



Water Governance and Water Management Challenges in Indonesia Towards SDGs 2030

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Abstract

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Clean water and sanitation are basic needs that are guaranteed as human rights, but in Indonesia the challenges of fulfilling them are still significant. This study examines the concept of water governance as a participatory, inclusive, and sustainable water management framework in the context of achieving the 2030 Sustainable Development Goals (SDGs). Through the literature study method, this study examines the development of clean water access, institutional capacity, and the dynamics of multi-stakeholder participation in the last five years. The results of the study show that water management policies still face the problem of inequality of access, ineffective institutions, and limitations in adaptation to climate change. Nonetheless, collaborative practices through public-private partnerships and community-based programs have made a positive contribution. The discussion emphasized the importance of strengthening institutional capacity, expanding community participation, and integrating environmental sustainability aspects in water policy. This research emphasizes the relevance of water governance as a strategic instrument to realize the target of SDGs No. 6 in Indonesia.



1. Introduction

Clean water and proper sanitation are basic human needs that are universally recognized as part of human rights. The issue of access to clean water is not only related to public health aspects, but also related to economic, social, and environmental sustainability. In line with the Sustainable Development Goals, especially SDG 6, Indonesia faces considerable challenges to ensure the availability of inclusive and sustainable drinking water and sanitation services. In fact, there are still gaps in access between regions, especially in rural areas, which shows an inequality in the distribution of clean water and sanitation services.¹

This gap emphasizes the importance of water governance which emphasizes transparency, accountability, and community participation. The concept of water governance does not only focus on water technical management, but also on the institutional, policy, and multi-stakeholder dynamics aspects involved in it. As emphasized by Ummah and Kusumah², water management in Indonesia still faces serious challenges in building a comprehensive governance framework. This is due to weak coordination between agencies, limited human resources, and lack of community participation in policy formulation and program implementation.

In the context of national policies, the Indonesian government has launched various programs to improve access to clean water, one of which is the Citarum

¹ Tin Afifah, Mariet Tetty Nuryetty, Cahyorini, Dede Anwar Musadad, Anne Schlotheuber, Nicole Bergen, and Richard Johnston. "Subnational regional inequality in access to improved drinking water and sanitation in Indonesia: results from the 2015 Indonesian National Socioeconomic Survey (SUSENAS)." *Global health action* 11, no. sup1 (2018): 31-40.

² Mustabsyrotul Ummah and Rizky Isman Kusumah. "Theoretical study of water governance for water management in Indonesia." *JISIPOL | Journal of Social and Political Sciences* 4, no. 1 (2020): 29-51.

Harum program which has been run since 2018 as a response to the problem of river pollution. This program is one of the government's strategic steps in an effort to meet the SDGs targets, especially the sixth point. However, although this program shows progress, environmental, social, and economic problems still overshadow implementation in the field, including low monitoring effectiveness and limited community participation.³

In addition, the issue of climate change adds to the complexity of water management in Indonesia. Increasing the frequency of floods, droughts, and water quality degradation requires adaptive and evidence-based policies. Diwangkari⁴ emphasized that climate change has a significant impact on water quality and sanitation in disaster-prone areas, so the integration of climate risk mitigation into water governance is a must. This shows that water governance cannot be seen as a purely sectoral issue, but must be placed within the framework of sustainable development that is cross-sectoral.

Furthermore, research shows that the aspect of equality in access to clean water and sanitation is still an urgent homework in Indonesia. Bayu et al.⁵ revealed that inequality in access to water and sanitation services is often influenced by socio-political factors, including the distribution of power and institutional capacity of the government. Therefore, strengthening inclusive water governance does not only

³ Helen Dian Fridayani. "The Government's Role in Facing SDGs 2030 Citarum River Clean-up Program, Indonesia: An Analysis." *Journal of Governance and Public Policy* 7, no. 1 (2020): 41-50.

⁴ Andyan Diwangkari. "Urban Form and Neighborhood Vulnerability to Climate Change Case Study: Jakarta, Indonesia." *Georg. Tech Libr* (2018): 1-50.

