

The Legal Governance of Water Resources: Between Public Interest and Environmental Sustainability

Afrae El-jabali ^{1*}, Samira Benboubker ¹, Ouail El imrani ², Aniss Moumen ¹

¹ Ibn Tofail University, Kenitra, Morocco

² Abdelmalek Essaadi University, Tetouan, Morocco

Abstract. Water is a rare and strategically essential natural resource that is regulated by a combination of public interest, environmental sustainability, and legal rules. Legal frameworks that are both cohesive and flexible are more vital than ever because of climate change, population growth, economic growth, and the need to balance the interests of different sectors. This essay explores the legal foundations of water governance by analyzing allocation mechanisms, principles of international water law, regulatory oversight systems, and doctrines of public and private trust. The paper examines how water legislation reconciles conflicting social, economic, and environmental issues to achieve sustainability and equality. Special attention is paid to ecological water demands, IWRM, public participation, institutional responsibility, and the right to water. In emerging and postcolonial contexts, the study underscores the conflicts among commercialization, governmental stewardship, and collective environmental responsibility. The findings indicate that effective water governance requires transparent regulatory frameworks, participatory processes, and enforced legal protections. Principles of public interest and sustainability should be given priority. It is important to strengthen the legal control of water resources to make sure that they are resilient in the long term, protect the environment, and give everyone equal access to them as global water stress grows.

1 Introduction

Limited fresh water drives policies and institutions for allocation, yet laws sometimes support unsustainable exploitation [1]. Diverse forms of governance, state-driven centralization, privatization, decentralized participatory arrangements, emerged under various historical, ecological, and economic contexts and tensions among political institutions, stakeholder interests, and values [2].

Water governance must span articulation of user rights and institutional considerations including authority boundaries, compliance mechanisms, and stakeholder participation. Priority is accorded to the public and government interest fortifying management across contexts, institutions, and legal systems. Water allocation intersects socio-cultural, environmental, and economic dimensions and embodies technical, legal, political, and ethical dimensions intertwined with diverse worldviews, values, and social contracts (Government of the Province of Ontario, 2013). Different, sometimes contrasting, water concepts emerge from physical science, law, social science, and economics, further complicating understanding of allocation.

Sustainability supplements the public interest criteria established since water governance reform began. Water sustainability echoes the environment concept; while social and economic dimensions appear in sustainability frameworks, environmental and ecological concerns dominate the discourse [3]. Public interest and sustainability criteria also encounter tensions. Compared with prior allocation in economic, socio-

economic, and demographic domains, sustenance provision in cultural or religious integration represents emergent criteria. The interaction between public interest and sustainability raises questions on precedential and contingent interactions; some disputes become forfeited once the water quantity threshold recedes, while other applications apply concurrently [4].

2 The Public Interest in Water Governance

The public interest in water governance cannot be examined without engaging the normative foundations expected and associated objectives surrounding the idea. Water resources and related services are critical socio-economic ground for life formation and sustainability on earth. Within the national interest of a state or river basin, various conflicting interests are competing for water resources with different rationales of justification, including social, economical, and ecological basis. Examining the differences surrounding these competing interests narrows the analytical focus onto economic, social, and environmental polarized grounds of governance. Each of these identified competing interests further presents water access problems or resource endowment within broader water right discussions. The analysis also indicates that the resolution between the competing interests is built upon the character or nature of water. Water possesses common, multi-purpose characteristics in essence, there is a compelling justification that a privileged position should be provided to public interest among the

* Corresponding author: Pr.afrae@gmail.com

competing others, namely, it has a legitimacy priority to be accommodated. Public interest holds a founding status with normative guidelines of water rights promulgating or encouraging access to the benefits, values, and settings carried by water, which are definitely of assistance to achieve sustainability. Sustainable development represents the balance between public interests accommodating private ones but always emphasizes the former. Water governance enjoys a rich heritage grounding on legal environments promulgating water rights either as property ownership or trust regime or socio-economic governance as a prerequisite public interest endorsement on the authorizing level [2].

