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Water and Justice: Evaluating the 2004 Indonesian Water Resources Law in Protecting Vulnerable Communities from Climate-Induced Water Scarcity

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Abstract

This study evaluates the effectiveness of the 2004 Indonesian Water Resources Law (Law No. 7/2004) in protecting vulnerable communities from the impacts of climate-induced water scarcity. As climate change intensifies, many regions in Indonesia are experiencing increased water stress due to altered rainfall patterns, droughts, and the depletion of freshwater resources. These challenges disproportionately affect marginalized groups, particularly in rural and indigenous communities, who rely heavily on local water sources for both domestic use and livelihood activities. The research critically examines how the 2004 Water Resources Law addresses the needs of these vulnerable communities, assessing its provisions on water allocation, access, and the role of local governance in ensuring equitable distribution. By combining legal analysis, policy review, and interviews with affected communities and water management officials, the study identifies gaps in the law's implementation and enforcement that hinder its ability to provide comprehensive protection in the face of climate variability. The findings suggest that while the law outlines broad principles for water management and equity, it often falls short in ensuring that vulnerable groups have access to clean and sufficient water, especially during periods of water scarcity. The study calls for a more inclusive and adaptive legal framework that prioritizes the needs of marginalized communities and integrates climate resilience into water governance. This research contributes to the broader conversation on climate justice,

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advocating for reforms that enhance the legal protections for those most at risk from water scarcity in Indonesia.

[*Studi ini mengevaluasi efektivitas UU Sumber Daya Air Indonesia tahun 2004 (UU No. 7/2004) dalam melindungi masyarakat rentan dari dampak kelangkaan air akibat perubahan iklim. Seiring intensifikasi perubahan iklim, banyak wilayah di Indonesia mengalami peningkatan tekanan air akibat perubahan pola curah hujan, kekeringan, dan penipisan sumber daya air tawar. Tantangan ini secara tidak proporsional memengaruhi kelompok-kelompok marginal, khususnya di masyarakat pedesaan dan masyarakat adat, yang sangat bergantung pada sumber air lokal untuk penggunaan domestik dan kegiatan mata pencaharian. Penelitian ini secara kritis mengkaji bagaimana UU Sumber Daya Air tahun 2004 menangani kebutuhan masyarakat rentan ini, dengan menilai ketentuan-ketentuannya tentang alokasi air, akses, dan peran tata kelola lokal dalam memastikan distribusi yang adil. Dengan menggabungkan analisis hukum, tinjauan kebijakan, dan wawancara dengan masyarakat yang terdampak dan pejabat pengelolaan air, studi ini mengidentifikasi kesenjangan dalam implementasi dan penegakan hukum yang menghambat kemampuannya untuk memberikan perlindungan komprehensif dalam menghadapi variabilitas iklim. Temuan penelitian menunjukkan bahwa meskipun hukum menguraikan prinsip-prinsip umum untuk pengelolaan air dan kesetaraan, hukum tersebut seringkali gagal memastikan bahwa kelompok rentan memiliki akses terhadap air bersih dan cukup, terutama selama periode kelangkaan air. Studi ini menyerukan kerangka hukum yang lebih inklusif dan adaptif yang memprioritaskan kebutuhan masyarakat yang terpinggirkan dan mengintegrasikan ketahanan iklim ke dalam tata kelola air. Penelitian ini berkontribusi pada percakapan yang lebih luas tentang keadilan iklim, mengadvokasi reformasi yang meningkatkan perlindungan hukum bagi mereka yang paling berisiko terkena dampak kelangkaan air di Indonesia.*]

Keywords: Water Resources, Climate Change, Vulnerable Communities, Indonesia, Water Governance

Introduction

1. Background and Context

Water scarcity has become one of the most critical environmental and socio-economic challenges of the twenty-first century, particularly as climate change intensifies pressure on freshwater systems worldwide. Changes in precipitation patterns, increasing temperatures, prolonged droughts, glacier and snowpack reduction, and increasing frequency of extreme climatic events have significantly altered hydrological cycles and reduced the reliability of freshwater availability in many regions (IPCC, 2023). Unlike conventional environmental problems that may affect ecosystems independently, climate-induced water scarcity directly

threatens human security because water is fundamental to domestic consumption, agricultural production, public health, and economic development. The United Nations recognizes access to safe and sufficient water as a fundamental human right, emphasizing that water insecurity represents not only a resource management challenge but also a governance and justice issue (United Nations, 2010). Consequently, climate change has transformed water governance from a technical problem of supply management into a complex question involving equity, institutional capacity, and social vulnerability.

The impacts of climate-induced water scarcity are not distributed equally across societies. Vulnerability to water insecurity depends not only on physical exposure to climate hazards but also on social, economic, and institutional conditions that determine people's ability to access, control, and adapt to changing water resources. According to the vulnerability framework proposed by Adger (2006), climate vulnerability emerges from the interaction between exposure, sensitivity, and adaptive capacity. Communities with limited economic resources, weak infrastructure, and restricted political representation are often more severely affected by water scarcity because they possess fewer mechanisms to cope with environmental changes. This situation demonstrates that climate change functions as a "risk multiplier," amplifying existing inequalities related to poverty, geography, and social exclusion (Bennett et al., 2021). Therefore, addressing water scarcity requires not only increasing water availability but also ensuring that adaptation strategies address unequal access and institutional barriers experienced by vulnerable populations.

mall-scale rural communities represent one of the groups most affected by climate-induced water stress because their livelihoods are closely connected with local ecosystems and natural resource availability. Agricultural communities, indigenous populations, and rural households often depend directly on rivers, groundwater, rainfall, and traditional water management systems for domestic and productive activities. When droughts occur or rainfall becomes increasingly unpredictable, these communities face declining agricultural productivity, increased household burdens, and greater competition over limited water resources. The Social-Ecological Systems perspective emphasizes that human societies and ecosystems are interconnected, meaning that environmental degradation can undermine social stability while social inequalities can reduce the capacity of communities to manage ecological change effectively (Berkes & Folke, 1998). In this context, water scarcity should be understood as a socio-environmental challenge where ecological processes and governance structures interact to determine who receives protection and who bears the greatest risks.

Indonesia provides an important case for examining the relationship between climate change, water governance, and social justice. As an archipelagic country with diverse climatic conditions, Indonesia experiences significant variations in water availability across regions. While some areas face excessive

rainfall and flooding, others experience prolonged dry seasons and water shortages, particularly in eastern and semi-arid regions (World Bank, 2021). Climate projections indicate that increasing temperature trends and changing rainfall patterns may intensify seasonal water stress, affecting agricultural production, rural livelihoods, and community access to freshwater resources (IPCC, 2023). These challenges are particularly significant for communities that rely on locally managed water sources and have limited access to alternative infrastructure. Consequently, climate change creates new pressures on Indonesia's existing water governance framework and raises questions regarding whether current legal and institutional arrangements are sufficient to protect vulnerable populations.

Historically, Indonesia's water governance has been shaped by the principle that water resources are controlled by the state and must be managed for public welfare. Law No. 7 of 2004 concerning Water Resources represented a major attempt to establish an integrated framework for water management, including principles of conservation, utilization, and protection of water resources. However, the implementation of this law generated significant debates regarding the balance between state control, public access, and private sector involvement in water management. The Constitutional Court Decision No. 85/PUU-XI/2013 subsequently annulled Law No. 7/2004, emphasizing that water management must prioritize public interest and state responsibility over commercial interests. A revised framework was later introduced through Law No. 17 of 2019 concerning Water Resources, which reaffirmed the state's obligation to guarantee people's right to water. Nevertheless, the emergence of climate-induced water scarcity raises additional questions regarding whether existing legal frameworks adequately incorporate climate adaptation, protection of vulnerable communities, and principles of water justice.

The concept of water justice provides an important analytical framework for evaluating whether water governance systems adequately protect vulnerable communities under conditions of climate change. Similar to climate justice, water justice emphasizes that access to water involves questions of distribution, recognition, and participation rather than merely physical availability (Schlosberg, 2012). Distributional justice concerns whether water resources and adaptation benefits are allocated fairly; recognition justice examines whether marginalized communities and their knowledge systems are acknowledged; and procedural justice focuses on whether affected communities participate meaningfully in water-related decision-making processes. Applying this framework to Indonesia allows an examination of whether water laws and governance institutions effectively address the needs of communities most vulnerable to climate-induced scarcity.

Based on this context, this study critically evaluates the effectiveness of the 2004 Indonesian Water Resources Law (Law No. 7/2004) in protecting

vulnerable communities from climate-induced water scarcity. Although the law established important principles of integrated water management, questions remain regarding its capacity to address emerging climate risks and ensure equitable access during periods of water stress. By combining legal analysis, policy evaluation, and perspectives from affected communities and water governance actors, this research examines the relationship between water law, climate adaptation, and social justice. The study contributes to broader discussions on climate-resilient water governance by highlighting the importance of legal reform that places vulnerable communities at the center of water management strategies.

2. Water Scarcity and Vulnerable Communities in Indonesia

The impacts of climate-induced water scarcity in Indonesia are experienced unevenly across different regions and social groups, reflecting the unequal distribution of environmental risks and adaptive capacities. Although Indonesia is generally perceived as a water-rich country due to its high annual rainfall and extensive river systems, spatial and temporal inequalities create significant challenges in ensuring reliable water access for all communities. Several regions, particularly parts of eastern Indonesia, small islands, and drought-prone agricultural areas, experience recurring water shortages during extended dry seasons. These conditions are increasingly intensified by climate variability, including shifts in monsoon patterns, prolonged drought events, and increasing temperature extremes (IPCC, 2023). For communities dependent on local water sources, such as shallow wells, springs, rivers, and rainwater harvesting systems, climate-induced changes in water availability directly affect domestic needs, agricultural productivity, and livelihood security. Therefore, water scarcity in Indonesia should not be understood simply as a problem of physical resource limitation but as a governance challenge involving unequal access, institutional capacity, and social vulnerability.