⁵ Tidar Bayu, Hyungjun Kim, and Taikan Oki. "Water governance contribution to water and sanitation access equality in developing countries." *Water Resources Research* 56, no. 4 (2020): e2019WR025330.

depend on technical aspects, but also on institutional reform and strengthening government capacity at the local and national levels.

Thus, the urgency of implementing better water governance in Indonesia is becoming clearer. This study seeks to analyze the development of water governance in Indonesia in relation to efforts to achieve SDG 6, focusing on challenges, opportunities, and strategies that can be implemented. The next section will discuss a literature review to strengthen the theoretical foundation, the research methods used, findings from the literature analysis, as well as discussions that emphasize the importance of multi-stakeholder collaboration and cross-sectoral policy integration in water management.

2. Literature Review

The concept of water governance basically emphasizes the relationship between institutions, actors, and policies in water resource management. Since the emergence of the SDGs in 2015, especially the SDG 6 targets on clean water and sanitation, academic discourse has highlighted the importance of participatory, transparent, and accountable water governance. In Indonesia, this issue is becoming increasingly relevant given the inequality of access between regions and the challenges of climate change that exacerbate the condition of water resources. Several studies highlight the problem of gaps in access to clean water and sanitation as the main factors hindering the achievement of the SDGs targets. Afifah et al.⁶

⁶ Tin Afifah, Mariet Tetty Nuryetty, Cahyorini, Dede Anwar Musadad, Anne Schlotheuber, Nicole Bergen, and Richard Johnston. "Subnational regional inequality in access to improved drinking water and sanitation in Indonesia:

show that regional inequalities in the distribution of clean water services in Indonesia are still very real, especially in rural and remote areas. This gap reflects the weak capacity of institutions to support inclusive policies and the limited coordination mechanisms between agencies. In addition, institutional aspects are an important component of water governance. Li et al.⁷ emphasized that institutional capacity in managing water resources plays an important role in ensuring the successful implementation of policies.

However, institutions in developing countries, including Indonesia, are often still sectoral and not yet integrated, resulting in overlapping authority and inefficiency. On the other hand, socio-political dynamics also have a significant influence on water governance. Bayu et al.⁸ reveal that inequality in access to water and sanitation is not only influenced by geographical factors, but also by the distribution of power and political decisions. Therefore, strengthening water governance requires a paradigm shift, from a mere technical approach to management based on the principles of inclusivity and social justice. Thus, previous literature suggests that water governance in Indonesia still faces complex structural, institutional, and political challenges. This underscores the need for a more integrative multi-stakeholder strategy to achieve the SDG 6 targets in a sustainable manner.

results from the 2015 Indonesian National Socioeconomic Survey (SUSENAS)." *Global health action* 11, no. sup1 (2018): 31-40.

⁷ Wanxin Li, David von Eiff, and Alicia Kyoungjin An. "Analyzing the effects of institutional capacity on sustainable water governance." *Sustainability Science* 16, no. 1 (2021): 169-181.

⁸ Tidar Bayu, Hyungjun Kim, and Taikan Oki. "Water governance contribution to water and sanitation access equality in developing countries." *Water Resources Research* 56, no. 4 (2020): e2019WR025330.

3. Method

This research uses the library research method, which is an approach that focuses on collecting, reviewing, and analyzing scientific sources relevant to the theme of water governance and water management in Indonesia in relation to the achievement of SDG 6. This method was chosen because it allows researchers to gain a deep understanding of the conceptual developments, policies, and implementation of programs related to clean water and sanitation without conducting direct field research. The research process begins with the identification of academic literature published in the last five-year period. This time limit is set so that the study produced is in accordance with the latest developments, especially in the context of the implementation of the SDGs in Indonesia. Data sources are obtained from reputable international journals, accredited national journals, reports of international institutions such as WHO and UN-Water, and Indonesian government policy documents. The selection of sources is carried out purposively, taking into account the relevance of the content to the topic of water governance, its connection to clean water and sanitation issues, and its contribution in explaining institutional and multi-actor dynamics.

