

Urban Green Space Regulation: Challenges to Water Resources Conservation in Indonesia and Australia



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ABSTRACT

The escalating environmental crisis and pressing water resource conservation issues globally necessitate comprehensive research. This study investigates urban green space regulations and water resource conservation challenges in Indonesia and Australia. Employing a comparative analysis, it examines the legal frameworks, policies, and implementations in both countries. The research aims to identify innovative and sustainable strategies for water resource protection. Findings reveal substantial disparities in regulatory approaches, public involvement, and the integration of green technologies in green space management between the two nations. Indonesia needs help enhancing institutional capacity and integrating green space policies into urban planning, while Australia focuses on climate change adaptation and sustainable water resource management. The study advocates cross-sectoral collaboration and ecosystem principles in green space regulations for practical water conservation objectives. It contributes fresh perspectives on legal and policy frameworks for addressing water resource conservation challenges through urban green space management, offering recommendations for cohesive and sustainable policy development.



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1. Introduction

The challenges of rapid urbanization, population growth and expansion of urban areas are placing natural resources, especially water resources, under significant pressure. As a result, regulating urban green space is an essential issue in water resource conservation efforts. During the second half of the 20th century, water resource problems became more intricate. They intensified due to the rising demands and conflicts resulting from population increase, urbanization,

industrialization, and agricultural development.¹ The urbanization process is causing an increase in demand for water and putting strain on water resources. Consequently, numerous significant underground water sources, known as aquifers, are being exhausted.²

The Dublin Statement on Water and Sustainable Development (1992) acknowledged the worldwide significance of water resource management by emphasizing the relevance of sustainability and the natural environment. It advocated for the inclusion of users, planners, and policy-makers at all levels in a participatory approach.³ The Water resources carrying capacity (WRCC) is essential for achieving sustainable development, as it plays a critical role in balancing ecological preservation and socio-economic progress.⁴ According to Law Number 26 of 2007 concerning Spatial Planning, green open space is defined as an elongated/lane and clustered area with more open users, where plants grow naturally and deliberately planted.⁵ The configuration, layout, and purpose of our urban surroundings substantially impact our cultural affinity, enjoyment, and ability to obtain goods, services, and opportunities. How we live in our urban surroundings directly impacts the conditions of our natural environment. This urban green space includes the level of biodiversity, the sustainability and quality of our natural resources, and the magnitude of trash and pollution produced.⁶

Green open space is essential because it provides ecological, social and economic benefits, including carbon dioxide absorption, improved air quality, reduced urban temperatures, recreational space for the community, and increased mental and physical well-being of city residents.⁷ Green open spaces also play a vital role in conserving water resources in the hydrological cycle, including rainwater absorption, which reduces the risk of flooding and improves

¹ Kenji Nagata and others, 'Practicality of Integrated Water Resources Management (IWRM) in Different Contexts', *International Journal of Water Resources Development*, 38.5 (2022) <https://doi.org/10.1080/07900627.2021.1921709>

² Abdulla Al Kafy and others, 'Geospatial Approach for Developing an Integrated Water Resource Management Plan in Rajshahi, Bangladesh', *Environmental Challenges*, 4 (2021), 100139 <https://doi.org/10.1016/J.ENVC.2021.100139>

³ Widodo Dwi Putro and others, 'Ecological Sustainability from a Legal Philosophy Perspective', *Journal of Indonesian Legal Studies*, 8.2 (2023), 595–632 <https://doi.org/https://doi.org/10.15294/jils.v8i2.69262>

⁴ Yan Shi and others, 'Forecasting and Advancing Water Carrying Capacity in Henan Province in China: Application of "Four Determinations with Water" in AHP and SD Modeling', *Science of The Total Environment*, 2024, 170757 <https://doi.org/10.1016/J.SCITOTENV.2024.170757>

⁵ Reza Octavia Kusumaningtyas and others, 'Reduction of Digitalization Policy in Indonesian MSMEs and Implications for Sharia Economic Development', *Juris: Jurnal Ilmiah Syariah*, 21.2 (2022), 157–71 <https://doi.org/10.31958/juris.v21i2.6855>

⁶ 'Australia State of the Environment'.

⁷ Qian Wang and Zili Lan, 'Park Green Spaces, Public Health and Social Inequalities: Understanding the Interrelationships for Policy Implications', *Land Use Policy*, 83 (2019), 66–74 <https://doi.org/10.1016/J.LANDUSEPOL.2019.01.026>

groundwater quality.⁸ In addition, urban green open space plays a vital role in mitigating the negative impacts of urbanization, such as increasing temperatures and reducing the water infiltration rate into the soil, directly affecting water resource availability.⁹ Urban green space regulation is critical in ensuring sustainable water resource management in Indonesia and Australia, two countries with diverse geographical and climatic challenges. Therefore, an in-depth understanding of urban green space management's legal and policy framework is necessary to support effective water resource conservation.

The specific problem raised in this research relates to challenges in setting and implementing urban green space policies as a water resources conservation strategy. Planning for green open spaces, in particular, can play an important role, as they support essential ecosystem services, including those that assist in flood management.¹⁰ Obstacles in integrating green space management and water conservation policies create significant gaps in conserving water resources.¹¹ The lack of public awareness and participation in environmental conservation exacerbates the need for more coordination between institutions and stakeholders.¹² This condition results in a decrease in the quality and quantity of water resources, which impacts not only the environment but also the socio-economic life of the community.¹³ In the context of water resources law, this situation demands the development of a legal framework that is more integrative and adaptive to environmental changes and social needs.¹⁴

The importance of this issue in the context of water resources law lies in the urgent need to ensure sustainable water access for the growing urban population.

⁸ Abubaker Omer and others, 'Water Scarcity in the Yellow River Basin under Future Climate Change and Human Activities', *Science of The Total Environment*, 749 (2020), 141446 <https://doi.org/10.1016/J.SCITOTENV.2020.141446>

⁹ Yongyuan Lin and others, 'Green Space Optimization for Rural Vitality: Insights for Planning and Policy', *Land Use Policy*, 108 (2021), 105545 <<https://doi.org/10.1016/J.LANDUSEPOL.2021.105545>>.