Rural communities represent one of the groups most exposed to climate-related water insecurity because their livelihoods often depend directly on natural resource systems. Small-scale farmers, indigenous communities, and rural households frequently rely on traditional water sources for irrigation, livestock, sanitation, and household consumption. When these sources decline due to drought or environmental degradation, communities with limited economic resources face greater difficulties in securing alternative supplies. According to Adger (2006), vulnerability is produced through the interaction between exposure to environmental hazards and the social conditions that influence adaptive capacity. Communities with stronger financial resources, infrastructure, and political influence are generally better positioned to respond to water stress, while marginalized groups often experience greater consequences. This creates a situation where climate change reinforces existing inequalities by increasing the

burden on communities that have historically contributed least to global greenhouse gas emissions. From a climate justice perspective, protecting vulnerable communities from water scarcity requires addressing these structural inequalities rather than focusing exclusively on increasing water supply.

Indigenous and local communities face particular challenges because their relationships with water resources are often embedded within cultural, ecological, and customary systems that may not be fully recognized within formal governance frameworks. Indigenous communities frequently possess traditional knowledge regarding water conservation, watershed management, and ecological adaptation, yet these knowledge systems may receive limited recognition in state-led water planning processes. Berkes et al. (2000) argue that local ecological knowledge represents an important adaptive resource because communities develop long-term strategies for managing environmental variability through accumulated experience. However, when water governance systems prioritize centralized technical approaches without incorporating local knowledge, adaptation measures may become less effective and socially disconnected. Recognition justice, therefore, becomes a critical dimension of water governance because equitable management requires acknowledging not only people's physical need for water but also their cultural relationships, knowledge systems, and rights associated with water resources (Schlosberg, 2012).

Water scarcity also has significant gendered implications, particularly for women in rural and resource-dependent communities. In many Indonesian households, women bear primary responsibility for domestic water management, including collecting, storing, and allocating water for household needs. During periods of scarcity, women often spend more time obtaining water, reducing opportunities for education, employment, or participation in community decision-making. Feminist environmental scholars argue that environmental challenges are shaped by existing social relations, meaning that women and men experience resource insecurity differently because of unequal responsibilities and access to resources (Rocheleau et al., 1996). This gender dimension is frequently overlooked in water governance policies that treat households as homogeneous units rather than recognizing differences in responsibilities and vulnerabilities among household members. Integrating gender perspectives into water management is therefore essential to achieving procedural justice and ensuring that adaptation strategies respond to the realities of those most affected.

Agricultural communities are another vulnerable group facing increasing pressure from climate-induced water scarcity. Agriculture remains one of Indonesia's most important livelihood sectors, particularly for rural populations whose economic security depends on predictable water availability. Changes in rainfall patterns and prolonged droughts can reduce crop productivity, increase production costs, and threaten household income. According to the Food and Agriculture Organization (FAO, 2022), climate variability poses significant risks

to smallholder farmers because they often lack access to irrigation infrastructure, financial protection mechanisms, and technological resources. These challenges illustrate the relationship between water insecurity and livelihood vulnerability, where limited access to water reduces economic resilience and increases dependence on fragile coping strategies. The Sustainable Livelihoods Framework emphasizes that sustainable livelihoods depend on access to multiple forms of capital, including natural, financial, physical, human, and social resources (Scoones, 1998). When climate change undermines access to water, it simultaneously weakens several livelihood assets, particularly for poor rural households.

The unequal impacts of water scarcity also reveal institutional challenges within Indonesia's water governance system. Although national policies recognize water as a public resource and emphasize equitable access, implementation often faces difficulties related to fragmented authority, limited infrastructure, and uneven institutional capacity between regions. Decentralization has provided local governments with greater responsibility for resource management, but differences in financial capacity and administrative effectiveness have created variations in communities' ability to respond to water challenges. Ostrom (1990) highlights that effective resource governance requires institutions capable of balancing state authority, community participation, and local conditions. In the Indonesian context, this suggests that addressing water scarcity requires not only stronger legal provisions but also governance arrangements that empower local actors while maintaining accountability and equity.

The vulnerability of Indonesian communities to water scarcity therefore reflects a combination of environmental exposure and social inequality. Climate change has intensified existing pressures, but the severity of impacts depends largely on institutional arrangements, economic conditions, and recognition of community rights. The protection of vulnerable groups requires a shift from a purely resource-management approach toward a justice-oriented framework that considers who has access to water, whose knowledge is recognized, and who participates in decisions regarding water governance. Such an approach is consistent with the principles of climate justice and supports the development of adaptive water governance systems capable of responding to increasing climate uncertainty.

3. Water Justice and Environmental Governance

Water governance has increasingly moved beyond the traditional focus on technical management and infrastructure development toward broader questions of justice, rights, and social inclusion. Historically, water management policies have often emphasized efficiency, supply expansion, and economic productivity, while paying limited attention to how water resources are distributed among

different social groups. However, climate change has challenged this approach by demonstrating that water insecurity is not only a consequence of physical scarcity but also a reflection of political, institutional, and social inequalities. The concept of water justice provides a critical framework for examining these dimensions by questioning who has access to water, whose interests are prioritized in water allocation decisions, and whose knowledge and experiences are recognized within governance processes (Schlosberg, 2012). From this perspective, effective water governance requires more than ensuring sufficient water availability; it requires creating institutional arrangements that guarantee equitable access, protect vulnerable populations, and enable meaningful participation in decision-making.

The concept of water justice is closely connected with the broader framework of climate justice, which emphasizes that climate-related risks and responsibilities are unevenly distributed across societies. Climate change affects water systems globally, but the consequences are experienced most severely by communities with limited adaptive capacity and weak political representation. Schlosberg (2012) argues that environmental justice consists of three interconnected dimensions: distribution, recognition, and participation. Distributional justice concerns the fair allocation of environmental benefits and burdens, including access to clean and sufficient water during periods of scarcity. Recognition justice focuses on acknowledging marginalized communities, including indigenous peoples and rural populations, as legitimate stakeholders with valuable knowledge and rights. Procedural justice emphasizes the importance of inclusive decision-making processes where affected communities have meaningful opportunities to influence policies that shape their lives. Applying these dimensions to water governance allows researchers to evaluate whether legal frameworks protect not only water resources but also the social rights of communities dependent on those resources.

The relationship between water justice and environmental governance is particularly important because legal frameworks determine how water resources are controlled, allocated, and protected. Environmental governance theory emphasizes that natural resource management is shaped by interactions among governments, communities, markets, and institutions (Berkes & Folke, 1998). Water laws therefore function not merely as technical regulations but as mechanisms that define power relations between different actors. In this context, questions regarding ownership, access rights, public participation, and state responsibility become central to evaluating whether water governance systems promote justice. Ostrom (1990) highlights that sustainable resource governance requires institutional arrangements that recognize local contexts, encourage collective participation, and balance centralized authority with community involvement. Therefore, legal systems that regulate water resources must consider not only administrative efficiency but also the capacity of institutions to protect vulnerable communities under changing environmental conditions.

The principle of water as a human right provides another important foundation for evaluating water governance. The United Nations General Assembly recognized access to safe and clean water as a fundamental human right, emphasizing that governments have obligations to ensure availability, accessibility, quality, and affordability of water resources (United Nations, 2010). This principle challenges governance models that treat water primarily as an economic commodity and reinforces the idea that water management must prioritize basic human needs. In Indonesia, the constitutional framework establishes that natural resources, including water, are controlled by the state and must be utilized for the greatest prosperity of the people. Article 33(3) of the 1945 Constitution provides the foundation for state responsibility in managing natural resources, which has been interpreted by the Constitutional Court as requiring government control to protect public welfare rather than allowing unrestricted commercialization. Consequently, water governance must balance economic utilization with constitutional obligations to protect citizens' rights and environmental sustainability.

The evaluation of water law through the perspective of justice is particularly relevant in the context of climate change because existing legal frameworks were often developed before climate risks became a central governance concern. Traditional water management approaches typically focus on allocation, infrastructure, and pollution control, while climate adaptation requires additional considerations, including uncertainty management, ecosystem resilience, and protection of highly vulnerable groups. The concept of adaptive governance emphasizes that institutions must be flexible, participatory, and capable of responding to changing environmental conditions (Folke et al., 2005). Therefore, a climate-resilient water law should not only regulate present water use but also establish mechanisms for responding to future risks such as prolonged droughts, changing rainfall patterns, and increasing competition among water users.

In the Indonesian context, the adoption of Law No. 7 of 2004 concerning Water Resources represented an important attempt to modernize water governance through integrated water resource management principles. The law introduced concepts related to conservation, utilization, control of water damage, and community participation. However, its implementation generated debates regarding the balance between state responsibility, private sector involvement, and community rights. Critics argued that certain provisions created opportunities for excessive commercialization of water resources and potentially weakened the constitutional principle that water should primarily serve public welfare. These concerns eventually contributed to the Constitutional Court Decision No. 85/PUU-XI/2013, which annulled Law No. 7/2004 and emphasized that water management must maintain strong state control and prioritize people's rights. This legal development illustrates that water governance is not

merely a technical issue but a contested arena involving competing interpretations of justice, rights, and public interest.

