



Evolution of Water Resources Management Regulations in Indonesia: Challenges of Integrating Hydrological Paradigms and Decentralization

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ABSTRACT: Water resources management in Indonesia has evolved from a centralistic and sectoral approach toward an integrated management paradigm based on hydrological units from 1974 to 2023. This study seeks to understand the dynamics of water resources policy evolution within the context of decentralization, using a juridical-normative approach with analysis of primary and secondary legal documents. The results are Law Number 11 of 1974 established the foundation of management centered on infrastructure development, while Law Number 7 of 2004 introduced management based on River Basins and Groundwater Basins. The annulment of that law by the Constitutional Court in 2015 resulted in Law Number 17 of 2019, which strengthens state control and establishes a hierarchy of water allocation priorities with basic minimum needs and people's agriculture as the primary priorities. Presidential Regulation Number 37 of 2023 marks a further shift toward the National Water Security paradigm. The conclusion is although the regulatory framework has developed toward an integrated approach, the main challenge remains the conflict between the principle of hydrological unit-based management and the administrative structure of decentralization, which causes inter-agency coordination difficulties. The gap between normative provisions and practical implementation, particularly in resolving jurisdictional conflicts, constitutes a significant obstacle to realizing effective water resources management.

KEYWORDS: Water Resources Management, State Control, Decentralization, Water Security.

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INTRODUCTION

Water resources management in Indonesia faces complex dynamics due to regulatory paradigm shifts, the implementation of decentralization, and external challenges such as climate change (ADB, 2016); (Global Water Partnership, 2022). Policy evolution began with a centralistic approach in Law Number 11 of 1974, which focused on infrastructure development (particularly irrigation and physical projects), and later developed toward an integrated management paradigm based on hydrological units (river basins) through Law Number 7 of 2004 (Purbo, 2019). However, the annulment of that law by the Constitutional Court on the grounds that it contained elements of liberalization led to the enactment of Law Number 17 of 2019, which affirms state control and social priority in water allocation (Koeswahyono et al., 2022).

Although the regulatory framework has moved toward a more integrated approach, its implementation faces structural obstacles. Conflicts between the principle of hydrological unit-based management such as River Basins and Groundwater Basins and the division of authority based on administrative boundaries within the decentralization framework frequently hinder inter-agency coordination (Hendriyanto et al., 2025). These challenges are further exacerbated by hydrological uncertainty and limitations in information systems that support decision-making (World Bank, 2021). This study aims to analyze the evolution of water resources management regulations from 1974 to 2023, focusing on paradigm shifts and their implementation implications. Through comparative analysis of legal documents, this research identifies the shift from a sectoral approach toward integrated management, as well as the main challenges in the form of jurisdictional conflicts that hinder policy effectiveness.

MATERIAL AND METHOD

This research employs a juridical-normative approach with analysis of primary and secondary legal documents (Steuer, 2023). Primary legal materials include Laws and Regulations governing the water sector in Indonesia. Secondary materials

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encompass academic literature, policy reports, and institutional analyses regarding water governance, privatization, and inter-sectoral conflicts. Analysis is conducted in a descriptive-analytical manner by tracing the chronology of regulatory changes, institutional structures, allocation priorities, as well as public and judicial debates (Steuer, 2023). This approach enables the identification of policy change patterns, paradigm differences among regulations, and the implications of various legal frameworks for the implementation of water resources management in Indonesia, in line with the principles of integrated water resource management (IWRM) adapted locally. The focus is directed toward the shift from the 1974 framework, the 2004 interruption, post-2013 recovery, to the 2019–2023 consolidation. Data are interpreted to identify patterns of state control, space for private participation, and implementation challenges at the central, regional, and river basin levels.

RESULT

The development of water resources management regulations can be divided into two main periods: the centralistic approach during the New Order era and the integrated paradigm in the decentralization era (ADB, 2016). In the first period, Law Number 11 of 1974 became the main foundation that placed water management under the control of the central government. This law focused on water resources development covering various aspects, including irrigation, flood control, and drinking water supply, with coordination authority centralized in the relevant minister. Government Regulation Number 22 of 1982 introduced the River Basin concept as a management unit and established drinking water as the primary priority, marking an initial step toward functional decentralization concerning Water Arrangement; official elucidation and analysis of river basin implementation. Government Regulation Number 23 of 1982 further regulated irrigation management by emphasizing community participation, particularly farmers, in the management of tertiary irrigation networks concerning Irrigation; provisions regarding the transfer of tertiary plot management to water-user farmers. Meanwhile, Government Regulation Number 20 of 1990 introduced water quality control through the concepts of water quality standards and pollution load carrying capacity, shifting the focus from quantity to water quality.