The next stage is to categorize the literature into several main themes, namely: (1) gaps in access to clean water and sanitation; (2) institutional capacity in water governance; (3) the influence of social, political, and economic factors on water management; and (4) integration of climate change issues in water policy. This categorization facilitates the literature synthesis process so that researchers can identify patterns, similarities, and differences between previous researches. Data

analysis was carried out with a descriptive-analytical approach. The collected literature is not only read in depth, but also critically compared to find trends in findings, research gaps, and opportunities for the development of water governance concepts in Indonesia. This approach allows researchers to formulate arguments that are based on scientific evidence while offering new perspectives on the future direction of water management.

To maintain validity, this study only uses verifiable literature, either through DOIs, official journal links, or credible academic repositories. In addition, the literature triangulation technique is also applied by comparing data from various types of sources, for example comparing the results of academic research with reports from international institutions or government policies. Thus, the resulting findings are not only conceptual, but also have practical relevance. The literature study method in this study provides a systematic framework to explore the role of water governance in supporting the achievement of SDG 6 in Indonesia. Through this approach, the research seeks to present a comprehensive analysis that can enrich academic discourse while providing applicable policy input.

4. Results

4.1. Gaps in Access to Clean Water and Sanitation

The availability of clean water and proper sanitation is one of the main indicators of achieving SDG 6. However, until the 2018–2022 period, Indonesia still

faces serious challenges in realizing equitable access. Afifah et al.⁹ found significant inequality between urban and rural areas, where people in remote areas tend to have more difficulty in obtaining clean water and proper sanitation services. This inequality shows the existence of infrastructure gaps and weak distribution mechanisms that are not able to reach all levels of society. The access gap is not only geographical, but also related to socio-economic factors. Fridayani¹⁰ highlights that communities with low economic levels often have more limited access to clean water services. This condition is exacerbated by river pollution in densely populated areas, such as the case of the Citarum River, which affects water quality and increases public health risks. In this context, clean water is not only an infrastructure issue, but also a social justice issue.

A study by Bayu et al.¹¹ added that inequality of access to clean water is also closely related to governance. Weak coordination between government agencies and inefficiencies in budget allocation are the causes of the slow increase in access in areas in need. This underscores the importance of inclusive water governance, where social and political aspects are considered on par with technical aspects. In addition, research trends on water, sanitation, and hygiene (WASH) in Indonesia show that

⁹ Tin Afifah, Mariet Tetty Nuryetty, Cahyorini, Dede Anwar Musadad, Anne Schlotheuber, Nicole Bergen, and Richard Johnston. "Subnational regional inequality in access to improved drinking water and sanitation in Indonesia: results from the 2015 Indonesian National Socioeconomic Survey (SUSENAS)." *Global health action* 11, no. sup1 (2018): 31-40.

¹⁰ Helen Dian Fridayani. "The Government's Role in Facing SDGs 2030 Citarum River Clean-up Program, Indonesia: An Analysis." *Journal of Governance and Public Policy* 7, no. 1 (2020): 41-50.

¹¹ Tidar Bayu, Hyungjun Kim, and Taikan Oki. "Water governance contribution to water and sanitation access equality in developing countries." *Water Resources Research* 56, no. 4 (2020): e2019WR025330.

the issue of access disparities still dominates academic discourse. Satriani et al.¹² through their systematic review stated that most of the research in the last five years period emphasized differences in achievement between regions and limited local capacity in managing water resources. These findings indicate that despite improvements, government efforts have not been enough to address entrenched disparities.

Furthermore, research by Umami et al.¹³ emphasizes that access issues are not only related to the physical availability of water, but also to the sustainability of resources. Overexploitation and environmental pollution lead to a reduction in the quality and quantity of water that can be accessed by the community. Therefore, the strategy to increase access must be long-term oriented with the sustainability of the water ecosystem in mind. From these findings, it can be concluded that the gap in access to clean water and sanitation in Indonesia is a multidimensional problem influenced by geographical, socio-economic, institutional, and environmental factors. This underscores the need for a more holistic and collaborative strategy in water governance so that the SDG 6 target can be achieved sustainably.