A justice-oriented evaluation of water law therefore requires examining not only whether legal provisions exist but also whether they effectively protect communities facing increasing climate risks. Laws may establish principles of equality and sustainability, yet implementation gaps can prevent vulnerable groups from receiving meaningful protection. Issues such as weak enforcement, limited community participation, fragmented institutional responsibilities, and insufficient climate adaptation mechanisms may reduce the effectiveness of legal frameworks. As climate change intensifies water scarcity, the ability of water governance systems to protect vulnerable communities becomes an essential measure of legal effectiveness. Accordingly, this study adopts water justice as an analytical framework to assess whether Indonesia's water resources law adequately addresses the challenges posed by climate-induced water insecurity.

4. Research Gap, Objectives, and Research Questions

Existing research on water governance in Indonesia has generated significant discussions regarding legal reform, institutional arrangements, resource management, and the relationship between state authority and public access to water resources. Previous studies have examined the implications of Law No. 7 of 2004 concerning Water Resources, particularly regarding issues of privatization, constitutional interpretation, and the role of the state in controlling essential natural resources. However, much of this scholarship has focused primarily on legal interpretation and governance structures, while limited attention has been given to how water law responds to climate-induced water scarcity and the differentiated vulnerabilities experienced by marginalized communities. This limitation is increasingly significant because climate change has fundamentally altered the conditions under which water resources are governed. Legal frameworks developed primarily around conventional water management challenges may not be sufficient to address emerging risks associated with prolonged droughts, unpredictable rainfall patterns, and increasing competition over freshwater resources.

A second research gap concerns the limited integration between environmental law analysis and climate justice perspectives. Although climate change research has extensively examined vulnerability, adaptation, and resilience, fewer studies have critically evaluated whether legal institutions provide equitable protection for communities most affected by climate-related water insecurity. Climate justice scholarship emphasizes that environmental risks are socially and politically constructed, meaning that vulnerability depends not only on exposure to hazards but also on access to resources, recognition within governance systems, and participation in decision-making processes (Schlosberg, 2012; Fraser, 2008). However, these dimensions remain

insufficiently explored within Indonesian water governance studies. Existing legal analyses often evaluate whether regulations comply with constitutional principles but pay less attention to whether those regulations effectively protect rural communities, indigenous populations, smallholder farmers, and other vulnerable groups facing water scarcity. This study addresses this gap by applying a justice-oriented framework to evaluate the effectiveness of water law under conditions of climate uncertainty.

A third gap relates to the disconnect between formal legal protection and practical implementation. While Indonesia has established legal principles recognizing water as a public resource and affirming state responsibility for ensuring public welfare, significant challenges remain in translating these principles into equitable outcomes. Institutional fragmentation, uneven local government capacity, limited community participation, and insufficient climate adaptation mechanisms may restrict the ability of legal frameworks to protect vulnerable populations. As Ostrom (1990) and Folke et al. (2005) emphasize, sustainable resource governance depends not only on formal rules but also on institutional capacity, social participation, and adaptive management. Therefore, evaluating water law requires examining both normative legal provisions and their ability to respond to social and ecological realities. This study contributes to this discussion by bridging legal analysis with empirical perspectives from affected communities and water governance actors.

The primary objective of this research is to evaluate the effectiveness of Law No. 7 of 2004 concerning Water Resources in protecting vulnerable communities from climate-induced water scarcity. Although the law has been replaced following Constitutional Court developments and subsequent water legislation, it remains an important historical and analytical reference because it represents a significant stage in Indonesia's transition toward integrated water resource management. By examining the strengths and limitations of this legal framework, the study seeks to identify broader lessons regarding the relationship between environmental law, climate adaptation, and social justice. Specifically, the research evaluates whether the principles embedded within the law adequately address issues of equitable water allocation, community protection, and institutional responsiveness under increasing climate pressure. This study is guided by three main research questions:

1. RQ1: How effectively did Law No. 7 of 2004 concerning Water Resources address equitable access to water resources and protection of vulnerable communities in Indonesia? This question examines the normative capacity of the law by analyzing its provisions concerning water allocation, public interest, state responsibility, and community rights. It evaluates whether the legal framework sufficiently recognized vulnerable populations as priority groups in water management.

2. RQ2: What legal and institutional gaps limited the ability of Law No. 7 of 2004 to protect communities facing climate-induced water scarcity? This question focuses on implementation challenges, including governance fragmentation, limited participation mechanisms, weak enforcement, and the absence of explicit climate adaptation considerations within water management frameworks.
3. RQ3: How can Indonesia develop a more climate-resilient and justice-oriented water governance framework? This question explores pathways for legal and institutional reform by integrating principles of water justice, climate adaptation, and inclusive governance. It considers how future water policies can better protect vulnerable communities while ensuring sustainable management of freshwater resources.

By addressing these questions, this research contributes to the emerging field of climate-resilient environmental governance by demonstrating that water security cannot be achieved solely through technological solutions or resource expansion. Instead, sustainable water governance requires legal frameworks that recognize social inequalities, strengthen community participation, and incorporate climate justice principles. The study therefore positions water law as not only an instrument for resource regulation but also as a mechanism for protecting human rights and advancing environmental justice in an era of climate uncertainty.

Literature Review

A. Climate Change, Water Security, and Vulnerability

Climate change has fundamentally altered the global water security landscape by disrupting hydrological systems and increasing uncertainty in freshwater availability. Water security is commonly understood as the capacity of societies to ensure sustainable access to adequate quantities of acceptable quality water for human well-being, economic development, ecosystem protection, and risk management (Grey & Sadoff, 2007). However, climate change challenges this objective by increasing the frequency and intensity of droughts, changing precipitation patterns, accelerating water ecosystem degradation, and creating greater competition among different water users (IPCC, 2023). These impacts demonstrate that water security is not solely a question of physical availability but also a governance challenge involving institutions, infrastructure, social inequalities, and adaptive capacity. In regions where communities depend heavily on climate-sensitive water sources, climate variability can rapidly translate into livelihood insecurity and social vulnerability.

The relationship between climate change and water security is particularly significant because water systems operate as interconnected social-ecological systems. Berkes and Folke (1998) argue that environmental resources cannot be separated from the social institutions, cultural practices, and economic activities

that shape their use and management. Changes in water availability therefore influence not only ecological conditions but also household livelihoods, agricultural production, public health, and social relations. The Social-Ecological Systems (SES) perspective highlights that resilience depends on the ability of communities and institutions to adapt to environmental change while maintaining essential functions. In this context, climate-induced water scarcity represents a challenge to both ecological resilience and governance capacity, particularly in communities where formal institutions and infrastructure remain limited.

The concept of vulnerability provides an important framework for understanding why climate impacts are experienced differently among social groups. Adger (2006) defines vulnerability as the degree to which a system is susceptible to and unable to cope with adverse effects of climate change, including climate variability and extreme events. Vulnerability is shaped by three interconnected dimensions: exposure to hazards, sensitivity to impacts, and adaptive capacity. Exposure refers to the extent to which communities experience climate-related risks, such as drought or declining water availability. Sensitivity concerns the degree to which livelihoods and social systems are affected by these changes. Adaptive capacity reflects the ability of individuals, communities, and institutions to anticipate, respond to, and recover from environmental stress. This framework demonstrates that water scarcity is not simply a natural consequence of climate change but a socially differentiated process influenced by economic resources, institutional support, and political recognition.

Research on climate vulnerability increasingly emphasizes that marginalized communities often face disproportionate impacts because they possess fewer resources and weaker institutional representation. According to Ribot (2014), vulnerability is closely related to access, entitlement, and power relations that determine who can obtain and control essential resources. In water governance, this perspective highlights that scarcity is often produced not only by environmental conditions but also by unequal distribution systems and institutional decisions. For example, communities with limited political influence may experience greater difficulties accessing water infrastructure, government support, or adaptation programs compared with more powerful users. Therefore, addressing water insecurity requires examining the social and political processes that shape access to water resources rather than focusing exclusively on hydrological conditions.

The Water Security Framework developed by Grey and Sadoff (2007) provides an important perspective for evaluating the relationship between water resources and development outcomes. The framework emphasizes that water security requires balancing three interconnected objectives: reducing water-related risks, ensuring reliable access to water services, and maintaining ecological sustainability. However, climate change requires expanding this

framework by incorporating questions of justice and inclusion. Traditional approaches to water security often prioritize infrastructure development, supply expansion, and economic efficiency, but such approaches may overlook whether vulnerable communities benefit equally from water management interventions. Zeitoun et al. (2013) argue that water security must include considerations of power, equity, and political relations because unequal access to water is frequently linked to governance structures rather than absolute scarcity alone.

Climate change also challenges conventional approaches to water governance by introducing uncertainty and complexity into resource management. Adaptive governance theory suggests that institutions must become more flexible, participatory, and capable of learning in response to changing environmental conditions (Folke et al., 2005). Fixed management approaches based on historical climate patterns may become increasingly ineffective as future hydrological conditions become less predictable. Adaptive governance therefore requires collaboration among governments, communities, scientists, and other stakeholders to develop responses that are context-specific and socially legitimate. In vulnerable communities, this approach is particularly important because local knowledge and community-based practices can provide valuable insights into managing water variability.

The implications of climate change for water security are particularly significant in developing countries, where institutional capacity and infrastructure limitations may constrain adaptation efforts. The IPCC (2023) emphasizes that climate impacts on water resources are expected to intensify existing inequalities, particularly among rural populations, low-income households, and communities dependent on climate-sensitive livelihoods. These challenges highlight the importance of integrating climate adaptation into water governance frameworks. Legal and institutional systems must move beyond managing current water demands and develop mechanisms capable of protecting vulnerable populations under future climate scenarios.