3 Legal Frameworks for Water Rights and Allocation

Rights to extract or utilize water are the primary means by which the public interest of sustainability is secured through legal governance. Such rights are accompanied by a range of provisions designed to address tensions between sustaining the resource and competing social, economic, ecological, and cultural interests. The frame of property and public trust doctrines establish entitlements to water use and delineate the role of the state as steward of the resource. Given increasing development pressures and uncertainties around climate change, effective allocation frameworks become imperative to avoid monopolizing interests and prioritize those aligned with sustainability.

3.1 Property and Public Trust Doctrines

The legal governance of water begins with the general notion of rights to extract or utilize the resource. Two broad frames underpin rights, namely, concepts of private property and public trust, the former entitling the holder to beneficial use and the latter designating the state as custodian of the resource on behalf of the public and future generations. Property rights to water are delivered through the doctrine of prior appropriation, a property frame that attends to scarcity and competing social, economic, and ecological interests. Water quality and ecological considerations can be enshrined through instruments such as environmental flow requirements, and contemporary regulatory movements remain open to complementing property with principles embedded in the public trust [3]. Under an alternative riparian doctrine access is determined by adjacency to a watercourse, the legal framework of water rights varies considerably across jurisdictions, and corresponding concepts of water property at national and state levels influence regional hydrological governance [4]. Property rights constitute a fundamental element of any legal system governing resources, including water, serving as the primary link between individuals and the resources they use. Water might be owned outright, through either a sovereignty model or a property-specific model, under which water rights can be regulated. Alternatively, society may not possess ownership over the water itself but instead asserts

certain rights to the water, either as inalienable rights to pursue particular activities (such as fishing) without arbitrary interference or in the form of a public trust governing general access to and protection of waters. These rights are systemically essential because of the commercial pressures on water resources, the overuse of aquifers and rivers, and the mounting difficulty of restoring ecosystems [5]. These rights, which can be property- or trust-like, are broad and cover both surface and groundwater. They often deal with the part of natural water that can be removed. They don't just include the rights to extract, divert, or pollute water; they also include the rights of other private parties, communities, and the general public to access and use resources, as well as things like keeping minimum flows and clean water in the system.

3.2 Allocation Mechanisms and Prior Appropriation

Water resources allocation mechanisms vary significantly among jurisdictions and depend on diverse geographical, socio-economic, political, and cultural factors. Three distinct allocation systems—a first come, first served system, an administratively determined right, and a market-based allocation—are generally recognised. The appropriator system is the most widespread in North America. Under this system, appropriated water-right priorities are based solely on the date of initial appropriation, and any further public interest consideration is circumvented by appropriating the water first. In some jurisdictions, priority assignment occurs by prioritization of specific water uses during a declared scarcity period. The priority consideration focus is generally complemented by a permitting system designed to enforce certain public interest concerns at the time of the initial appropriation. A few jurisdictions prohibit new appropriations altogether during declared scarcity [6].

3.3 International Water Law and Transboundary Resources

Transboundary water resources provide an ideal opportunity to reflect upon the appropriate distribution of water to different users and how much water should be left in-situ for ecosystems. The International Law Association's New Delhi Declaration on Principles of International Law Relating to Water Resources provides guidance for equitable and reasonable utilization of transboundary water resources [7]. Among core principles are the realization of internal and external equitable rights, consultation and joint research pertaining to operational and management rules, and independent approaches to dispute resolution, not limited to state actors. Game theory as a conceptual framework for negotiating transboundary arrangements crafts a model of bilateral exchange that respects the original position, flexibility over time, and the interdependence of aquifers with their land-use regimes [8].

Requirements hinge not only on human consumption but also on rejuvenating landscapes, preserving biodiversity, and regulating climate flows; the specific requirements of transboundary water resources become the subject of additional treaties and protocols as highlighted in some of the agreements observed earlier.

4 Environmental Sustainability in Water Law

Water governance must balance economic, social, and environmental interests to effectively allocate water resources and achieve sustainable outcomes, but priority measures are contested. Because scientific evidence cannot dictate prioritization or specific measures, establishing governance frameworks that uphold public-interest and sustainability principles is crucial. These principles reflect diverse interests, values, and political traditions. Legal frameworks and institutions shape water management choices and public-interest orientation by regulating access, defining ownership, and clarifying rights. Water-resource allocation, rights, and responsibilities vary widely within and among countries. Australia's unique arrangements have come about because of its own history, climate, water systems, and institutions. However, they show that there are bigger problems with governance that affect many different national and regional settings. Learning about how Australia's water governance has changed over time and how it fits into frameworks for public interest and sustainability might help us understand different situations [1].