4.2. Institutional Capacity in Water Governance

Water governance in Indonesia is greatly influenced by institutional capacity, both at the national and local levels. Strong institutions are needed to ensure the achievement of effective, fair, and sustainable clean water and sanitation policies.

¹² S. Satriani, Izana Saffana Ilma, and D. Daniel. "Trends of water, sanitation, and hygiene (WASH) research in Indonesia: A systematic review." *International Journal of Environmental Research and Public Health* 19, no. 3 (2022): 1617.

¹³ Afriza Umami, Hadid Sukmana, Edza Aria Wikurendra, and Edit Paulik. "A review on water management issues: potential and challenges in Indonesia." *Sustainable Water Resources Management* 8, no. 3 (2022): 63.

However, a number of studies show that institutions in Indonesia still face various obstacles, ranging from weak coordination to limited resources. Li et al.¹⁴ emphasized that institutional capacity is one of the main pillars in the water governance framework. In Indonesia, water-related institutions often work in a sectoral manner, so cross-sector coordination is not optimal. This creates overlap of authority and slows down program implementation. This situation shows that institutional reform is key in strengthening water governance.

Furthermore, Dickin et al.¹⁵ through their research on the WASH (Water, Sanitation, and Hygiene) system highlights the importance of reciprocal accountability between actors in the institutional system. Weaknesses in accountability mechanisms lead to low transparency and effectiveness of policy implementation. In fact, accountability is the main principle in good governance which is directly related to the success of achieving SDG 6. Ummah and Kusumah¹⁶ also emphasized that water governance in Indonesia is still casuistic and does not have a comprehensive framework. Institutions tend to be more reactive to problems, rather than building long-term strategies. This condition shows the need for more systematic policy formulation by involving multi-level actors, both from the central government, local governments, and the community.

¹⁴ Wanxin Li, David von Eiff, and Alicia Kyoungjin An. "Analyzing the effects of institutional capacity on sustainable water governance." *Sustainability Science* 16, no. 1 (2021): 169-181.

¹⁵ Sarah Dickin, Abu Syed, Nishrin Qowamuna, George Njoroge, Carla Liera, Mohamad Mova Al'Afghani, Sidratun Chowdhury et al. "Assessing mutual accountability to strengthen national WASH systems and achieve the SDG targets for water and sanitation." *H2Open Journal* 5, no. 2 (2022): 166-179.

¹⁶ Mustabsyrotul Ummah and Rizky Isman Kusumah. "Theoretical study of water governance for water management in Indonesia." *JISIPOL | Journal of Social and Political Sciences* 4, no. 1 (2020): 29-51.

In addition, program implementation in the field often faces limitations in technical capacity. Suryani¹⁷ through a study of the Citarum Harum Program found that the weak technical capabilities of local government officials are a factor inhibiting the effectiveness of river pollution control programs. This shows that in addition to structural reform, strengthening the technical capacity of the apparatus is also absolutely necessary. On the other hand, Fridayani¹⁸ underlines the importance of the government's role in providing political direction and leadership. Without strong political commitment, institutional programs are often ceremonial and do not bring about significant change. Therefore, institutional capacity in water governance is not only related to structure and resources, but also to the existence of consistent political will. Thus, the findings confirm that institutions are a crucial foundation for the success of water governance in Indonesia. Without strengthening institutional capacity, both in structural, technical, and political aspects, the SDG 6 target is difficult to achieve sustainably.

4.3. Impacts of Climate Change and the Environment on Water Management

Climate change has serious consequences for water availability and quality in Indonesia. Changes in rainfall patterns, rising temperatures, and extreme weather events have implications for the risk of flooding, drought, and deteriorating water source quality. This condition demands adaptive water governance and is oriented

¹⁷ Anih Sri Suryani. "The development of clean water and sanitation during the Covid-19 pandemic." *Aspiration: Journal of Social Issues* 11, no. 2 (2020): 199-214.