In summary, the literature demonstrates that climate-induced water scarcity is a multidimensional challenge involving environmental change, social vulnerability, and governance capacity. Water security cannot be achieved solely through increasing water supply or improving infrastructure; it requires institutions capable of ensuring equitable access, recognizing vulnerable communities, and enabling meaningful participation. This understanding provides the theoretical foundation for evaluating Indonesia's water governance framework and assessing whether existing legal arrangements adequately protect communities facing increasing climate-related water risks.

B. Water Justice and Climate Justice Frameworks

The concept of water justice has emerged as an important theoretical framework for examining inequalities in access, control, and decision-making

related to freshwater resources. Traditional approaches to water governance have often treated water primarily as a technical resource requiring efficient allocation and management. However, increasing evidence demonstrates that water scarcity is not solely caused by physical limitations but is also produced through social, economic, and political processes that determine who receives protection and who experiences greater risks (Boelens et al., 2018). Water justice expands the analysis of water governance by emphasizing questions of equity, rights, recognition, and participation. It challenges the assumption that increasing water availability automatically results in greater security for all groups by highlighting that distribution mechanisms and institutional arrangements determine whether vulnerable communities can access and benefit from water resources. In the context of climate change, water justice provides a critical framework for evaluating whether legal and governance systems are capable of protecting those most affected by increasing water uncertainty.

The philosophical foundation of water justice is closely connected with broader theories of social justice, particularly John Rawls' theory of justice as fairness. Rawls (1971) argues that a just society should be structured according to principles that ensure fair equality of opportunity and that social and economic inequalities are arranged to benefit the least advantaged members of society. Applied to water governance, the Rawlsian perspective suggests that water allocation systems should prioritize the basic needs of vulnerable populations before allowing greater benefits to more powerful users. This principle is particularly relevant in situations where water resources become increasingly scarce due to climate change, because competition among domestic users, agricultural sectors, industries, and commercial interests may intensify. From this perspective, legal frameworks governing water resources should establish clear priorities that protect essential human needs and prevent vulnerable communities from bearing disproportionate burdens of scarcity.

However, distributive approaches alone are insufficient to explain the complexity of water inequality because injustice also occurs through the exclusion and marginalization of certain groups. Fraser (2008) argues that justice requires attention not only to redistribution but also to recognition and representation. Recognition justice concerns whether social groups, their identities, knowledge systems, and lived experiences are acknowledged within institutional structures. In water governance, this dimension is particularly important for indigenous communities, rural populations, and local users whose relationships with water may extend beyond economic utilization and include cultural, ecological, and spiritual meanings. Failure to recognize these relationships can result in governance systems that prioritize technical expertise or commercial interests while marginalizing local knowledge. Therefore, a just water governance system must acknowledge diverse forms of knowledge and ensure that affected communities are visible within policy processes.

The procedural dimension of justice further emphasizes the importance of participation in environmental decision-making. According to Fraser (2008), marginalized groups cannot achieve justice if they remain excluded from processes where decisions affecting their lives are made. This perspective aligns with environmental governance theories that emphasize participation, accountability, and democratic legitimacy. In water management, procedural justice requires that communities have meaningful opportunities to participate in decisions regarding water allocation, infrastructure development, conservation policies, and adaptation strategies. Participation should not be limited to symbolic consultation but should involve genuine influence over outcomes. This principle is particularly relevant in climate adaptation because communities experiencing water scarcity often possess valuable local knowledge regarding seasonal changes, resource management practices, and coping strategies that can improve policy effectiveness.

Schlosberg's (2012) environmental justice framework provides a more comprehensive approach by integrating distribution, recognition, and participation into a unified analytical model. According to Schlosberg, environmental injustice occurs when vulnerable groups experience unequal exposure to environmental harms, lack recognition within governance systems, and are excluded from decision-making processes. This framework has become particularly influential in climate justice scholarship because it explains why climate impacts are not experienced equally even when environmental hazards are widespread. In the context of water scarcity, climate justice requires examining not only whether water resources are physically available but also whether communities have equitable access, whether their vulnerabilities are acknowledged, and whether they participate in shaping adaptation responses.

The application of climate justice theory to water governance is especially important because climate change introduces new forms of inequality. Although water scarcity may be caused by global environmental processes, the capacity to respond depends heavily on social and institutional conditions. Developed regions and economically advantaged groups often based on economic efficiency or administrative effectiveness; it must also be assessed according to whether it fulfills rights-based obligations toward vulnerable populations. This principle is particularly relevant for evaluating water possess greater ability to secure alternative water supplies, invest in infrastructure, and influence governance decisions. Conversely, poor and marginalized communities frequently depend on fragile local water systems and have limited political capacity to demand protection. As a result, climate change can intensify existing patterns of inequality. According to Schlosberg and Collins (2014), climate justice requires recognizing that adaptation policies must address both immediate climate impacts and the structural conditions that produce vulnerability.

The human right to water provides an additional normative foundation for water justice. The United Nations General Assembly Resolution 64/292 recognizes access to safe and clean drinking water and sanitation as a human right essential for the full enjoyment of life and other human rights (United Nations, 2010). This recognition establishes that governments have obligations to ensure water availability, accessibility, quality, and affordability. Within this framework, water governance cannot be evaluated solely based on economic efficiency or administrative effectiveness; it must also be assessed according to whether it fulfills rights-based obligations toward vulnerable populations. This principle is particularly relevant for evaluating water laws because legal frameworks determine how rights are defined, protected, and implemented.

In Indonesia, the water justice perspective provides a useful framework for examining the relationship between constitutional principles, water legislation, and climate adaptation. Article 33(3) of the 1945 Constitution establishes that land, water, and natural resources are controlled by the state and utilized for the greatest prosperity of the people. The Constitutional Court has interpreted this principle as requiring strong state responsibility in protecting public access to essential resources. Therefore, evaluating Law No. 7 of 2004 concerning Water Resources requires examining whether its provisions adequately reflected principles of distributive, recognition, and procedural justice. Questions regarding water allocation priorities, community participation, and institutional protection of vulnerable groups become central to determining whether the legal framework was capable of addressing emerging climate-related water challenges.

Overall, the literature demonstrates that water justice and climate justice provide complementary frameworks for evaluating environmental law and governance. Water scarcity under climate change is not merely a problem of resource availability but a question of rights, power, and institutional responsibility. A justice-oriented analysis therefore enables a deeper evaluation of whether water governance systems protect vulnerable communities, recognize diverse relationships with water, and provide meaningful opportunities for participation. These theoretical perspectives form the foundation for assessing the strengths and limitations of Indonesia's water resources legislation in responding to climate-induced water scarcity.

C. Environmental Law and Water Governance in Indonesia

Environmental law plays a fundamental role in shaping how societies define, allocate, and protect natural resources, including freshwater systems. In the context of water governance, legal frameworks determine the relationship between the state, communities, and economic actors by establishing rights, responsibilities, and mechanisms for resource management. Water governance is therefore not merely an administrative process but a reflection of political choices regarding ownership, access, and public responsibility. According to Bosselmann

(2017), environmental law increasingly needs to incorporate ecological sustainability and social justice principles because environmental resources are closely connected with human rights and community welfare. This perspective is particularly relevant in countries such as Indonesia, where water resources are constitutionally recognized as essential resources under state responsibility. As climate change intensifies pressure on freshwater systems, the effectiveness of environmental law depends on its ability to integrate ecological protection, equitable access, and adaptive governance principles.

Indonesia's legal approach to water governance is rooted in Article 33 paragraph (3) of the 1945 Constitution, which states that land, water, and natural resources contained therein are controlled by the state and utilized for the greatest prosperity of the people. This constitutional principle establishes the doctrine of state control (hak menguasai negara) over natural resources. However, state control does not imply absolute ownership but rather a public responsibility to regulate, manage, supervise, and ensure that natural resources serve collective welfare. The Constitutional Court has repeatedly interpreted this principle as requiring the state to maintain a balance between utilization and protection, particularly for resources essential to human life. Therefore, water governance in Indonesia is constitutionally connected with public interest, social justice, and protection of citizens' rights.

Before the enactment of Law No. 7 of 2004 concerning Water Resources, Indonesia's water governance was primarily regulated through Law No. 11 of 1974 concerning Irrigation. Although this earlier framework contributed significantly to agricultural water management, it was considered insufficient to address broader challenges related to integrated water resource management, environmental sustainability, and increasing competition among water users. The emergence of Law No. 7 of 2004 represented a shift toward integrated water resources management (IWRM), emphasizing conservation, utilization, control of water-related damages, and community participation. The law introduced a more comprehensive approach by recognizing water as a resource requiring coordination across sectors, regions, and administrative levels. From a governance perspective, this represented an important institutional transition from sector-based management toward a more integrated framework.

However, Law No. 7 of 2004 became the subject of significant legal and political debate, particularly concerning the relationship between state responsibility and private sector involvement. Critics argued that several provisions within the law created opportunities for excessive commercialization of water resources by allowing private actors greater involvement in water management activities. From a water justice perspective, concerns emerged regarding whether market-oriented approaches could undermine the constitutional principle that water should primarily serve public welfare. Scholars of water governance have warned that treating water primarily as an economic

commodity may marginalize communities that lack financial capacity or political influence to compete for access (Bakker, 2007). In this context, the debate surrounding Law No. 7 of 2004 reflected a broader global tension between water as an economic resource and water as a fundamental human right.