Fig .1. The human right to water : Legal principles and sustainability

The illustration shows that the right to water is a complex idea that is built on four main ideas: accessibility, availability, cost, and legal protection. The picture makes it apparent that water is more than just a resource that may be shared; it is a basic human right that the law must safeguard. Legal protection means that the courts and other government bodies are responsible for upholding these principles. Accessibility means that everyone can get to water, regardless of their race or gender. Affordability means that the cost of water does

not interfere with other basic needs. Availability means that there is always enough safe water available. The chart highlights the importance of prioritizing public interest and sustainability in water governance systems by focusing on the "Right to Water." Long-term, water laws need to include ideas of equity, accountability, and environmental sustainability in order to safeguard resources and promote social justice.

4.1 Ecological Water Requirements and Biodiversity

From climate change and pollution to competing uses and growing demand, stress on water resources is mounting globally. Water-related ecosystems provide crucial services and safeguards against risks to food security and health, poverty, and economic growth; yet these services are underappreciated and therefore threatened. Climate-related shifts necessitate adequate ecological functions in rivers and aquifers. Nevertheless, governing authorities often overlook ecological water requirements [9].

Ecological flows define the amount and timing of water required to sustain aquatic and associated ecosystems, needed to safeguard water-related biodiversity such as wetlands, fish, macroinvertebrates, and riparian vegetation. Water law can help determine, implement, and monitor ecological requirements, yet their application remains limited in the licensing of new withdrawals and in river basin management. Debate persists over the weights assigned to ecological flows compared to other human uses and the legal right to these flows.

4.2 Integrated Water Resources Management and Policy Coherence

Integrated Water Resources Management (IWRM) is a concept that emerged in the 1990s to support the sustainable development of the world's basins. According to the GWP (2000), IWRM is "a process that promotes the coordinated development and management of water, land and related resources, in order to maximize the economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems." IWRM is based on three key principles: a. management should be basin-based, b. all stakeholders should be involved in water management issues, and c. to comply with IWRM, policies in all sectors that may affect water resources should be coherent one another. Since a basin's water resources may be used for a relatively large variety of purposes (GWP, 2000), it is always difficult to achieve a perfect balance in the satisfaction of the demand, and sometimes it requires solutions with policy instruments and tools outside the water management sector. Only a few scholars seem to analyse the issue of policy coherence in terms of water resources. Onel & Çerçit (2017) analyses the coherence and disagreement between the EU's water framework directive and the communications released to launch the circular economy. Kharas & Ji (2019) examine the integration of

water and sanitation issues in the Urban Agenda for the EU to generalize knowledge about the issues of coherence and inconsistency in urban development policies. IWRM conceptualises and portrays water as a socio-economic good [10]. Many of the socio-economic alternatives to the construction of dams and inter-basin transfers fall outside the realm of water management. Therefore, solutions may be sought in trade policies, industrial competitiveness, technological development, regional rural development, urbanization or environmental protection. In this respect, the coherent integration of policies within the water framework is frequently neglected when the management of water demand through socio-economic solutions is explored.

4.3. Climate Resilience and Adaptive Governance

Climate-change adaptation considers amendments to existing rights, expansions of new rights, and alterations to obligations, while remaining subject to the constraints of sustainability [11]. Establishing temperature-specific criteria, communicating transboundary and seasonal measures, stimulating the sharing of voluntary data among basin actors, and determining life-stage thresholds for fish species are examples of adaptation measures already in use. A non-legal code of undisputed "ground water ethics" preserves the common wealth of the kind ignored by positive Dutch law and the Common Law doctrine of waste, facilitates adaptation, and maintains the public interest.