¹⁰ Gemma Schuch and others, 'Water in the City: Green Open Spaces, Land Use Planning and Flood Management – An Australian Case Study', *Land Use Policy*, 63 (2017), 539–50 <https://doi.org/10.1016/J.LANDUSEPOL.2017.01.042>

¹¹ Daniel K. Maduku, 'Water Conservation Campaigns in an Emerging Economy: How Effective Are They?', *International Journal of Advertising*, 40.3 (2021) <https://doi.org/10.1080/02650487.2020.1780060>

¹² Toqeer Ahmed and others, 'Water-Related Impacts of Climate Change on Agriculture and Subsequently on Public Health: A Review for Generalists with Particular Reference to Pakistan', *International Journal of Environmental Research and Public Health*, 13.11 (2016) <https://doi.org/10.3390/IJERPH13111051>

¹³ Haseeb Akbar and others, 'Comprehensive Review of Groundwater Scarcity, Stress and Sustainability Index-Based Assessment', *Groundwater for Sustainable Development*, 18 (2022), 100782 <https://doi.org/10.1016/J.GSD.2022.100782>

¹⁴ Maria Pettersson and E. Carina H. Keskitalo, 'Adaptive Capacity of Legal and Policy Frameworks for Biodiversity Protection Considering Climate Change', *Land Use Policy*, 34 (2013), 213–22 <https://doi.org/10.1016/J.LANDUSEPOL.2013.03.007>

Water use conflicts,¹⁵ degradation of water quality due to pollution,¹⁶ and drought risk¹⁷ are becoming increasingly evident in many large cities in Indonesia and Australia. A robust legal framework¹⁸ supporting water resource conservation through managing urban green spaces is crucial. This legal framework is relevant for meeting people's basic needs and supporting healthy urban ecosystems and long-term environmental sustainability.¹⁹ Therefore, this research contributes to developing a better understanding of the interactions between urban green space regulation and water resources conservation, offering a new perspective in formulating legal policies that support both objectives synergistically.

The regulatory issues currently faced include the need for a more comprehensive and integrated legal framework, lack of coordination between institutions, and challenges in implementing and enforcing the law. In addition, the imbalance between economic development and environmental conservation often complicates water resource conservation efforts in urban areas. Meanwhile, limited water resources in urban areas are caused by various factors, including increasing water consumption due to population growth and urbanization,²⁰ pollution of water sources,²¹ and climate change,²² which affects water availability. This situation is exacerbated by inefficient and unsustainable water resource management.²³ Increasing urbanization²⁴ significantly impacts water resources

¹⁵ A. T. Wolf, 'International Waters: Conflict, Cooperation, and Transformation', *Encyclopedia of the Anthropocene*, 1–5 (2017), 291–99 <https://doi.org/10.1016/B978-0-12-809665-9.09444-1>

¹⁶ Toqeer Ahmed, Mohammad Zounemat-Kermani, and Miklas Scholz, 'Climate Change, Water Quality and Water-Related Challenges: A Review with Focus on Pakistan', *International Journal of Environmental Research and Public Health*, 17.22 (2020), 1–22 <https://doi.org/10.3390/IJERPH17228518>

¹⁷ Yunan Yan and others, 'Three-Dimensional Agricultural Water Scarcity Assessment Based on Water Footprint: A Study from a Humid Agricultural Area in China', *Science of The Total Environment*, 857 (2023), 159407 <https://doi.org/10.1016/J.SCITOTENV.2022.159407>

¹⁸ 'Legal and Policy Framework for Agroforestry Ecosystem Management', 2024, 419–28 <https://doi.org/10.1016/B978-0-323-95393-1.00003-8>

¹⁹ Natalie Marie Gulsrud, Kelly Hertzog, and Ian Shears, 'Innovative Urban Forestry Governance in Melbourne?: Investigating "Green Placemaking" as a Nature-Based Solution', *Environmental Research*, 161 (2018), 158–67 <https://doi.org/10.1016/J.ENVRES.2017.11.005>

²⁰ Edmund Ntom Udemba, Nazakat Ullah Khan, and Syed Ale Raza Shah, 'Demographic Change Effect on Ecological Footprint: A Tripartite Study of Urbanization, Aging Population, and Environmental Mitigation Technology', *Journal of Cleaner Production*, 437 (2024), 140406 <https://doi.org/10.1016/J.JCLEPRO.2023.140406>

²¹ Isabelle R. Horvath and others, 'Volunteer Science Data Show Degraded Water Quality Disproportionately Burdens Areas of High Poverty', *Journal of Hydrology*, 613 (2022), 128475 <https://doi.org/10.1016/J.JHYDROL.2022.128475>

²² S. T.A. Pickett and others, 'Urban Ecological Systems: Scientific Foundations and a Decade of Progress', *Journal of Environmental Management*, 92.3 (2011), 331–62 <https://doi.org/10.1016/j.jenvman.2010.08.022>

²³ Sarah Ann Wheeler, Katherine Owens, and Alec Zuo, 'Is There Public Desire for a Federal Takeover of Water Resource Management in Australia?', *Water Research*, 248 (2024), 120861 <https://doi.org/10.1016/J.WATRES.2023.120861>

through land use changes that reduce water absorption areas, increase surface runoff, and worsen water quality due to pollution.