The evolution from Law 1974 to the various Government Regulations of 1982 and 1990 can be analyzed through the lens of water policy as a response to three main pressures, namely a) Institutional Pressures: Law 1974 established that the State controls water. However, in operational implementation (such as irrigation and daily water governance), the centralistic model proved inefficient or unable to accommodate regional complexity. This triggered the emergence of PP 22/1982 and PP 23/1982, which delegated authority to Regional Governments and integrated the role of communities (farmers, Subak), indicating a shift from Government to Governance (Suhardiman & Giordano, 2014); (Ricks & Doner, 2021). b) Sectoral and Development Pressures: Indonesia in the 1970s and 1980s was highly focused on food security. PP 23/1982 emerged to provide a strong and specific legal framework for irrigation as a priority development field. At the same time, PP 22/1982 had to affirm the priority of drinking water as a basic need, balancing social needs with agricultural/industrial production needs (Ricks, 2016). c) Environmental Pressures: Rapid industrial development and urbanization after 1974 began to show negative impacts in the form of declining water quality. The adoption of Law 4/1982 (Environmental Management) encouraged the integration of environmental protection into the water sector, resulting in PP 20/1990. This regulation filled the technical regulatory gap focused on quality, shifting the paradigm from water as an unlimited resource to water as a vulnerable resource with limited capacity to receive pollution as pollution load carrying capacity (Fulazzaky, 2014).

The difference between Law 1974 as philosophical umbrella and the three Government Regulations (technical and operational regulations) is a classic reflection of how public policy is translated from a broad political mandate into measurable and executable managerial mechanisms (Suhardiman et al., 2015). If we imagine water policy as the construction of a house or a state, it can be described as follows: a) Law 1974 is the architectural blueprint that establishes ownership rights (the State) and the main function of the house (people's prosperity), as well as stipulating that the foundation must be strong and extensive; b) PP 22/1982 is the project management that decides how development authority is divided from central to regional, River Basins and ensures that the main raw material (drinking water) is always available at the entrance; c) PP 23/1982 is the technical specification for the kitchen and garden irrigation that regulates in detail how farmers communities must cooperate at the micro level to produce harvests, even integrating local wisdom (Subak) into the operational design; and d) PP 20/1990 is the environmental quality supervision system as hygiene and sanitation that ensures that household waste does not damage the surrounding environment quality standards and imposes fines for improper waste disposal or waste retribution, keeping the house functioning sustainably (Ricks & Doner, 2021).

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Table 1. Comparison of Water Laws during the New Order Period (1970–1998)

Policy Feature	Law No. 11 of 1974	PP No. 22 of 1982 (Water Arrangement)	PP No. 23 of 1982 (Irrigation)	PP No. 20 of 1990 (Pollution Control)
Main Scope	Comprehensive Water Resources Regulation (Macro).	Water Arrangement (Management, Use, Exploitation).	Irrigation (Provision and Regulation of Water for Agriculture).	Water Pollution Control (Focus on Water Quality).
Key Principles/Philosophy	Water controlled by the State for the prosperity of the people (Social Function).	Adding principles of Public Benefit, Balance, and Sustainability.	Supporting Agriculture (Optimum Production), Community Participation.	Maintaining Water Quality according to Designated Use; Based on Quality Standards.
Institutional/Management Unit	Centralization in the Minister of Water Resources.	Using River Basins as management units (IWRM). Delegation of authority to Regional Governments (Assistance Tasks).	Irrigation Areas; Formation of Irrigation Committees (Regional Sectoral Coordination).	Management based on water designation (Classes A–D) and Pollution Load Carrying Capacity.
Use Priority	Drinking water, household, Defense/Security, Religious purposes (Priority A).	Drinking water as the primary priority above all other needs.	Provision of water for food crops prioritized, as well as for household needs and firefighting.	N/A (Focus on water quality, not volume allocation order).
Role of Community	Respecting customary rights as long as not contrary to National Interests.	Water Use Rights, the right to use water for basic daily needs without permits.	Active participation and full responsibility of the community (Water User Farmers/Subak) in tertiary network management.	Communities obliged to report pollution and assist in prevention.
Technical Innovation	Basic concepts: Water Arrangement, Water Resources System, Technical Planning.	Concept of Water Use Rights, Delegation of Authority Based on River Basins.	Recognition of Subak, Formation of Irrigation Committees.	Introduction of Water Quality Standards, Pollution Load Carrying Capacity, Liquid Waste Quality Standards.

