁴⁰

The next pillar is to make data-permits-monitoring-participation a package of scarcity-control instruments, especially for groundwater. Here, Law 17/2019 provides a strong basis. Under Article 54, the Government is obliged to organise a Water Resources Information System, and, in addition, paragraph (3) requires natural resources data/information to be accessible to stakeholders in accordance with the provisions of regulations.⁴¹ Meanwhile, licensing instruments for the management/exploitation of natural resources are emphasised for further regulation in Article 53, and the strengthening of the role of the community/partnership is facilitated in Article 55.⁴² The obligation of openness can be emphasised through Law of the Republic of Indonesia Number 14 of 2008 concerning Public Information Disclosure (Law 14/2008) precisely in Article 7 paragraphs (2)-(3) Public Agencies are obliged to provide accurate information and build "information and documentation systems ... so that it can be easily accessed", Article 9 also requires to announce information promptly. Article 11 specifies the provision of information at all times, which is relevant for the groundwater dashboard (water level, quality, permits/quotas, compliance, sanctions).⁴³ In terms of accountability, Article 65, paragraph (2), of Law 32/2009 emphasises access to information, participation, and justice, and Article 70 broadens the spectrum of community roles to include social supervision, objections, complaints, and the submission of reports.⁴⁴

If you look at the studies that support the above statement, you can refer to the explanation of Meinzen-Dick and Bruns which states "There are many institutional tools for governing groundwater, but no panaceas, and successes are rare",⁴⁵ This means that permits/quotas/tariffs/monitoring/enforcement need to be assembled as *a combination* that fits the context (carrying capacity and local risk), rather than a single recipe. To reduce the cost of supervision and close the implementation gap, participatory practices can be positioned as part of the *regulatory design* with a community that monitors micro-conditions, "reducing the transaction costs of monitoring, regulation and enforcement that the state is unable to overcome".⁴⁶ This is in line with the argument that transparency, public engagement and justiciability are essential steps towards the fulfilment of substantive rights: "enhanced levels of transparency, public engagement and justiciability ... significant for ... the ... right to water".⁴⁷ As an international *benchmark* for the aspect of data and emergency management, the 1997 UN Convention on *International Watercourses*

³⁸ Republic of Indonesia, "Law of the Republic of Indonesia Number 25 of 2009 concerning Public Services.", Articles 21, 37, 51-52.

³⁹ Nations, International Covenant on Economic, Social and Cultural Rights.

⁴⁰ Rights, Convention on the Elimination of All Forms of Discrimination against Women Adopted and opened for signature, ratification and accession by General Assembly resolution 34/180 of 18 December 1979.

⁴¹ Law of the Republic of Indonesia No. 17 of 2019, Law No. 17 of 2019 concerning Water Resources, Article 54 and Article 54(3).

⁴² Law of the Republic of Indonesia No. 17 of 2019, Articles 53 and 54.

⁴³ Republic of Indonesia, "Law of the Republic of Indonesia Number 14 of 2008 concerning Public Information Disclosure" (2008), Article 7 (2)-(3), Article 9, and Article 11.

⁴⁴ Republic of Indonesia, "Law of the Republic of Indonesia Number 32 of 2009 concerning Environmental Protection and Management", Article 65(2) and Article 70.

⁴⁵ Meinzen-Dick and Bruns, "Crafting Combinations to Govern Groundwater: Knowledge, Motivation, and Agency," 586.

⁴⁶ Vora, "Learning Together for Groundwater Management: A Case of the Devnadi Basin, Nashik, Maharashtra, India," 509.

⁴⁷ Virginie Barral, "Towards Judicial Coordination For Good Water Governance?," *International and Comparative Law Quarterly* 67, no. 4 (October 22, 2018): 933, <https://doi.org/10.1017/S0020589318000301>.

specifically Article 9 regulates the regular exchange of data/information and Article 28 specifies the obligation to notice/coordination in emergencies that may have adverse impacts, which can be adopted *mutatis mutandis* to domestic groundwater governance, namely open data obligations, early warning protocols, and a cross-sectoral/cross-level response of Government with a clear division of roles.⁴⁸

Based on the explanation above, the main contribution of this research is not to technical claims about water availability, but to a map of public policy law reform that can be tested and implemented. This framework can also serve as a basis for further empirical follow-up research, such as measuring the impact of licensing instruments, data transparency, or community-based programs on changes in water-use behaviour at the local level.

Conclusion

This article concludes that the main problem in rights-based and environment-based water scarcity mitigation is not the absence of normative recognition, but the incomplete translation of such recognition into operational, measurable, and enforceable governance instruments. Indonesia has a relatively integrated regulatory framework through the 1945 Constitution, Law Number 17 of 2019 concerning Water Resources, Law Number 32 of 2009 concerning Environmental Protection and Management, and related policy instruments; however, its effectiveness remains constrained by fragmented authority, weak groundwater extraction data, administrative licensing, limited monitoring, inconsistent sanctions, and insufficient transparency. India, although characterised by a more decentralised and fragmented water governance structure, offers relevant comparative lessons through constitutional rights reasoning, pollution-control mechanisms, central environmental powers, groundwater extraction regulation, aquifer mapping, and community-based monitoring. The novelty of this article lies in affirming that water scarcity prevention must be designed as a binding chain of legal instruments that connects minimum water needs, measurable ecological limits, and accountable governance through open data, licensing control, monitoring, participation, complaints mechanisms, and enforceable sanctions. Its contribution is therefore directed toward strengthening public policy law reform in Indonesia by moving water governance from reactive crisis response to preventive, rights-sensitive, ecologically grounded, and empirically testable scarcity mitigation.

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⁴⁸ United Nations, Convention on the Law of the Non-navigational Uses of International Watercourses 1997.

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