Urbanization also increases water demand, placing additional pressure on already limited water resources. Lack of awareness and understanding of the importance of water conservation and sustainable practices among urban residents²⁵ is a significant challenge. Public education and campaigns must be increased to increase understanding of the importance of efficient management and conservation of water resources.²⁶ A comparison of urban green space regulations between Indonesia and Australia shows differences in the legal framework,²⁷ level of community participation, and implementation of green technology.²⁸ In Indonesia, key challenges include strengthening institutional capacity and integrating green space policies.²⁹ In contrast, in Australia, the focus is more on adaptation to climate change and sustainable management of water resources.³⁰

In the context of this research, the fundamental premise that will be tested is that the existence and effective implementation of urban green space regulations significantly contribute to water resource conservation efforts in Indonesia and Australia. This premise departs from the assumption that a robust and integrated legal and policy framework that supports the development and maintenance of urban green spaces can facilitate more sustainable water resource management through increased rainwater infiltration and reduced surface runoff.³¹ Therefore, this study assumes that one of the key factors influencing the effectiveness of

²⁴ Halvard Buhaug and Henrik Urdal, 'An Urbanization Bomb? Population Growth and Social Disorder in Cities', *Global Environmental Change*, 23.1 (2013), 1–10 <https://doi.org/10.1016/J.GLOENVCHA.2012.10.016>

²⁵ Dan Zhu and others, 'Nature-Based Solutions in Australia: A Systematic Quantitative Literature Review of Terms, Application and Policy Relevance', *Nature-Based Solutions*, 4 (2023), 100092 <https://doi.org/10.1016/J.NBSJ.2023.100092>

²⁶ Magnus Moglia, Stephen Cook, and Sorada Tapsuwan, 'Promoting Water Conservation: Where to from Here?', *Water (Switzerland)*, 2018 <https://doi.org/10.3390/w10111510>

²⁷ Muhammad Alif K. Sahide and others, *Navigating the Hidden Politics of Water Resource Bureaucracies in Indonesia: Mapping Issue-Elements and Alliances*, *Hasanuddin Law Review*, 2023, IX <https://doi.org/10.20956/halrev.v9i1.4304>

²⁸ Rizwana Yasmeen and others, 'The Impact of Green Technology, Environmental Tax and Natural Resources on Energy Efficiency and Productivity: Perspective of OECD Rule of Law', *Energy Reports*, 9 (2023), 1308–19 <https://doi.org/10.1016/J.EGYR.2022.12.067>

²⁹ Alexander Dunlap, 'The Green Economy as Counterinsurgency, or the Ontological Power Affirming Permanent Ecological Catastrophe', *Environmental Science & Policy*, 139 (2023), 39–50 <https://doi.org/10.1016/J.ENVSCI.2022.10.008>

³⁰ Abdul Kadir Jaelani, Reza Octavia Kusumaningtyas, and Asron Orsantinutsakul, 'The Model of Mining Environment Restoration Regulation Based on Sustainable Development Goals', *Legality: Jurnal Ilmiah Hukum*, 30.1 (2022), 131–46 <https://doi.org/https://doi.org/10.22219/ljih.v30i1.20764>

³¹ Paul Atagamen Aidonojie, Toyin Afolabi Majekodunmi, and Janet Adeyemi-balogun, 'The Legal Issues Concerning the Operation of Fin-Tech in Nigeria', *Media Hukum*, 50.2017 (2023), 76–88 <https://doi.org/https://doi.org/10.18196/jmh.v30i2.18337>

water resources conservation in cities is the quality and applicability of regulations relating to green spaces.³² This hypothesis led the research to investigate the status of existing laws and policies and the implementation practices and challenges faced in ensuring that urban green spaces function effectively as water conservation tools.³³ Thus, this research seeks to identify the causal relationship between urban green space regulation and water resources conservation while offering recommendations for improving the two in urban environmental management policy and practice.³⁴

In a literature review on public spaces and water resources conservation, S. Ahmed R. Bali et al. define public space as space within a community area that is used for public contact activities by its residents.³⁵ This definition provides a basis for understanding the importance of urban green spaces as an essential public space component. Their research emphasizes the function of public space as a place for social interaction and as a critical element in managing natural resources, including water. The research results of Tuti Khairani Harahap et al., supported by the research results of Yong Li et al. that effective design and management of public spaces can contribute significantly to the conservation of water resources through the provision of open spaces that support water infiltration and reduce surface runoff.³⁶ Furthermore, Qian Wang et al.³⁷ highlight that green public spaces have several main functions; namely, they can improve the quality of life of urban communities and contribute to public health through various potential pathways. Thus, the availability of green public space must be considered in its design and use. The approach of Magnus Moglia et al.³⁸ about the things that influence people's decisions to save water and conserve water, as well as awareness of water conservation behavior, provide essential insights into how urban green spaces can be designed and managed in ways that not only meet the physical needs of

³² Emad Mohammad, Al Amaren, and Mustafa M Al-husban, 'A Critical Overview of Islamic Performance', *Legality: Jurnal Ilmiah Hukum*, 32.1 (2024), 51–70 <https://doi.org/https://doi.org/10.22219/ljih.v32i1.29964>

³³ Ahmad Siboy and others, 'The Islamic Law-Based Design of Regional Head', *Legality: Jurnal Ilmiah Hukum*, 32.1 (2024), 1–15 <https://doi.org/https://doi.org/10.22219/ljih.v32i1.31261>

³⁴ Hari Sutra Disemadi, Abdurrakhman Alhakim, and Ninne Zahara Silviani, 'Intellectual Property Synergies: Merging Halal Certification with Indonesian Communal Intellectual Property Rights Laws', *Legality: Jurnal Ilmiah Hukum*, 32.1 (2024), 16–32 <https://doi.org/https://doi.org/10.22219/ljih.v32i1.30143>

³⁵ Tuti Khairani Harahap, 'Ethics Green Open Space Public Service by Government Pekanbaru City', *Procedia - Social and Behavioral Sciences*, 211 (2015), 945–52 <https://doi.org/10.1016/J.SBSPRO.2015.11.125>

³⁶ Yong Li, Bairong Wang, and Manfei Cui, 'Environmental Concern, Environmental Knowledge, and Residents' Water Conservation Behavior: Evidence from China', *Water (Switzerland)*, 14.13 (2022) <https://doi.org/10.3390/w14132087>

³⁷ Wang and Lan.

³⁸ Moglia, Cook, and Tapsuwan.

communities but also support the emotional and social well-being of their users. At the same time, they are promoting the conservation of water resources.