(Processed by the researcher, 2026)

DISCUSSION

In the decentralization era, Law Number 7 of 2004 explicitly adopted the paradigm of integrated water resources management based on hydrological units, namely River Basins for surface water and Groundwater Basins for groundwater based on Law No. 7 of 2004 Articles 12 (ADB, 2016). This paradigm is aligned with the principles of integrated water resources management (IWRM), which emphasize comprehensive management within a single hydrological unit (Gerald Ndubuisi, 2025); (Pambudi et al., 2023). However, the annulment of that law by the Constitutional Court in 2015 on the grounds that it contradicted Article 33 paragraph (3) of the 1945 Constitution of the Republic of Indonesia resulted in the enactment of Law Number 17 of 2019. This law maintains the principle of hydrological unit-based management but with a stronger emphasis on state control and restrictions on the role of the private sector in water resources management. Implementing regulations such as Government Regulation Number 69 of 2014 regulate water use rights by establishing a clear priority hierarchy: basic minimum daily needs, followed by people's agriculture, and only then business needs. This hierarchy ensures that water allocation for social interests cannot be disrupted by economic interests. In addition, Presidential Regulation Number 37 of 2023 introduces the National Water Security paradigm as the strategic direction of water resources management until 2030. This paradigm goes beyond conventional management by integrating risk management aspects, including resilience to climate change, and uses the Water Security Index as a performance indicator (Chotimah & Holland, 2025).

Although the regulatory framework has developed toward integrated management, its implementation faces significant structural challenges, particularly the conflict between the principle of hydrological unit-based management and the administrative

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structure of decentralization (ADB, 2016). Water resources laws consistently establish River Basins and Groundwater Basins as the main management units. However, the division of authority within the decentralization framework, as regulated in Law Number 32 of 2004 and Government Regulation Number 38 of 2007, is based on the administrative boundaries of regional governments. The mismatch between hydrological boundaries and administrative boundaries creates overlapping authority and coordination difficulties, especially in addressing cross-boundary issues such as flood control, watershed conservation, and water allocation (Clegg et al., 2023).

These jurisdictional conflicts hinder the effectiveness of water resources management due to fragmented responsibilities across levels of government; for example, rivers that cross several regencies or provinces require coordination involving various regional governments, but formal coordination mechanisms such as the River Basin Water Resources Management Coordination Team (TKPSDA WS) often lack adequate executive authority to ensure uniform implementation. Analysis of various sources confirms that this tension results in a lack of accountability and difficulties in preparing and implementing integrated management plans (Clegg et al., 2023). D. In addition to jurisdictional conflicts, another challenge is the limitation of information systems that support data-based management (Rakha Muyassar, 2025). Presidential Regulation Number 88 of 2012 establishes the importance of the Hydrology, Hydrometeorology, and Hydrogeology Information System as a prerequisite for decision-making. However, data quality, availability, and integration are often inadequate, thereby hindering water allocation planning, resource availability monitoring, and control. Without a credible information system, the implementation of the water allocation priority hierarchy and the measurement of water security become difficult to carry out effectively (OECD, 2023).

Comparison among regulations shows a consistent paradigm shift from a sectoral approach toward integrated management (ADB, 2016). Law Number 11 of 1974 represents a centralistic approach focused on infrastructure development, while Law Number 17 of 2019 maintains the hydrological unit principle with an emphasis on state control. Government Regulation Number 69 of 2014 strengthens the priority hierarchy that places social needs above business interests, reflecting a response to concerns about the commercialization of water resources. However, despite progress in the normative framework, implementation effectiveness remains hindered by the gap between legal provisions and field practices (Pambudi et al., 2023). The water allocation priority hierarchy, although normatively clear, has not been empirically tested under actual water scarcity conditions (studies on water allocation implementation and data/empirical challenges in Indonesia). Similarly, although the Water Security Index has been introduced as an evaluation tool, there is no systematic analysis demonstrating a causal relationship between policy implementation and changes in the index (official text of Perpres No. 37 of 2023 on the calculation of the Water Security Index; evaluation reports on SDA policy implementation (Chotimah & Holland, 2025).

CONCLUSION

The evolution of water resources management regulations in Indonesia shows a movement from a centralistic and sectoral approach toward an integrated management paradigm based on hydrological units, with an increasingly strong emphasis on state control, social priorities, and systemic resilience. Law Number 17 of 2019 and Presidential Regulation Number 37 of 2023 constitute important milestones in this development, strengthening the principle that water allocation must prioritize basic needs and people's agriculture. However, the main challenge lies in the structural conflict between the principle of hydrological unit-based management and the administrative structure. Jurisdictional conflicts arising from the mismatch between hydrological boundaries and administrative boundaries hinder coordination and accountability in water resources management. In addition, the success of implementation depends on the availability of integrated information systems to support data-based decision-making. To address these challenges, it is necessary to strengthen institutional coordination mechanisms that can bridge the differences between hydrological units and administrative boundaries, such as the establishment of coordination forums with greater authority. Furthermore, empirical evaluation of the implementation of the priority hierarchy and the effectiveness of information systems is required to ensure that the normative framework can be translated into effective management practices.

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