The controversy surrounding Law No. 7 of 2004 eventually resulted in Constitutional Court Decision No. 85/PUU-XI/2013, which annulled the entire law. The Court argued that the regulation did not sufficiently guarantee state control over water resources and potentially allowed excessive privatization that could conflict with constitutional obligations. The decision reaffirmed that water management must prioritize state responsibility and public welfare. The Court established several principles for evaluating water management policies, including the prioritization of public needs, state supervision, environmental sustainability, and protection against exploitation. This decision represents an important development in Indonesian environmental constitutionalism because it positioned access to water within the broader framework of social justice and human rights.

Following the Constitutional Court decision, Indonesia enacted Law No. 17 of 2019 concerning Water Resources as a replacement legal framework. The new law reaffirmed that water resources are controlled by the state and emphasized that the right to water must be guaranteed by the government. It also strengthened provisions concerning conservation, community participation, and protection of water functions. Nevertheless, while Law No. 17 of 2019 provides stronger recognition of public rights, challenges remain regarding implementation, institutional coordination, and adaptation to climate change. The existence of legal recognition does not automatically guarantee equitable outcomes because effective water governance depends on enforcement capacity, institutional arrangements, and meaningful participation of affected communities.

One important limitation of Indonesian water law is the relatively weak integration of climate change adaptation principles. Traditional water laws have generally focused on allocation, conservation, and infrastructure management, but climate change requires additional legal mechanisms capable of addressing uncertainty, increasing variability, and long-term ecological changes. According to Craig (2010), climate change challenges conventional environmental law because future risks cannot always be managed through fixed regulatory approaches based on historical conditions. Instead, legal frameworks must incorporate adaptive management, risk prevention, and flexible governance mechanisms. In Indonesia, where climate impacts vary significantly across regions, water governance requires legal instruments that allow local adaptation while maintaining national principles of equity and sustainability.

The implementation of water governance also faces institutional challenges associated with decentralization and multi-level governance. Although regional

autonomy provides opportunities for local governments to develop context-specific water management strategies, differences in administrative capacity, financial resources, and institutional coordination can produce unequal outcomes among regions. Ostrom (1990) emphasizes that successful natural resource governance depends on institutions capable of aligning formal rules with local realities. Therefore, effective water governance requires collaboration among national agencies, local governments, communities, and civil society organizations. Without such coordination, vulnerable communities may remain excluded from decision-making processes despite formal recognition of their rights.

From the perspective of water justice, the evolution of Indonesian water law demonstrates a continuing effort to balance resource utilization, environmental protection, and public rights. However, significant questions remain regarding whether existing legal frameworks adequately protect communities facing climate-induced water scarcity. Legal recognition of access rights must be accompanied by institutional mechanisms that ensure equitable distribution, recognition of local knowledge, and participation of vulnerable groups. Therefore, evaluating Law No. 7 of 2004 requires not only examining its legal provisions but also assessing whether its governance model was capable of responding to climate risks and advancing principles of environmental justice.

D. Research Gap and Conceptual Framework

The existing literature on water governance, climate change, and environmental law provides important insights into the challenges of managing freshwater resources under increasing environmental pressure. Previous studies have extensively examined the relationship between climate change and water insecurity, emphasizing the impacts of changing precipitation patterns, drought frequency, and ecosystem degradation on human and ecological systems (IPCC, 2023). Similarly, research on water governance has highlighted the importance of institutional capacity, integrated management, and stakeholder participation in achieving sustainable water outcomes (Grey & Sadoff, 2007; Ostrom, 1990). However, these bodies of literature often develop separately, resulting in limited integration between climate vulnerability analysis, environmental legal frameworks, and principles of water justice. As climate change increasingly transforms water scarcity from a resource management issue into a question of social inequality and human rights, there is a need for research that connects these analytical dimensions.

A significant limitation in previous studies concerns the insufficient examination of how legal frameworks protect vulnerable communities under conditions of climate-induced water scarcity. Existing analyses of Indonesian water law have primarily focused on constitutional interpretation, state control over natural resources, and debates surrounding privatization following the

enactment of Law No. 7 of 2004 concerning Water Resources. While these studies provide valuable legal insights, they have paid relatively limited attention to whether the law effectively addressed the differentiated vulnerabilities of communities facing water insecurity. Questions regarding rural populations, indigenous communities, smallholder farmers, and other marginalized groups remain underexplored. In particular, limited research has examined whether the principles embedded within Indonesia's water legislation align with contemporary climate justice perspectives emphasizing equitable distribution, recognition, and participation.

Another important gap relates to the limited integration of climate adaptation considerations within environmental legal analysis. Many legal studies evaluate regulations based on institutional authority, constitutional consistency, and administrative effectiveness, but fewer studies assess whether legal frameworks are sufficiently adaptive to respond to future climate risks. Climate change introduces uncertainty that challenges traditional regulatory approaches based on historical environmental conditions. Therefore, environmental laws must increasingly incorporate adaptive governance principles, including flexibility, precaution, resilience-building, and participatory decision-making (Folke et al., 2005). Evaluating water law through this perspective allows researchers to assess not only whether legal provisions exist but also whether they provide meaningful protection for communities exposed to increasing environmental risks.

This study addresses these gaps by developing an integrated analytical framework that combines climate vulnerability theory, water justice principles, and environmental governance analysis. The framework assumes that climate change intensifies water scarcity, but the social consequences of scarcity are shaped by existing patterns of inequality, institutional capacity, and governance arrangements. Therefore, vulnerability is not understood as a direct consequence of environmental exposure alone but as a product of interactions between ecological pressures and social conditions (Adger, 2006). Within this framework, water governance institutions and legal systems become critical determinants of whether communities can access resources, participate in decision-making, and develop adaptive capacities.

The conceptual framework of this study consists of four interconnected dimensions. First, climate-induced water stress represents the environmental driver affecting freshwater availability through changing rainfall patterns, droughts, and ecosystem disruption. Second, community vulnerability captures the social consequences of water scarcity by examining exposure, sensitivity, and adaptive capacity among affected populations. Third, water governance and legal frameworks represent the institutional mechanisms through which water resources are regulated, allocated, and protected. Fourth, water justice outcomes evaluate whether governance systems achieve equitable distribution, recognition

of vulnerable groups, and meaningful participation. Through this framework, the effectiveness of Law No. 7 of 2004 can be assessed not only through legal compliance but also through its capacity to address social and environmental realities. The analytical relationship can be summarized as follows:

Climate Change Impacts → Water Scarcity → Differential Community Vulnerability → Water Governance Response → Justice and Adaptation Outcomes

This framework recognizes that climate change does not automatically produce identical impacts across society. Instead, the consequences of water scarcity depend on how legal systems, institutions, and social structures mediate access to resources. A community with strong institutional support, political representation, and economic capacity may experience limited disruption, while marginalized communities may face severe livelihood and health consequences. Therefore, assessing water governance requires examining both environmental conditions and institutional responses.

By applying this conceptual framework, the study contributes to broader debates on climate-resilient environmental governance in three ways. First, it extends existing water law scholarship by incorporating climate justice perspectives into legal evaluation. Second, it contributes to climate adaptation research by demonstrating the importance of institutional and legal arrangements in shaping community resilience. Third, it provides policy insights for Indonesia and other developing countries seeking to reform water governance systems under increasing climate pressure. Ultimately, this research argues that effective water governance requires legal frameworks that move beyond resource management toward rights-based, participatory, and justice-oriented approaches capable of protecting vulnerable communities in an era of climate uncertainty.

Methods

This study employs a qualitative socio-legal research approach to evaluate the effectiveness of Indonesia's water resources legal framework in protecting vulnerable communities from climate-induced water scarcity. A socio-legal approach was selected because the research examines not only the normative dimensions of Law No. 7 of 2004 concerning Water Resources but also its relationship with social realities, governance practices, and community vulnerability. Unlike purely doctrinal legal research that focuses exclusively on statutory interpretation, socio-legal analysis enables an examination of how legal principles are implemented, experienced, and contested within society (Banakar & Travers, 2005). This approach is particularly relevant for studying water governance because legal effectiveness depends not only on formal provisions but

also on institutional capacity, stakeholder participation, and social conditions affecting access to water resources.

The study uses multiple sources of data, including primary legal materials, secondary academic literature, and empirical perspectives related to water governance and climate vulnerability. Primary legal materials consist of relevant Indonesian legal documents, including Law No. 7 of 2004 concerning Water Resources, Constitutional Court Decision No. 85/PUU-XI/2013, Law No. 17 of 2019 concerning Water Resources, and related environmental and climate policies. Secondary sources include peer-reviewed journal articles, international reports from institutions such as the Intergovernmental Panel on Climate Change (IPCC) and the United Nations, and scholarly works on water justice, climate adaptation, and environmental governance. Empirical insights are obtained from interviews and documented experiences of communities and water governance actors to understand how water scarcity affects vulnerable groups and how legal frameworks operate in practice.

Data analysis was conducted through a combination of doctrinal legal analysis and thematic analysis. The doctrinal analysis examines the principles, objectives, and mechanisms established within Indonesia's water resources legislation, particularly regarding state responsibility, public access, conservation obligations, and community participation. The thematic analysis focuses on identifying recurring themes related to climate vulnerability, water access, governance challenges, and justice dimensions. The findings are interpreted using the water justice framework proposed by Schlosberg (2012), which emphasizes three dimensions of justice: distribution, recognition, and participation. This framework enables the study to evaluate whether existing legal arrangements adequately address the needs and rights of vulnerable communities affected by water scarcity.