Provisions regarding Green Open Space and water resources conservation in Law No. 26 of 2007 provide a legal basis for local governments to formulate spatial planning policies and programs that pay attention to environmental aspects. Implementing this provision involves assessing environmental impacts, establishing conservation zones, controlling land use, and increasing public awareness of the importance of environmental preservation and water resources conservation.³⁹ This research is relevant to urban green space regulation and water resource conservation challenges in Indonesia and Australia, showing how effective public space design and management can be applied to overcome these challenges. The integration of democratic and responsive public space concepts in urban green space settings offers opportunities to create environments that not only support water resource conservation but also improve the quality of urban life. Therefore, an in-depth understanding of the theory and practice related to public space and its management is crucial in designing effective policies and interventions for the conservation of water resources in cities.⁴⁰

The proposed research aims to fill the knowledge gaps related to urban green space regulation and water resources conservation in the literature review. Although a previous study by S. Ahmed R. Bali et al. and Qian Wang et al. has provided a theoretical basis regarding the importance of public space and the qualities it should have, however, there is still room for further research regarding the practical implementation of this theory in the specific context of urban green space regulation for water resources conservation in Indonesia and Australia. Given the geographic, climate and policy differences between the two countries, this research focuses on how urban green space regulation can be more effective in supporting water resource conservation. The contribution or distinction of this proposed research lies in its specific focus on urban green space regulation in the context of water resources conservation in Indonesia and Australia, deepening the analysis of how legal and policy frameworks can be more effectively adapted to meet current environmental challenges. This research seeks to fill the gap between theory and practice by offering concrete solutions that can be applied. Thus, this research not only adds to the academic literature but also offers practical guidance for developing policies that are more sustainable and responsive to the need for water resource conservation in the era of urbanization.

³⁹ Muhammad Firdaus and Chryshnanda Dwilaksana, 'Shifting Polri's Law Enforcement Strategy: Restorative Justice for Public Trust', *Jurnal Media Hukum*, 2.2 (2023), 46–52 <https://doi.org/https://doi.org/10.18196/jmh.v30i2.18628>

⁴⁰ Daffa Ladro Kusworo, Abdulrazaq Owolabi Abdulkadir, and Nur Khaliza Fauzi, 'Reflections on the Dismissal of Theft Charges Through Prosecutor's Restorative Justice House in Lampung', *Media Hukum*, 2.2019 (2023) <https://doi.org/https://doi.org/10.18196/jmh.v30i2.18384>

The main objective of this research is to identify and comprehensively analyze how urban green space regulations can be optimized to support water resource conservation in Indonesia and Australia. Through this research, researchers aim to reveal the gaps and challenges in the current legal and policy framework and compare the approaches taken by the two countries in managing urban green spaces for water conservation purposes. Furthermore, this research aims to produce evidence-based policy recommendations that can increase green space regulations' effectiveness in managing water resources sustainably. Thus, this research not only has the ambition to contribute to the academic literature on water resources management and urban green spaces but also aims to offer practical guidance for policymakers and practitioners in designing and implementing more innovative and effective strategies in facing resource conservation challenges water power in cities.⁴¹

The research focuses on Melbourne as a case study to explore how a large city faces environmental and urbanization challenges, addresses urban green space provision. Melbourne is a city of more than 4.5 million people and the capital city of Victoria in south-eastern Australia. The City of Melbourne is an appropriate case for this analysis as it represents an opportunity to reveal and analyze new and unique phenomena within the context of nature-based solutions to climate resilience and ES delivery through urban re-naturing. The city of Melbourne is facing three substantial challenges: climate change, population growth and urban heating, which threaten to undermine the quality of life and wellness of city residents and ravage its urban tree population.⁴²

This research seeks to generate insights that can assist in formulating more effective and innovative policy recommendations to increase the contribution of urban green spaces to water resources conservation. These questions are designed to direct research investigations into a deeper understanding of how current policies and practices can be improved or modified to achieve better outcomes in the context of urban environment and sustainability. Regulation of water resource conservation in urban areas is crucial, given the increasing pressure on water resources due to population growth⁴³ and urbanization.⁴⁴ This regulation aims to regulate the use and management of water resources sustainably to ensure their availability for present and future generations. The importance of these

⁴¹ Fokky Fuad and Heriyono Tardjono, 'Ownership of Land: Legal Philosophy and Culture Analysis of Land Property Rights', *Media Hukum*, 30.2 (2023), 98–116 <https://doi.org/https://doi.org/10.18196/jmh.v30i2.18264>

⁴² Putro and others.

⁴³ Peter Kjær Kruse-Andersen, 'Directed Technical Change, Environmental Sustainability, and Population Growth', *Journal of Environmental Economics and Management*, 122 (2023), 102885 <https://doi.org/10.1016/J.JEEM.2023.102885>

⁴⁴ Yajun Pan and others, 'Impact and Mechanism of Urbanization on Urban Green Development in the Yangtze River Economic Belt', *Ecological Indicators*, 158 (2024), 111612 <https://doi.org/10.1016/J.ECOLIND.2024.111612>

regulations lies in their ability to prevent pollution,⁴⁵ control water extraction, and ensure fair and efficient water distribution.

2. Research Method

This type of legal research uses a conceptual approach and a statutory approach. The conceptual approach is used to develop legal ideas, principles, and concepts and to discover legal principles related to the problems discussed. The statutory approach includes examining and analyzing all applicable laws and regulations about legal issues. This methodology allows them to understand the existing legal framework and identify related legal matters.⁴⁶ These two approaches are designed to explain the problems this paper discusses objectively. Next, analyze the sources of legal materials using prescriptive analysis. Prescriptive analysis is an approach that combines descriptive and predictive analysis to determine the action to be taken in a current problem or decision. This method analyzes the content and meaning of the rule of law.⁴⁷ It is also supported by comparative analysis to reveal valuable lessons that can be applied more widely. Through this analysis, the aim is to activate the effectiveness of existing regulations, identify gaps and challenges in their implementation, and suggest modifications or additions to policies that can improve their performance in the context of air conservation.⁴⁸ This analysis will produce informative and evidence-based policy recommendations, which can support air resource conservation efforts through more effective management of urban green spaces in Indonesia and Australia.⁴⁹

3. Results and Discussion

The Urban Green Space Regulation in Indonesia and Australia

Urban green space regulations in Indonesia currently include various rules and policies to protect and manage green open spaces in the urban environment. Some relevant regulations include Law Number 26 of 2007 concerning Spatial Planning, which requires local governments to integrate the preservation of green open