¹⁸ Helen Dian Fridayani. "The Government's Role in Facing SDGs 2030 Citarum River Clean-up Program, Indonesia: An Analysis." *Journal of Governance and Public Policy* 7, no. 1 (2020): 41-50.

towards mitigating environmental risks. Diwangkari¹⁹ show that climate change has a direct impact on water quality in disaster-prone areas in Indonesia, especially in coastal and urban areas. These impacts include increased water contamination, reduced availability of clean water, and high threats to public health. These findings underscore the need to integrate climate mitigation strategies into water policy.

Nugroho et al.²⁰ in a study on household access to clean water found a fluctuating pattern during the 2018–2022 period. Changes in rainfall patterns have a significant effect on household water supply, so the resilience of clean water access increasingly depends on the readiness of infrastructure and institutions in the face of climate variability. In addition to climate factors, environmental pollution is also a serious problem. Umami et al.²¹ emphasized that overexploitation and lack of environmental protection lead to a decline in surface water and groundwater quality. Industrial pollution and domestic waste further exacerbate this condition, so access to decent water is increasingly threatened. Belinawati et al.²² highlight the case of the Citarum River which is severely polluted due to industrial and household waste. The government's revitalization program shows an integration effort between pollution

¹⁹ Andyan Diwangkari. "Urban Form and Neighborhood Vulnerability to Climate Change Case Study: Jakarta, Indonesia." *Georg. Tech Libr* (2018): 1-50.

²⁰ Hunggul Yudono Setio Hadi Nugroho, Dewi Retna Indrawati, Nining Wahyuningrum, Rahardyan Nugroho Adi, Agung Budi Supangat, Yonky Indrajaya, Pamungkas Buana Putra et al. "Toward water, energy, and food security in rural Indonesia: A review." *Water* 14, no. 10 (2022): 1645.

²¹ Afriza Umami, Hadid Sukmana, Edza Aria Wikurendra, and Edit Paulik. "A review on water management issues: potential and challenges in Indonesia." *Sustainable Water Resources Management* 8, no. 3 (2022): 63.

²² Resha Ayu Putri Belinawati, Tri Edhi Budhi Soesilo, Donna Asteria, and Riza Harmain. "Sustainability: Citarum River, government role on the face of SDGs (water and sanitation)." In *E3S Web of Conferences*, vol. 52, EDP Sciences, (2018): 00038.

control and ecosystem restoration, but its implementation still faces various technical and social obstacles.

In addition, Meutia et al.²³ shows that environmental crises, including low access to proper sanitation, have contributed to the increase in cases of water-based diseases, such as diarrhea in toddlers in Southeast Sulawesi. This confirms the close link between environmental quality, public health, and the effectiveness of water governance. The impact of climate change and environmental degradation on water governance in Indonesia shows that this problem is multidimensional. Strengthening water governance not only requires coordination between agencies, but also the integration of environmental and health issues into policy planning and implementation. In this way, the resilience of national water systems can be improved in the face of the global challenges of climate change.

5. Discussion

The results of this study show that water governance in Indonesia still faces complex structural, institutional, and environmental challenges. Gaps in access to clean water and sanitation, weak institutional capacity, and the impact of climate change and environmental degradation show that water governance in Indonesia is not fully able to respond to the demands of sustainable development. In the context of achieving SDG 6, this condition underscores the need for a more inclusive, adaptive, and evidence-based approach to governance.

²³ Ami A. Meutia, Royke Lumowa, and Masayuki Sakakibara. "Indonesian artisanal and small-scale gold mining—a narrative literature review." *International Journal of Environmental Research and Public Health* 19, no. 7 (2022): 3955.