5 Institutions, Accountability, and Oversight

Water governance frameworks must ultimately achieve a legitimacy that indicates accountability and compliance; the gap between law as written and law as practiced is often critical [1]. Under scrutiny from the 1990s onwards, the discipline of legitimacy offers a means of systematically clarifying how water governance might remain aligned with both the public interest and environmental sustainability as fundamental objectives. Legitimacy accordingly comprises the objective to which institutional arrangements should aspire, together with the means by which that aspiration can be monitored. Three interrelated branches of investigation determine the extent to which institutional arrangements support that framework: compliance with legal requirements on the formulation and application of governance, the degree to which opportunities for public participation in relevant processes are provided, and the effectiveness of monitoring and enforcement systems designed to ensure adherence to procedural and substantive constraints.

5.1 Regulatory Agencies and Permitting Systems

While broadly mandated, agency powers and oversight differ among jurisdictions. Agencies with fishery, wildlife, and natural resource mandates may possess authority over linked water allocation decisions. In these circumstances, precautionary principles may apply to permit decisions proffering ecological flows.

Regulatory agencies issue permits that govern how society may acquire and use water. Permit systems remain prevalent in many industrialized nations. They preemptively ascertain the physical and legal availability of water for enterprises, mandates highly regulated development arrangements, and target public interest and environmental sustainability as prioritization prerequisites. General information disclosures include water quality and allocation for a defined term determined by comprehensive solute analysis (like salinity estimates). The ensuing legal availability process evaluates the extra hydrologic development justifications relative to existing rights and the potential economic, social, and environmental weightings associated with each request. A triage report following these technical and legal inquiries ranks demands according to established criteria. [1]

5.2 Public Participation and Stakeholder Engagement

This section gives an overview of how people might get involved in Brazilian water governance. It focuses on vulnerable groups, deliberative processes, and informed consent. Article 18 of the Brazilian Water Law says that public participation is an important part of environmental governance in general. People who were affected by the modification to the water system in 1997 were included in the process so that legislation could be changed to fit the needs of each location. The first drafts of legislation n. 9433/1997 were based on the 1998 National Water Conference, which took place before a national water legislation was passed. The conference's goal was to get feedback from attendees on how to regulate things at the sub-national level [1].

Research shows that stakeholder engagement is still low and not evenly spread across regions, even though it is important. There hasn't been much discussion on a few important aspects of engagement, such as how to put the "polluter pays" idea into action, what the public interest really is, and how to use normative tools to manage ecohydrological choices for managing watershed systems. The initial Institutional Strategy stressed the importance of hosting workshops with civil society organizations [10], but only a small group of people who were seen to be well-educated were allowed to participate. Due to the ambiguity in the institutional framework for stakeholder engagement, public water resource management has started to emulate private sector practices.

5.3 Compliance, Monitoring, and Enforcement

To make sure that water governance rules are in line with legal and policy aims, they must include ways to check and make sure that people are following them. Water management is only legitimate if the organizations that oversee water are able and willing to make sure that the law is followed [1]. For institutional players to build a credible system of governance and judge how well they are doing, they must follow all of their legal obligations. The validity of these

compromises depends on how well and responsibly the administrative bodies that are in charge of enforcing the rules and checking for compliance do their jobs. These bodies often have to balance competing ecological and hydrological needs and manage the different needs of different users.

6 Equity, Access, and Social Considerations

Although many theoretical frameworks highlight the need for equitable access to society's critical water resources, discussions lack specific instruments to extend this coverage into operating rules. This is of critical importance in developing nations where water remains scarce and subject to competition. Spatial disparity sharply focuses attention on access in rural versus urban areas, in many cases stretching already-thin value chains to transport bulk supplies around. Water access also maintains fundamental ties to society's structural dependency on land. In some instances, compulsory provisions to allocate a minimal volume of water to establishment of urban zones adjoining agricultural domains have emerged as a vehicle to mitigate structural inequalities, encouraging multi-supply systems through more extensive networks. In other situations, solutions developed within the informal market formulation are best pursued through the regulatory frame even when an informal market specification addresses urban-rural access fully. Such competing avenues may provide potential openings for sheltered dialogue among water and sanitation authorities, land-use planners, agricultural extensionists, and rural stakeholders about water access roles. Similarly critical, affiliation with the decolonization movement has led to heightened awareness of indigenous societal configurations worldwide and fostered a more formal view of indigenous peoples' water needs. Guidelines promulgated worldwide underscore various principles spanning recognition, project consultation, benefit-sharing, cooperative management, and safeguarding of knowledge by dominant-language institutions while respecting decisions regarding dissemination within indigenous communications for agendas of value beyond those of commercial interest[15]. Besides natural resources, water plays a fundamental role also in alleviating numerous societal maladies such as poverty, illness, and food insecurity in great part via urban-rural transfer of substantial and growing quantities of green and blue water. Gender plays a particularly critical role here, since water-related activities supply economic empowerment to women and girls worldwide fostering schools that allow children and young mothers to pursue educational paths.