⁴⁵ Jie Yu and others, 'Horizontal Ecological Compensation Policy and Water Pollution Governance: Evidence from Cross-Border Cooperation in China', *Environmental Impact Assessment Review*, 105 (2024), 107367 <https://doi.org/10.1016/j.EIAR.2023.107367>

⁴⁶ Sholahuddin Al-Fatih, 'Understanding Delegated Legislation in The Natural Resources Sector', *Bestuur*, 11.2 (2023), 290–311 <https://doi.org/https://dx.doi.org/10.20961/bestuur.v11i2.78125>

⁴⁷ Mohammad Thoha and others, 'Can Indonesia ' s Decentralized Education Technology Governance Policy: Evidence from Muslim Countries', *Bestuur*, 11.2 (2023), 217–34 <https://doi.org/https://dx.doi.org/10.20961/bestuur.v11i2.78320>

⁴⁸ Husni Mubarrak and Faisal Yahya, 'Contestation on Religious Interpretation in Contemporary Aceh Shari'a : Public Caning in Prison as the Case of Study', *JURIS (Jurnal Ilmiah Syariah)*, 22.2 (2023), 213–22 <https://doi.org/http://dx.doi.org/10.31958/juris.v22i2.10258>

⁴⁹ Tommy Leonard, Elvira Fitriyani, and Rakotoarisoa Maminirina, 'The Influence of Green Tax Regulations on New Renewable', *Bestuur*, 11.2 (2023), 384–405 <https://doi.org/https://dx.doi.org/10.20961/bestuur.v11i2.82506>

space in urban space planning. As an organic regulation of this law, Government Regulation Number 68 of 2010 concerning Forms and Procedures for the Community's Role in Spatial Planning and Ministerial Regulation and Regulation of the Minister of Agrarian Affairs and Spatial Planning/National Land Agency Number 14 of 2022 concerning the Provision and Utilization of Open Space have been issued.⁵⁰

Observing and analyzing the content of the effectiveness of regulations in promoting water resources conservation shows several weaknesses, namely related to; first, the limitations in implementation. Even though there are provisions regulating the role of the community in spatial planning, there often needs to be more community participation in the decision-making process regarding spatial planning.⁵¹ Limitations in implementation can be caused by low public awareness of the importance of their role in environmental development and a need to understand the mechanisms and procedures that must be followed.⁵² Second, the lack of law enforcement. Although this regulation states that the community has the right to participate in spatial planning, more compliance with the established procedures is often needed. A lack of law enforcement against these violations can reduce the effectiveness of these regulations in providing legal protection and certainty for the community.⁵³ Third, the lack of resources and capacity at the local level may hinder implementation. Many local governments still need expert personnel and funds to support community participation in spatial planning. This Lack of resources and capacity can hinder consultation and decision-making processes that involve the community.⁵⁴

In Australia, basics of urban green space regulation include several rules and policies to protect, manage, and expand green open space in urban environments. One of the principal regulations is the Environment Protection and Biodiversity Conservation Act 1999, which provides a framework for protecting the

⁵⁰ Harry Setya Nugraha and others, 'Examining the Legal Standing of IKN Authority Regulations within Indonesian 's Legislation System', *Volksgeist: Jurnal Ilmu Hukum Dan Konstitusi*, VI.40 (2023), 21–34 <https://doi.org/https://doi.org/10.24090/volksgeist.v6i2.9394>

⁵¹ Antonio Di Marco, 'Water Democracy under European Union Law: Requiring Participatory Services Management', *Utilities Policy*, 84 (2023), 101648 <https://doi.org/10.1016/J.JUP.2023.101648>

⁵² Antonino Galati, Alessandro Cotichio, and Ángel Peiró-Signes, 'Identifying the Factors Affecting Citizens' Willingness to Participate in Urban Forest Governance: Evidence from the Municipality of Palermo, Italy', *Forest Policy and Economics*, 155 (2023), 103054 <https://doi.org/10.1016/J.FORPOL.2023.103054>

⁵³ Erlan Wijatmoko, Armaidly Armawi, and Teuku Faisal Fathani, 'Legal Effectiveness in Promoting Development Policies: A Case Study of North Aceh Indonesia', *Heliyon*, 9.11 (2023), e21280 <https://doi.org/10.1016/j.heliyon.2023.e21280>

⁵⁴ A Zamakhsyari, 'Safeguarding Consumers : The Role of Industry and Trade Office in Countering Monopolistic Practices and Ensuring Business Protection', *Volksgeist: Jurnal Ilmu Hukum Dan Konstitusi*, VI.40 (2023), 299–312 <https://doi.org/https://doi.org/10.24090/volksgeist.v6i2.9065>

environment and biodiversity, including green open spaces. Apart from that, local and regional government policies regulate spatial planning, such as the Metropolitan Open Land Strategy and Local Environment Plans, which lead to the development and preservation of green open spaces. Evaluation of the success of this regulation in promoting water conservation shows that exemplary implementation of green available space management policies can positively impact water quality and availability in urban areas.⁵⁵ Several best practices and successful case studies in green open space management that contribute to water conservation have been identified, including applying green technologies such as rainwater management systems, rehabilitation of river ecosystems, and the development of sustainable water parks.⁵⁶

There are several types of regulations and policies relating to the management of urban green spaces in Australia, first, environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). This legislation provides a framework for protecting the environment and biodiversity in Australia. The sections of the EPBC Act relating to green open spaces provide for the protection of natural habitats and biodiversity, including green open spaces in urban environments. Second, Metropolitan Open Land Strategy (MOLS):⁵⁷ This policy aims to maintain and increase green open spaces in Melbourne. MOLS provides guidelines for the city's management, preservation, and development of green open spaces. Third, Local Environment Plans (LEPs). LEPs are planning regulations at the local level that regulate land use, including the management of green open spaces. Local governments regulate LEPs, including zoning, development restrictions, and development requirements for green open space. Fourth, the sustainable development regulations,⁵⁸ some local governments in Australia implement sustainable development regulations that require developing green open space in any new development. These regulations aim to improve the quality of the urban environment and support community welfare.