First, the gap in access to clean water and sanitation is not only influenced by geographical factors, but also by socio-economic and political conditions. As revealed by Afifah et al.²⁴, rural communities and low-income groups are the most affected by the inequality in service distribution. This shows that government policies need to focus on fair distribution and priority for vulnerable groups, so that clean water and sanitation can truly be a universal right enjoyed by all levels of society. Second, the not yet solid institutions exacerbate the problem of water governance. Weak inter-agency coordination, overlapping authority, and low technical capacity of the apparatus make water policy often partial and inconsistent. Dickin et al.²⁵ emphasized the importance of building a mechanism of reciprocal accountability between actors in the WASH system to improve transparency and policy effectiveness. Thus, institutional reforms that emphasize cross-sectoral coordination, technical capacity building, and consistent political commitment are strategic steps that are inevitable.

Third, the challenges of climate change and environmental degradation require the integration of environmental issues in water policy. Climate change affects water quality and availability, while environmental degradation, including industrial and domestic pollution, exacerbates existing conditions. Diwangkari²⁶

²⁴ Tin Afifah, Mariet Tetty Nuryetty, Cahyorini, Dede Anwar Musadad, Anne Schlotheuber, Nicole Bergen, and Richard Johnston. "Subnational regional inequality in access to improved drinking water and sanitation in Indonesia: results from the 2015 Indonesian National Socioeconomic Survey (SUSENAS)." *Global health action* 11, no. sup1 (2018): 31-40.

²⁵ Sarah Dickin, Abu Syed, Nishrin Qowamuna, George Njoroge, Carla Liera, Mohamad Mova Al'Afghani, Sidratun Chowdhury et al. "Assessing mutual accountability to strengthen national WASH systems and achieve the SDG targets for water and sanitation." *H2Open Journal* 5, no. 2 (2022): 166-179.

²⁶ Andyan Diwangkari. "Urban Form and Neighborhood Vulnerability to Climate Change Case Study: Jakarta, Indonesia." *Georg. Tech Libr* (2018): 1-50.

affirm that climate impact mitigation must be part of adaptive water governance, as the sustainability of water resources is not only related to the technical aspects of supply, but also to the resilience of the ecosystems that support it. The findings of this study also highlight the importance of multi-stakeholder collaboration in water governance. Governments, communities, the private sector, and international organizations need to work together in formulating and implementing policies. Community participation, for example in community-based programs such as Pamsimas, shows that citizen involvement can increase the effectiveness of implementation. However, this participation must be facilitated with policies that provide real space for community contributions, not just a formality.

In addition, this study confirms the need to strengthen databases and research related to clean water and sanitation in Indonesia. Accurate and integrated data is essential to support evidence-based decision-making. By strengthening research, governments can formulate policies that are more responsive to social, political, and environmental dynamics. This discussion shows that water governance in Indonesia requires a fundamental transformation. These efforts include reducing access gaps, institutional reforms, adapting to climate change, and strengthening cross-sector collaboration. With a comprehensive approach, water governance in Indonesia can be more effective in supporting the achievement of SDG 6 and realizing equitable and sustainable development.

6. Conclusion

This research shows that water governance in Indonesia still faces various multidimensional challenges, ranging from access gaps, institutional weaknesses, to the impact of climate change and environmental degradation. The gap in access to clean water and sanitation is still real between urban and rural areas, as well as between high- and low-income groups. Meanwhile, institutional capacity that is not optimal causes cross-sector coordination to not run effectively, so that the implementation of water policies tends to be partial and less consistent.

Climate change and environmental pollution are further worsening water management conditions, thus demanding adaptive, integrative, and evidence-based policies. In this context, inclusive, transparent, and accountable water governance is the main prerequisite for achieving sustainable development goals, especially SDG 6. For this reason, the strategies that need to be pursued include: strengthening institutional capacity, increasing political commitment, integrating environmental issues into water policy, and expanding community and private sector participation. With a comprehensive and collaborative approach, Indonesia has the opportunity to accelerate the achievement of universal access to clean water and sanitation, while ensuring the sustainability of water resources for future generations.

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