To strengthen analytical validity, the study applies triangulation by comparing legal documents, academic perspectives, policy frameworks, and community experiences. Triangulation allows the research to identify potential gaps between formal legal commitments and practical implementation. The analysis also incorporates principles of adaptive governance, recognizing that climate change requires flexible and participatory institutions capable of responding to uncertain environmental conditions (Folke et al., 2005). Through this approach, the study evaluates not only whether water laws contain provisions for equitable management but also whether governance mechanisms are sufficiently responsive to increasing climate-related risks.

Ethical considerations were maintained throughout the research process by ensuring responsible interpretation of legal documents and empirical information. Any community-based information was treated with confidentiality and analyzed with sensitivity toward local social, cultural, and environmental contexts. The research does not position vulnerable communities merely as

subjects of risk but recognizes them as rights holders and knowledge contributors within water governance systems. This methodological approach supports the study's broader objective of developing a justice-oriented understanding of water governance and identifying pathways toward more inclusive and climate-resilient legal frameworks in Indonesia.

Results and Discussion

A. Climate-Induced Water Scarcity and the Growing Vulnerability of Communities

The findings indicate that climate-induced water scarcity has become an increasingly significant challenge for vulnerable communities in Indonesia, particularly those whose livelihoods and daily activities depend directly on local water resources. Changes in rainfall patterns, prolonged dry seasons, rising temperatures, and increasing climate variability have affected the reliability of freshwater availability in many regions. Although Indonesia possesses considerable freshwater resources, the uneven geographical distribution of water and increasing climate pressure have created localized conditions of scarcity. The vulnerability of communities is therefore not determined solely by the physical availability of water but also by their dependence on climate-sensitive resources and their capacity to adapt. This finding supports Adger's (2006) vulnerability framework, which emphasizes that climate impacts are shaped by the interaction between exposure, sensitivity, and adaptive capacity. Communities with limited infrastructure, economic resources, and institutional support experience greater difficulties in responding to water stress compared with groups with stronger adaptive capacities.

The analysis further reveals that rural and resource-dependent communities are among the groups most affected by climate-related water insecurity. Smallholder farmers, indigenous communities, and households relying on traditional water sources face significant challenges when droughts reduce water availability for agriculture, domestic consumption, and livelihood activities. Previous studies have demonstrated that climate change often intensifies existing social inequalities because disadvantaged groups generally have fewer resources to secure alternative water supplies or influence governance decisions (Ribot, 2014). In Indonesia, these vulnerabilities are reinforced by differences in regional infrastructure development and uneven institutional capacity among local governments. Consequently, water scarcity should be understood as a socio-environmental problem rather than merely a hydrological phenomenon. The unequal capacity of communities to respond to water stress demonstrates that climate change acts as a multiplier of existing vulnerabilities.

The findings also highlight the importance of recognizing local knowledge and community-based practices in addressing water insecurity. Many rural and indigenous communities in Indonesia have developed traditional mechanisms for

managing water resources, including customary rules, collective conservation practices, and local adaptation strategies. However, these forms of knowledge are not always incorporated into formal water governance systems. Berkes et al. (2000) argue that traditional ecological knowledge represents an important adaptive resource because it reflects long-term interactions between communities and ecosystems. Ignoring such knowledge may reduce the effectiveness and legitimacy of water management interventions. From the perspective of recognition justice, the exclusion of local knowledge represents a governance failure because affected communities are treated primarily as beneficiaries rather than as active participants and knowledge holders.

The impacts of water scarcity are also experienced through social and gendered dimensions. In many rural communities, women often carry significant responsibilities related to household water management, including collecting, storing, and ensuring the availability of water for domestic needs. During periods of scarcity, these responsibilities increase, creating additional time and labour burdens that may affect economic opportunities and social participation. Feminist environmental scholars have emphasized that environmental challenges are shaped by existing social structures, meaning that climate impacts are often distributed differently according to gender roles and social position (Rocheleau et al., 1996). However, these dimensions remain insufficiently addressed within conventional water governance approaches that frequently consider households as uniform units. Integrating gender-sensitive perspectives into water adaptation strategies is therefore necessary to ensure that governance responses address the lived realities of vulnerable groups.

The analysis demonstrates that climate-induced water scarcity exposes limitations within existing water governance approaches that focus primarily on resource management and infrastructure development. While increasing water supply and improving infrastructure remain important, such measures alone cannot resolve inequalities in access and protection. The Water Security Framework proposed by Grey and Sadoff (2007) emphasizes that sustainable water security requires not only physical availability but also effective institutions capable of managing risks and ensuring equitable outcomes. In the Indonesian context, this means that climate adaptation policies must integrate vulnerability reduction, community participation, and justice principles into water governance. The increasing pressure of climate change therefore requires a transition from conventional water management toward adaptive and inclusive governance systems capable of protecting communities most at risk.

B. The Strengths and Limitations of Law No. 7/2004 in Protecting Water Rights

The analysis of Law No. 7 of 2004 concerning Water Resources demonstrates that the legislation represented a significant transformation in

Indonesia's water governance by introducing an integrated approach to water resource management. The law attempted to move beyond fragmented sectoral management by establishing principles of conservation, sustainable utilization, control of water-related damages, and community participation. These principles reflected the global shift toward integrated water resources management (IWRM), which emphasizes coordination between ecological protection, social needs, and economic development. From a governance perspective, the law provided an important foundation for recognizing water as a strategic resource requiring comprehensive regulation rather than merely an infrastructure issue. The emphasis on conservation and public utilization also aligned with Indonesia's constitutional principle that natural resources must be managed for the greatest prosperity of the people. However, while the normative objectives of the law demonstrated an intention to balance utilization and protection, its implementation revealed tensions between public rights, economic interests, and institutional responsibilities.

One of the important contributions of Law No. 7 of 2004 was its recognition that water management requires the involvement of multiple stakeholders, including government institutions, communities, and other users. The law introduced provisions encouraging community participation in planning, conservation, and monitoring of water resources. From the perspective of procedural justice, this represented progress compared with earlier water governance models that were largely centralized and state-driven. According to Ostrom (1990), effective natural resource governance requires institutions that enable collective participation and recognize the role of local actors. Similarly, adaptive governance theory emphasizes that environmental management becomes more resilient when communities are actively involved in decision-making processes (Folke et al., 2005). Nevertheless, the practical implementation of participation mechanisms under Law No. 7 of 2004 remained limited because formal recognition did not always translate into meaningful influence over water management decisions. In many cases, vulnerable communities continued to have limited capacity to negotiate with government institutions and more powerful economic actors.

A major controversy surrounding Law No. 7 of 2004 concerned the extent to which it permitted private sector involvement in water resource management. Critics argued that certain provisions created opportunities for the commercialization of water resources by allowing private entities to participate in water exploitation and service provision. From a water justice perspective, this raised concerns regarding distributive justice because market-based approaches may disadvantage communities with limited economic resources. Bakker (2007) argues that treating water primarily as an economic commodity can create conflicts between efficiency-oriented management and rights-based approaches that prioritize universal access. The Constitutional Court Decision No. 85/PUU-

XI/2013 reflected these concerns by emphasizing that water management must remain under strong state control and must prioritize public welfare. The Court's decision reinforced the interpretation that water is not merely an economic asset but a fundamental resource connected to constitutional rights and social justice.

The findings also reveal that Law No. 7 of 2004 contained limitations in addressing the specific challenges created by climate change. Although the law included provisions concerning conservation and sustainable management, it was not explicitly designed within a climate adaptation framework. This limitation is significant because climate change introduces new forms of uncertainty that require flexible and adaptive legal mechanisms. Traditional environmental laws often assume relatively stable environmental conditions, whereas climate change requires institutions capable of responding to changing risks, including prolonged droughts, unpredictable rainfall, and increasing competition over water resources (Craig, 2010). From this perspective, the effectiveness of water legislation should be evaluated not only by its ability to regulate existing water use but also by its capacity to protect communities under future climate scenarios. The absence of explicit climate resilience mechanisms reduced the ability of the law to address emerging patterns of water insecurity.

Another limitation concerns the insufficient attention given to vulnerable communities within the legal framework. Although Law No. 7 of 2004 recognized public interest and community participation, it did not establish strong mechanisms ensuring priority protection for groups most affected by water scarcity, such as rural communities, indigenous populations, and smallholder farmers. A justice-oriented legal framework requires more than general statements regarding equality; it requires concrete institutional mechanisms that identify vulnerable groups and ensure their access to essential resources. Schlosberg (2012) emphasizes that environmental justice requires recognition of marginalized groups and their specific circumstances. Without explicit protection mechanisms, formally equal access provisions may fail to address existing inequalities because disadvantaged communities often lack the resources and political influence necessary to exercise their rights effectively.

The eventual replacement of Law No. 7 of 2004 through Law No. 17 of 2019 concerning Water Resources demonstrates the continuing evolution of Indonesia's approach to water governance. The newer legal framework strengthened the recognition of state responsibility and reaffirmed water as a resource that must be managed for public welfare. However, the challenges identified in the implementation of the previous law remain relevant because legal reform alone does not automatically resolve institutional and governance problems. Effective protection of vulnerable communities requires not only improved legislation but also stronger enforcement, inclusive decision-making processes, and integration of climate adaptation principles. Therefore, the experience of Law No. 7 of 2004 provides important lessons regarding the need

to design water governance systems that combine legal certainty, ecological sustainability, and social justice.