The significant variations in the effectiveness of urban green space regulations between Indonesia and Australia in supporting water resource conservation. In Indonesia, the main obstacles relate to limitations in implementing existing rules, including monitoring and law enforcement issues. In contrast, in Australia, the challenges are more about integrating green space policies with broader water

⁵⁵ Casey Furlong, Kein Gan, and Saman De Silva, 'Governance of Integrated Urban Water Management in Melbourne, Australia', *Utilities Policy*, 43 (2016), 48–58 <https://doi.org/10.1016/J.JUP.2016.04.008>

⁵⁶ Afif Noor and others, 'Overcoming Regulatory Hurdles in the Indonesian Crowdfunding Landscape', *Volksgeist: Jurnal Ilmu Hukum Dan Konstitusi*, VI.40 (2023), 245–60 <https://doi.org/https://doi.org/10.24090/volksgeist.v6i2.9447>

⁵⁷ Open Space and Strategy For, 'Open Space', 2021.

⁵⁸ Judy Bush, 'The Role of Local Government Greening Policies in the Transition towards Nature-Based Cities', *Environmental Innovation and Societal Transitions*, 35 (2020), 35–44 <https://doi.org/10.1016/J.EIST.2020.01.015>

conservation strategies. These findings emphasize the importance of developing legal and policy frameworks that are strong on paper and effective in practice. Furthermore, the research results suggest that community participation and the implementation of nature-based solutions can strengthen water conservation efforts through urban green spaces. These conclusions provide valuable guidance for formulating policies and practices to enhance urban green space development and water resources conservation, supporting sustainable development and urban environmental resilience.

There are differences in urban green space regulations in Indonesia and Australia in the regulatory framework and approaches the two countries apply. In Indonesia, rules related to urban green spaces are mainly regulated in Law Number 26 of 2007 concerning Spatial Planning, which emphasizes the importance of preserving green open spaces as an integral part of spatial planning.⁵⁹ On the other hand, Australia has a more structured and detailed regulatory framework, with regulations such as the Environment Protection and Biodiversity Conservation Act 1999 and the Metropolitan Open Land Strategy governing the management of green open spaces at national and regional levels.⁶⁰ Regarding the impact of regulations on water resource conservation, research shows that exemplary implementation of regulations can contribute positively to water quality and availability in cities. In Indonesia, efforts to preserve green open spaces have shown increased awareness of the importance of water conservation, although challenges are still faced in implementation and law enforcement. In Australia, integrated green available space management with water conservation has produced several best practices and successful case studies, such as applying green technology and rehabilitating river ecosystems. From the experiences of both countries, there are valuable lessons that can be learned, including the importance of a robust regulatory framework, the active role of communities in managing green open spaces, and the integration between green available space management and water resource conservation to achieve sustainable development goals in urban areas.⁶¹

The main findings of this research show that in Indonesia. However, some regulations support the development of urban green spaces to conserve water resources; implementation faces significant obstacles. These obstacles include limited resources, lack of public awareness and participation, and problems in monitoring and law enforcement. As a result, many urban green space areas need

⁵⁹ Jamaluddin Jahid, 'Analisis Kritis Terhadap UU Nomor 26 Tahun 2007 Tentang Penataan Ruang', *Jurnal Plano Madani*, 2.1 (2012), 1–4 <https://doi.org/https://doi.org/10.24252/jpm.v2i1.758>

⁶⁰ Sara Dolnicar, Anna Hurlimann, and Bettina Grün, 'Water Conservation Behavior in Australia', *Journal of Environmental Management*, 105 (2012) <https://doi.org/10.1016/j.jenvman.2012.03.042>

⁶¹ Abdul Kadir Jaelani and others, 'Green Tourism Regulation on Sustainable Development : Droning from Indonesia And', *Journal of Indonesian Legal Studies*, 8.2 (2023), 663–706 <https://doi.org/https://doi.org/10.15294/jils.v8i2.72210>

to be better maintained or function effectively as green infrastructure for water conservation. These findings emphasize the need for a more holistic and integrated approach in green space management, which does not only focus on physical development but also social, economic, and legal aspects.⁶²

Australia has three levels of government: federal, state and local. As a federation of states, the division of powers between federal and state governments is defined within the Australian constitution. Local governments lack recognition in the Australian constitution and are subordinate and accountable to their state governments. Nonetheless, local government plays a pivotal role in Australia's democratic system, being the level of elected government 'closest to the people'.⁶³ On the other hand, in Australia, research finds better integration between green space policies and water conservation strategies. However, challenges remain, especially in terms of adapting policies and practices to deal with the impacts of climate change. Australia shows more mature practices in urban green space management, focusing on water conservation, including advanced technology and nature-based solutions. However, there is room for improvement, particularly in increasing community participation and cross-sector policy integration. These findings suggest that the two countries can learn from each other in managing urban green spaces for water resource conservation, with Indonesia able to learn from Australia's integrative approaches and technologies. At the same time, Australia can increase climate change adaptation efforts and community participation.⁶⁴

One unexpected finding was the level of local innovation in managing green spaces for water conservation in several urban communities in Indonesia despite being faced with regulatory and resource limitations. This urban community shows the potential importance of community initiatives and community-based solutions in addressing environmental problems. A possible explanation for this is the urgent need for water conservation solutions amidst the water crisis and the desire of communities to improve their local environment. These findings emphasize the importance of supporting and strengthening these initiatives through more supportive policies and legal frameworks.⁶⁵

⁶² Soeleman Djaiz Baranyanan, Nilam Firmandayu, and Ravi Danendra, 'The Compliance of Regional Autonomy with State Administrative Court Decisions', *Journal of Sustainable Development and Regulatory Issues*, 2.1 (2024), 35–52 <https://doi.org/https://doi.org/10.53955/jsderi.v2i1.25>

⁶³ Bush.