6.1 Rural and Urban Access Disparities

Water governance in the developing world reflects postcolonial legacies of inequality and unevenness, around which tensions persist. Governments, donors, international financial institutions, consultancies, and

non-governmental organizations principally engage water institutions as technical questions still dominate [2]. The rural/urban divide epitomises differences. Even where national regimes accord rights, service delivery may be limited. Invaluable communal delivery systems, such as springs and shallow wells, may be unsurveyed, receive no support, and are excluded from discussion or consideration [10]. Even minimal formal rights sometimes require formalization against accession, rather than merely the affixing of licences.

The growing political salience of water, characterising a commodity important for economic growth in upland watersheds and for climate-related discourse, is noticeable. Geographically, a divide separates the construction of water as a pole for rural and urban development. Water embraces diverse international commitments and indicators such as the water security nexus with health or climate, and tensions between anthropocentric and biocentric perspectives. Failure of postcolonial contemporary water governance in the developing world arises from insufficient popular ownership and awareness of the global commitment to legal and institutional principles concomitant with the adoption of Sustainable Development Goals.

6.2 Indigenous Rights and Traditional Knowledge

Different places have laws that preserve Indigenous people's rights, like their right to access water and have a say in how it is administered. These frameworks stress the importance of combining traditional knowledge with the scientific and technical aspects of managing water. International and regional agreements encourage the recognition of Indigenous knowledge in water management[13]. They suggest that the advantages of this knowledge be shared and that systems for consultation and collaboration be set up. National laws, legislation, and judicial decisions provide Indigenous nations more status and let them talk to the state about how to manage water [12].

The UN General Assembly passed the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) in 2007. Since then, it has caused substantial revisions in the law in Canada, Colombia, Ecuador, New Zealand, and Norway, among other places. These nations have achieved significant advancement by enacting and implementing legislation that safeguards the rights of Indigenous populations. This framework is particularly essential because it makes sure that Indigenous communities have a meaningful and active say in how natural resources are handled. This shows that their rights and contributions to sustainable management are significant [14].

6.3 Gender and Community Resilience

Women are more likely than men to be affected by climate change-related risks such droughts, floods, and a lack of water [14]. Water management community organizations think that having women involved will make them more resilient as a group [1]. Collaboration

to reduce risk is made harder by things like a lack of autonomy, the duties of raising children, and a lack of access to information.

Improved access to clean water, greater control of water demand, and less exposure to risks are all important parts of strengthening resilience. There is a positive relationship between strength and women's ability to use water to build social capital, boost economic production, and bring stability to society. For example, women may experience more losses in transboundary water disputes than men, whereas local authorities may permit mining that causes less community harm, demonstrating how gendered outcomes vary both within and between contexts. Women, who also have different interests, support the gender-sensitive conversation choices.

7 Conclusion

Global analysis of water resource legislation reveals a continuous tendency to allocate funding to economically productive zones. The intention should be to provide social equity between urban and rural residents and to preserve the environment and ecosystems. It has been observed that most of the world's water resources indeed dwells only upon fewer countries; that a precious and strategic resource such as water is already subject to commercialization; and that the tendency to fund had reflected in many countries, if not all, thus the commencement of legal governance of water resources is imperative [10]. Water legislation should rather allocate little resources on economic growth, and instead more resources towards environmental, conservation and legal issues. Urban areas endeavor to commit huge investments on water management or balancing system; and such cities likely possess half or even more of the total Government funding of other local areas. Under the circumstance, the leftover of funding are still less than the amount required for the actual need.

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