Overall, the analysis indicates that Law No. 7 of 2004 contained important foundations for integrated water governance but was insufficient in addressing the complex challenges of climate-induced water scarcity. Its strengths lay in recognizing conservation, public interest, and stakeholder involvement, while its limitations emerged from weak climate adaptation provisions, contested approaches to private sector participation, and insufficient protection mechanisms for vulnerable groups. Evaluating the law through a water justice perspective demonstrates that effective water governance requires more than regulatory frameworks; it requires institutions capable of ensuring equitable access, recognizing diverse community needs, and enabling meaningful participation in decisions affecting water security.

C. Water Justice and Governance Gaps in Indonesia's Water Management System

The analysis reveals that one of the most significant challenges in Indonesia's water governance system is the persistence of distributive inequalities in access to and control over water resources. Although Indonesian water legislation recognizes water as a resource that must serve public welfare, practical access to safe and reliable water remains uneven across regions and social groups. Communities living in remote rural areas, small islands, and drought-prone regions frequently experience greater difficulties in accessing adequate water supplies compared with urban populations and economically stronger groups. These disparities demonstrate that water scarcity is not only determined by environmental conditions but also by infrastructure availability, institutional capacity, and political priorities. From the perspective of distributive justice, equal legal recognition of water rights does not automatically produce equitable outcomes because communities possess different capacities to access, claim, and benefit from water resources (Schlosberg, 2012). Therefore, climate-induced water scarcity may deepen existing inequalities when adaptation resources are not allocated according to levels of vulnerability.

The issue of distributional justice is particularly evident in the competition among different water users, including households, agriculture, industry, and commercial sectors. In situations of increasing water stress, allocation decisions often involve competing interests and difficult policy choices. While economic activities may contribute to regional development, prioritizing commercial water use without adequate protection mechanisms can reduce the availability of water for basic community needs. This tension reflects broader debates in global water governance regarding the balance between water as an economic resource and water as a fundamental human right (Bakker, 2007). The human right to water framework established by the United Nations emphasizes that water governance

must prioritize essential human needs, particularly for disadvantaged populations (United Nations, 2010). Therefore, climate adaptation policies must ensure that vulnerable communities are not placed in a weaker position when competing with more powerful economic actors for increasingly limited water resources.

Beyond distributional inequality, the findings identify recognition gaps as a major challenge within Indonesia's water governance system. Recognition justice requires institutions to acknowledge the identities, knowledge systems, and rights of communities whose lives are closely connected with water resources (Fraser, 2008; Schlosberg, 2012). However, formal water governance mechanisms often rely heavily on centralized technical approaches that may overlook local experiences and customary practices. Indigenous communities and local groups frequently possess valuable knowledge regarding watershed protection, seasonal water patterns, and sustainable resource management, yet these forms of knowledge are not always incorporated into formal decision-making processes. Berkes et al. (2000) emphasize that local ecological knowledge can strengthen environmental adaptation because it reflects long-term interactions between communities and ecosystems. Failure to recognize such knowledge represents not only a missed opportunity for improving water management but also a form of institutional marginalization.

The recognition gap is also reflected in the limited consideration of vulnerable groups within water policy frameworks. Communities affected by water scarcity are often represented as recipients of government assistance rather than as active participants with rights and expertise. This approach may unintentionally reinforce dependency and reduce opportunities for communities to contribute to governance processes. A justice-oriented approach requires a shift from viewing vulnerable populations as passive beneficiaries toward recognizing them as stakeholders capable of contributing to sustainable water management. This principle is consistent with the broader concept of climate justice, which emphasizes that affected communities should have their experiences, knowledge, and priorities reflected in adaptation strategies (Schlosberg & Collins, 2014). In the Indonesian context, strengthening recognition justice requires greater integration of customary knowledge, community-based management systems, and locally grounded adaptation practices into formal water governance.

The third dimension of water justice concerns procedural justice, particularly the extent to which communities can participate meaningfully in decisions affecting water resources. The findings indicate that although Indonesian water laws formally acknowledge community participation, practical opportunities for meaningful involvement remain limited. Participation is often constrained by unequal access to information, differences in technical knowledge, and power imbalances between communities and government

institutions or private actors. Arnstein's (1969) concept of the "ladder of citizen participation" illustrates that not all forms of participation provide genuine influence; consultation without decision-making power may represent symbolic rather than substantive participation. In water governance, procedural justice requires mechanisms that enable communities to influence planning, implementation, and evaluation processes rather than merely receive information about decisions that have already been made.

Institutional fragmentation represents another important governance gap affecting the achievement of water justice in Indonesia. Water management involves multiple levels of government and various sectors, including environmental protection, agriculture, infrastructure, and regional development. While decentralization has created opportunities for local adaptation, it has also generated challenges related to coordination, accountability, and unequal administrative capacity among regions. Ostrom (1990) argues that effective resource governance depends on institutional arrangements that clearly define responsibilities while enabling cooperation among stakeholders. In Indonesia, overlapping authorities and inconsistent implementation can reduce the effectiveness of water protection measures, particularly in areas where local governments have limited financial and technical capacity. These institutional challenges become more significant under climate change because adaptation requires coordinated responses across administrative boundaries and sectors.

The analysis demonstrates that Indonesia's water governance challenges are not primarily caused by the absence of legal principles but by gaps between normative commitments and practical implementation. The principles of public welfare, state responsibility, and community participation embedded within water legislation provide an important foundation for justice-oriented governance. However, without stronger mechanisms for equitable allocation, recognition of vulnerable groups, and meaningful participation, these principles may not translate into effective protection for communities facing climate-induced water scarcity. Therefore, improving water governance requires institutional reforms that address both environmental risks and social inequalities. A climate-resilient water governance system must integrate justice principles into legal implementation, ensuring that adaptation measures protect not only water resources but also the rights and dignity of communities dependent on them.

D. Toward Climate-Resilient and Justice-Oriented Water Governance

The findings suggest that addressing climate-induced water scarcity requires a fundamental shift from conventional water management toward a climate-resilient and justice-oriented governance approach. Existing water governance frameworks have traditionally emphasized resource allocation,

infrastructure development, and administrative regulation; however, increasing climate uncertainty requires institutions capable of managing complexity, anticipating future risks, and protecting vulnerable populations. Climate-resilient water governance should therefore integrate ecological sustainability with social justice principles by ensuring that adaptation measures address not only the availability of water resources but also questions of access, rights, and participation. As Folke et al. (2005) emphasize, adaptive governance requires flexible institutions that can learn from environmental changes and incorporate diverse forms of knowledge. In the Indonesian context, this means that water governance reforms must move beyond reactive responses to drought and scarcity toward proactive strategies that strengthen community resilience and institutional capacity.

A key priority for climate-resilient water governance is the integration of climate adaptation principles into water legislation and policy frameworks. Although Indonesian water laws recognize conservation and sustainable management, explicit mechanisms for addressing climate risks remain limited. Climate change introduces uncertainties that cannot be effectively managed through traditional regulatory approaches based solely on historical environmental conditions. Legal frameworks must therefore incorporate adaptive principles, including risk assessment, climate vulnerability mapping, drought preparedness, and flexible water allocation mechanisms. According to Craig (2010), climate adaptation requires environmental laws to evolve from static regulatory instruments into dynamic systems capable of responding to changing ecological realities. For Indonesia, this approach would require strengthening the connection between water governance and national climate policies, ensuring that water management strategies are aligned with broader climate adaptation commitments.

Another important reform direction involves strengthening the protection of vulnerable communities as central actors in water governance. The findings demonstrate that legal recognition of equal access is insufficient if marginalized groups continue to face structural barriers related to infrastructure, information, economic capacity, and political representation. A justice-oriented framework requires targeted measures that prioritize communities facing the greatest climate risks, including rural populations, indigenous communities, smallholder farmers, and low-income households. This approach reflects the principle of distributive justice, which argues that resources and adaptation benefits should be allocated according to vulnerability and need rather than solely according to economic efficiency (Rawls, 1971; Schlosberg, 2012). Policy interventions may include expanding community-based water management programs, improving access to climate information, strengthening rural water infrastructure, and ensuring that vulnerable groups are prioritized during periods of severe water stress.

Strengthening community participation represents another essential component of climate-resilient water governance. The findings indicate that formal recognition of participation within legal frameworks does not always guarantee meaningful involvement in decision-making processes. Future governance approaches should therefore promote participatory mechanisms that enable communities to influence water planning, monitoring, and adaptation strategies. Community-based management approaches have demonstrated that local institutions can contribute significantly to sustainable resource management when they are recognized and supported by formal governance systems (Ostrom, 1990). In Indonesia, integrating customary water management practices and local ecological knowledge into formal governance structures could enhance adaptation effectiveness while promoting recognition justice. Such integration would also strengthen the legitimacy of water policies by ensuring that governance decisions reflect the experiences and priorities of affected communities.

Institutional coordination and governance capacity must also be improved to address fragmentation within Indonesia's water management system. Climate-induced water scarcity requires cooperation among national agencies, local governments, communities, researchers, and civil society organizations. Fragmented responsibilities and inconsistent implementation can undermine otherwise strong legal principles. Adaptive governance emphasizes the importance of collaborative institutions that can coordinate across administrative levels and respond effectively to changing conditions (Folke et al., 2005). Therefore, future reforms should strengthen coordination mechanisms, clarify institutional responsibilities, and enhance the technical and financial capacity of local governments. Effective governance requires not only comprehensive regulations but also institutions capable of implementing those regulations in socially and environmentally appropriate ways.