⁶⁴ Purchase Land, 'Model Regulations for Collecting State Revenue in Registration of Sale And', *Journal of Sustainable Development and Regulatory Issues*, 2.1 (2024), 67–85 <https://doi.org/https://doi.org/10.53955/jsderi.v2i1.24>

⁶⁵ Abdul Kadir Jaelani, Resti Dian Luthviati, and Muhammad Jihadul Hayat, 'Halal Tourism Sector and Tax Allowance Policy: A Case Study Observed from Normative Problems to Effective Implementation', *Ijtihad: Jurnal Wacana Hukum Islam Dan Kemanusiaan*, 23.2 (2023), 185–210 <https://doi.org/10.18326/ijtihad.v23i2.185-210>

Australian state governments are primarily responsible for land use planning, each having its planning system and associated statutory and procedural frameworks. Local land-use decision-making functions are delegated to local governments. Local land-use decision-making functions are delegated to local governments. In Victoria, the State Government develops metropolitan-scale strategies for Melbourne and defines the *Victorian Planning Provisions* (VPP). Each local government, of which there are 32 within Melbourne's metropolitan area, must establish its local planning provisions, which must be consistent with state-level planning. Local governments are constrained by legislation in additional measures that can be included within their local planning schemes. Each local government must also develop a *Council Plan* within the first six months following the election. The *Council Plan* identifies the vision, goals, and associated outcomes that the elected Council seeks to achieve during its four-year term.

The application of Transition Management to policy analysis enabled a focus on the socio-institutional perspectives of urban sustainability transitions. Local government policies play a substantial role in urban green space provision. Local governments have demonstrated an increasing understanding of and commitment to green space provision for creating sustainable and liveable cities through ambitious strategic statements, goals, and objectives.⁶⁶ There are nested social and political challenges and complexities associated with green place-making as illustrated through the Melbourne case and the overlapping rationalities of UGI governance. Challenges of ecological gentrification and institutionalized hierarchies of cultural representation must be taken seriously by politicians, community leaders, and academics and warrant in-depth future studies. Based on this analysis, green place making should be seen as a nature-based solution to urban climate resilience.⁶⁷

Since the 1970s, increasing water scarcity and quality concerns have led to growing water market adoption and legislation. Major water reforms were also driven by the 1994 Council of Australian Governments (COAG) Framework (1994), which included a strategic framework for clarifying property rights, allocating water to the environment, trade arrangement, institutional reform, and public consultation and participation.⁶⁸

The Effective Urban Green Space Regulation

The effectiveness of urban green space regulations in maintaining water resource conservation can be improved through several policy suggestions that

⁶⁶ Bush.

⁶⁷ Gulsrud, Hertzog, and Shears.

⁶⁸ Wheeler, Owens, and Zuo.

can be implemented. First, regulations⁶⁹ that integrate water management⁷⁰ in the planning and managing of green open spaces,⁷¹ such as flood mitigation strategies⁷² and increasing water infiltration⁷³ in spatial planning regulations, should be strengthened. It was second, implementing incentive programs for developers and land owners that encourage the application of green technology⁷⁴, such as rooftop gardens and rain gardens, and using absorbent materials to increase water retention in urban environments. In addition, strategies are needed to increase public awareness and participation⁷⁵ in water conservation efforts⁷⁶. Public awareness and participation can be done through outreach campaigns, public education, and skills training on efficient water management in green open spaces. Collaboration between government, non-governmental organizations, and the private sector is also essential to build capacity and support the implementation of water conservation policies in green open spaces.

Strategies to increase public awareness and participation in water conservation efforts in green open spaces can be carried out through various approaches, first, they are using creative and easily accessible social media and doing information campaigns to reach multiple levels of society.⁷⁷ Second, they were developing environmental education programs integrated into the school curriculum to increase students' understanding of the importance of water conservation and their role in maintaining green open spaces.⁷⁸ Third, involve the community in participatory programs such as tree planting, river rehabilitation, and other

⁶⁹ Qiaoqiao Zheng and others, 'Will Informal Environmental Regulation Induce Residents to Form a Green Lifestyle? Evidence from China', *Energy Economics*, 125 (2023), 106835 <https://doi.org/10.1016/J.ENECO.2023.106835>

⁷⁰ Sahar Mohammad-Azari, Omid Bozorg-Haddad, and Asim Biswas, 'Water Pricing', *Economical, Political, and Social Issues in Water Resources*, 2021, 47–61 <https://doi.org/10.1016/B978-0-323-90567-1.00011-5>

⁷¹ Fei Xue, Zhonghua Gou, and Stephen Siu Yu Lau, 'Green Open Space in High-Dense Asian Cities: Site Configurations, Microclimates and Users' Perceptions', *Sustainable Cities and Society*, 34 (2017), 114–25 <https://doi.org/10.1016/J.SCS.2017.06.014>

⁷² Peng Huang and others, 'Vulnerability of Water Resource Management to Climate Change: Application to a Pyrenean Valley', *Journal of Hydrology: Regional Studies*, 44 (2022), 101241 <https://doi.org/10.1016/J.EJRH.2022.101241>

⁷³ Ignasius D.A. Sutapa and others, 'Ecohydrology Approach to Strengthen Public Green Open Space Management towards Comfortable Common Space and Playground in Kalijodo Area – Jakarta Province, Indonesia', *Ecohydrology & Hydrobiology*, 23.4 (2023), 518–31 <https://doi.org/10.1016/J.ECOHYD.2023.04.005>

⁷⁴ Pengzhen Liu and others, 'Environmental Regulation, Technology Density, and Green Technology Innovation Efficiency', *Heliyon*, 10.1 (2024), e23809 <https://doi.org/10.1016/J.HELIYON.2023.E23809>

⁷⁵ Galati, Coticchio, and Peiró-Signes.

⁷⁶ Moglia, Cook, and Tapsuwan.

⁷⁷ Maduku.

⁷⁸ Martina Pásková and others, 'Water Pollution Generated by Tourism: Review of System Dynamics Models', *Heliyon*, 10.1 (2024), e23824 <https://doi.org/10.1016/J.HELIYON.2023.E23824>

environmental activities to increase awareness and a sense of ownership of the green open spaces around them.⁷⁹

Collaboration and knowledge exchange between Indonesia and Australia can strengthen the implementation of urban green space regulations for water conservation. Collaboration and knowledge exchange can be done through the two countries' discussion forums, workshops, and case studies to exchange the best experiences and learnings in green open space management and water conservation. In addition, partnerships between government agencies, research institutions, and non-governmental organizations from both countries can facilitate knowledge exchange and cooperation in developing policies and best practices in water conservation in green open spaces.

Interpretation of the results of this research shows that urban green space regulations play an essential role in water resource conservation efforts. Still, their effectiveness is highly dependent on practical implementation and policy integration. In Indonesia, obstacles to implementing regulations show that more than the existence of rules alone is needed with the support of adequate resources, public awareness, and robust monitoring mechanisms. In contrast, in Australia, the integration of green space policies with water conservation strategies is more advanced, indicating that an integrated approach and technological support can increase the effectiveness of green space management for water conservation purposes. These findings underline the importance of a holistic approach in designing and implementing urban green space regulations, including legal but also social, economic, and technological aspects.

The results of this research directly contribute to answering the central question posed in the Introduction section, namely how urban green space regulations can be optimized to support water resource conservation. By showing variations in the effectiveness of rules between Indonesia and Australia and identifying factors that influence their successful implementation, this research underscores the importance of integrating policies, technological support, and community participation in the management of urban green spaces. These findings strengthen the existing literature on the importance of urban green spaces in water resource conservation and offer practical guidance for improving the effectiveness of related regulations and policies.

Furthermore, this research offers evidence-based policy recommendations that can assist governments and policymakers in Indonesia and Australia in designing and implementing more effective strategies for managing urban green spaces in

⁷⁹ Xi Zhang Shan, 'Attitude and Willingness toward Participation in Decision-Making of Urban Green Spaces in China', *Urban Forestry & Urban Greening*, 11.2 (2012), 211–17 <https://doi.org/10.1016/j.UFUG.2011.11.004>

the context of water resource conservation. Thus, the results of this study not only provide answers to research questions but pave the way for future research to explore innovative and integrated solutions to complex urban environmental challenges. This research significantly contributes to the current understanding of the linkages between urban green space regulation and water resources conservation by emphasizing the importance of effective policy implementation and integration. The research results challenge the conventional view, which often considers the existence of regulation as a definitive solution without considering the dynamics of its implementation. Under current conditions, it is essential to expand green and open spaces with all their green infrastructure and to optimize land use in terms of quality and quantity.⁸⁰

The discovery that regulatory effectiveness relies heavily on factors such as public awareness, technological support, and cross-sectoral engagement expands understanding of the complexities involved in managing urban green spaces as an instrument of water conservation. Regulatory effectiveness shows that a holistic approach, considering legal, social, technological, and ecological aspects, is necessary to achieve practical water resource conservation goals. Limitations in the data and methodology used in this research highlight the importance of collecting primary data to gain deeper insight into urban green space management practices and their impact on water resource conservation. Reliance on secondary data and literature may only partially reflect current conditions or local variability affecting regulations' effectiveness and implementation. Furthermore, empirical normative approaches, although providing a comprehensive understanding of the legal framework, may need to capture community perceptions, attitudes, and behavior that play a critical role in the success of green space management. Therefore, future research integrating qualitative methods, such as in-depth interviews or case studies, may provide valuable additional insights.

From a practical perspective, the findings of this study offer several recommendations that can assist policymakers and practitioners in improving the effectiveness of urban green space management for water conservation purposes. First, increasing public awareness and education about the benefits of green space for water resources conservation can increase public participation and support for green space management policies. Increasing public involvement emphasizes the importance of information campaigns and educational programs as integral to water conservation strategies. Second, integrating innovative technology and nature-based solutions in the design of urban green spaces can increase their capacity to manage rainwater and reduce surface runoff while supporting biodiversity and the aesthetics of the urban environment. To adequately address

⁸⁰ Zita Ring, Doris Damyanovic, and Florian Reinwald, 'Green and Open Space Factor Vienna: A Steering and Evaluation Tool for Urban Green Infrastructure', *Urban Forestry & Urban Greening*, 62 (2021), 127131 <https://doi.org/10.1016/j.ufug.2021.127131>

these problems, the current study proposed a comprehensive framework for water resource management. This framework includes a national water policy that argues for sustainability and improves institutional strength.⁸¹

Furthermore, cross-sectoral collaboration between the government, the private sector, the academic community, and civil society is needed to design and implement effective urban green space policies. This multi-stakeholder approach facilitates the exchange of knowledge and resources and enables the implementation of innovative and adaptive solutions to local challenges. Thus, the findings of this research not only enrich the corpus of literature on water resources management and urban green spaces but also provide practical guidance that can support more sustainable decision-making and policy planning.

4. Conclusion

This research concludes that the effectiveness of urban green space regulations in water resources conservation is highly dependent on practical implementation, technological support, and community participation. These findings challenge the assumption that regulations alone are sufficient to achieve water conservation goals, highlighting the importance of a more holistic and integrated approach. The main findings of this research show significant variations in the effectiveness of urban green space regulations between Indonesia and Australia, with the main obstacles in Indonesia related to the implementation of rules and in Australia more about integrating green space policies with water conservation strategies. These findings underscore the importance of developing legal and policy frameworks that are strong on paper and effective in practice, as well as the need for approaches that integrate technological and social aspects in the management of green spaces for water resources conservation. The implications of this research's findings for theory and practice in environmental and natural resources law are significant. These findings advance the understanding that successful water resource conservation through urban green space management requires more than just well-designed policies; Effective implementation, adequate technological support, and community involvement are also needed. Successful water resource conservation emphasizes the importance of a multidisciplinary approach in designing environmental policy, accommodating the complex interactions between legal, technological, and social aspects of conserving natural resources.

⁸¹ Shakeel Ahmad and others, 'Water Resources and Their Management in Pakistan: A Critical Analysis on Challenges and Implications', *Water-Energy Nexus*, 6 (2023), 137–50 <https://doi.org/10.1016/J.WEN.2023.10.001>

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