The analysis further indicates that water governance reform should incorporate a broader understanding of justice that connects environmental sustainability with human rights protection. Water scarcity under climate change is not merely an ecological problem but a challenge involving dignity, equality, and social responsibility. The human right to water requires governments to ensure that all individuals, particularly vulnerable groups, can access sufficient and safe water regardless of economic status or geographical location (United Nations, 2010). Therefore, climate adaptation strategies must avoid approaches that prioritize economic productivity while neglecting social protection. A justice-oriented water governance system should balance economic development, environmental conservation, and community rights by placing human well-being at the center of decision-making.

Therefore, the findings demonstrate that Indonesia's future water governance framework requires a transition from resource-centered

management toward a rights-based and adaptive model. The experience of Law No. 7 of 2004 illustrates that legal frameworks must continuously evolve in response to changing environmental and social conditions. While legal reform is necessary, it must be accompanied by institutional strengthening, community empowerment, and meaningful participation to achieve effective outcomes. Climate-resilient water governance should therefore be understood as a process of building equitable relationships between states, communities, and ecosystems. By integrating climate adaptation and water justice principles, Indonesia can develop a governance system capable of protecting vulnerable communities while ensuring the long-term sustainability of freshwater resources.

Conclusion

This study examined the effectiveness of Indonesia's water resources governance framework in protecting vulnerable communities from climate-induced water scarcity through a water justice and climate governance perspective. The findings demonstrate that climate change has transformed water scarcity from a primarily environmental challenge into a complex socio-legal issue involving inequality, governance capacity, and human rights protection. Although Indonesia possesses substantial freshwater resources, uneven distribution, increasing climate variability, and institutional limitations have created significant vulnerabilities among communities that depend directly on local water systems. The study confirms that vulnerability is not determined solely by exposure to climate risks but also by differences in adaptive capacity, political representation, infrastructure access, and institutional support. Therefore, addressing water insecurity requires governance approaches that recognize the social dimensions of climate impacts.

The analysis of Law No. 7 of 2004 concerning Water Resources shows that the legislation represented an important effort to establish integrated water resources management in Indonesia. The law introduced important principles related to conservation, sustainable utilization, public interest, and community participation. However, its effectiveness in protecting vulnerable communities was limited by several factors, including insufficient climate adaptation mechanisms, weak protection of marginalized groups, and debates regarding the involvement of private actors in water management. The Constitutional Court Decision No. 85/PUU-XI/2013 reflected these concerns by reaffirming that water resources must remain under strong state responsibility and must be managed primarily for public welfare. The experience of Law No. 7 of 2004 demonstrates that legal recognition alone is insufficient unless supported by effective institutions, equitable implementation, and mechanisms that prioritize vulnerable populations.

From a theoretical perspective, this study contributes to the integration of water justice, climate justice, and environmental governance approaches within

the analysis of water law. By applying the dimensions of distribution, recognition, and participation justice proposed by Schlosberg (2012), the research demonstrates that effective water governance requires more than ensuring physical access to water resources. It requires addressing structural inequalities, recognizing diverse community knowledge systems, and enabling meaningful participation in decision-making processes. The study also reinforces the importance of adaptive governance theory, which emphasizes institutional flexibility, learning capacity, and collaboration among stakeholders in responding to uncertain environmental changes. These perspectives provide a broader analytical framework for evaluating whether environmental laws are capable of protecting communities under conditions of climate change.

The findings have important implications for water governance and legal reform in Indonesia. Future water policies should strengthen climate adaptation mechanisms by incorporating vulnerability assessments, drought preparedness strategies, and flexible water allocation systems. Legal frameworks should also provide stronger protection for communities most affected by water scarcity by prioritizing equitable access, improving participation mechanisms, and recognizing local and indigenous knowledge in water management processes. Strengthening community-based governance, improving coordination between national and local institutions, and enhancing local government capacity are essential steps toward developing a more resilient water governance system. In this regard, climate adaptation should not be viewed only as a technical challenge but as a process of ensuring social justice and protecting fundamental human rights.

Despite its contributions, this study has several limitations. First, the analysis primarily focuses on legal frameworks and governance perspectives, while variations in local implementation across Indonesia's diverse regions require further empirical investigation. Second, although the study incorporates community vulnerability perspectives, future research could conduct more extensive field-based studies involving different geographical areas, indigenous communities, and specific water-dependent sectors such as agriculture and fisheries. Third, comparative research examining water governance reforms in other climate-vulnerable countries could provide additional insights into effective institutional models for climate adaptation and water justice.

Future research should further explore how legal systems can evolve from conventional resource management frameworks toward adaptive, rights-based, and justice-oriented governance models. Particular attention should be given to developing indicators for measuring water justice outcomes, evaluating the effectiveness of climate adaptation policies, and examining how local communities can be empowered as active participants in water governance. As climate change continues to intensify pressure on freshwater resources, the protection of vulnerable communities will increasingly depend on the ability of

legal and institutional systems to combine environmental sustainability with principles of equity, participation, and human dignity.

References

Adger, W. N. (2006). Vulnerability. *Global Environmental Change, 16*(3), 268–281. https://doi.org/10.1016/j.gloenvcha.2006.02.006

Arnstein, S. R. (1969). A ladder of citizen participation. *Journal of the American Institute of Planners, 35*(4), 216–224. https://doi.org/10.1080/01944366908977225

Bakker, K. (2007). The "Commons" versus the "Commodity": Alter-globalization, anti-privatization and the human right to water in the Global South. *Antipode, 39*(3), 430–455. https://doi.org/10.1111/j.1467-8330.2007.00534.x

Banakar, R., & Travers, M. (Eds.). (2005). *Theory and method in socio-legal research*. Hart Publishing. Bloomsbury

Berkes, F., & Folke, C. (Eds.). (1998). *Linking social and ecological systems: Management practices and social mechanisms for building resilience*. Cambridge University Press.

Berkes, F., Colding, J., & Folke, C. (2000). Rediscovery of traditional ecological knowledge as adaptive management. *Ecological Applications, 10*(5), 1251–1262. https://doi.org/10.1890/1051-0761(2000)010[1251:ROTEKA]2.0.CO;2

Boelens, R., Perreault, T., & Vos, J. (Eds.). (2018). *Water justice*. Cambridge University Press.

Bosselmann, K. (2017). *The principle of sustainability: Transforming law and governance*. Routledge.

Bourdieu, P. (1987). The force of law: Toward a sociology of the juridical field. *Hastings Law Journal, 38*(5), 805–853.

Craig, R. K. (2010). Stationarity is dead—Long live transformation: Five principles for climate change adaptation law. *Harvard Environmental Law Review, 34*(1), 9–75.

Folke, C., Hahn, T., Olsson, P., & Norberg, J. (2005). Adaptive governance of social-ecological systems. *Annual Review of Environment and Resources, 30*, 441–473. https://doi.org/10.1146/annurev.energy.30.050504.144511

Fraser, N. (2008). *Scales of justice: Reimagining political space in a globalizing world*. Columbia University Press.

Grey, D., & Sadoff, C. W. (2007). Sink or swim? Water security for growth and development. *Water Policy, 9*(6), 545–571. https://doi.org/10.2166/wp.2007.021

Intergovernmental Panel on Climate Change. (2023). *Climate change 2023: Synthesis report*. IPCC.

McDonald, J. (2011). The role of law in adapting to climate change. *WIREs Climate Change, 2*(2), 283–295. https://doi.org/10.1002/wcc.96

Ostrom, E. (1990). *Governing the commons: The evolution of institutions for collective action*. Cambridge University Press.

Rawls, J. (1971). *A theory of justice*. Harvard University Press.

Ribot, J. (2014). Cause and response: Vulnerability and climate in the Anthropocene. *Journal of Peasant Studies, 41*(5), 667–705. https://doi.org/10.1080/03066150.2014.894911

Rocheleau, D., Thomas-Slayter, B., & Wangari, E. (Eds.). (1996). *Feminist political ecology: Global issues and local experiences*. Routledge.

Schlosberg, D. (2012). Climate justice and capabilities: A framework for adaptation policy. *Ethics & International Affairs, 26*(4), 445–461. https://doi.org/10.1017/S0892679412000615

Schlosberg, D., & Collins, L. B. (2014). From environmental to climate justice: Climate change and the discourse of environmental justice. *Wiley Interdisciplinary Reviews: Climate Change, 5*(3), 359–374. https://doi.org/10.1002/wcc.275

Zeitoun, M., Lankford, B., Bakker, K., & Conway, D. (2013). *The global politics of water: A critical introduction*. Routledge.

International Legal References

United Nations. (2010). *The human right to water and sanitation: Resolution adopted by the General Assembly (A/RES/64/292)*. United Nations General Assembly.

United Nations Framework Convention on Climate Change. (2015). *Paris Agreement*. United Nations.

Indonesian Legal References

Constitution of the Republic of Indonesia of 1945.

Constitutional Court of the Republic of Indonesia. (2015). *Decision Number 85/PUU-XI/2013 concerning Judicial Review of Law Number 7 of 2004 concerning Water Resources.*

Republic of Indonesia. (1974). *Law Number 11 of 1974 concerning Irrigation.*

Republic of Indonesia. (2004). *Law Number 7 of 2004 concerning Water Resources.*

Republic of Indonesia. (2019). *Law Number 17 of 2019 concerning Water Resources.*

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The world is reaching the tipping point beyond which climate change may become irreversible. If this happens, we risk denying present and future generations the right to a healthy and sustainable planet – the whole of humanity stands to lose.

Kofi Annan
Former Secretary-General of UN

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