Achieving Sustainable Development Through SDG 6: Lessons for Sri Lanka

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ABSTRACT

Achieving Sustainable Development Goal 6 (SDG 6), which ensures universal access to clean water and sanitation, is pivotal for Sri Lanka's sustainable development. Despite significant strides in water management and sanitation, the country faces persistent challenges, including inadequate infrastructure, weak enforcement of water quality standards, and limited public awareness. This article examines Sri Lanka's progress toward SDG 6, highlighting key gaps in policy, governance, and resource allocation. Through a comparative analysis of Ecuador, India, and the European Union, this study identifies best practices and lessons for Sri Lanka.

The article proposes strategies to overcome key hurdles in Sri Lanka including enacting robust legal frameworks, strengthening institutional capacity, fostering public-private partnerships, and integrating climate resilience into water management strategies. To address these issues, this study employs a mixed-methods approach, combining qualitative analysis of legal frameworks with quantitative assessments of institutional capacity and stakeholder engagement in water management strategies."

By adopting significant measures and leveraging global best practices, Sri Lanka can accelerate its progress toward achieving SDG 6, ensuring equitable access to clean water and sanitation for all. This study underscores the critical role of government, private sector, and civil society collaboration in overcoming systemic barriers and fostering sustainable water management.

Keywords: Sustainable Development, Environment, SDG 6, Water Management

INTRODUCTION

Water is the essence of life, forming the foundation for health, poverty alleviation, food security, and ecosystem sustainability. Recognized as a universal human right by the United Nations, access to water, sanitation, and hygiene (WASH) is indispensable for achieving global peace and sustainable development.[2] However, the world grapples with escalating challenges, including water scarcity, pollution, degraded water-related ecosystems, and the complexities of transboundary water governance.[3] These threats are compounded by rapid population growth, urbanization, and rising water demands across agriculture, industry, and energy sectors.[4] Alarmingly, nearly half of the global population faces severe water scarcity for at least one month each year, a crisis exacerbated by climate change, which disrupts water availability and intensifies scarcity.[5]

The 2030 Agenda for Sustainable Development, adopted in 2015, underscores the international commitment to fostering peace, prosperity, and environmental resilience. Within this framework, Sustainable Development Goal (SDG) 6 aimed at "Clean Water and Sanitation for All" emerges as a pivotal target for ensuring broader

[2] United Nations General Assembly Resolution 64/292, adopted in July 2010.
[3] de Albuquerque, Catarina, *Realizing the Human Rights to Water and Sanitation: A Handbook* (UN Special Rapporteur on the Human Right to Safe Drinking Water and Sanitation 2014).
[4] John Smith, 'Urbanization and Water Demands: Challenges in the 21st Century' (2020) 15(3) Journal of Environmental Studies 234.
[5] United Nations, 'The Human Rights to Water and Sanitation' < https://www.un.org /waterforlifedecade/human_right_to_water.shtml> [accessed 3 December 2024.

sustainable development. The goal encompasses universal access to safe water and sanitation, equitable hygiene practices, and the sustainable management of water ecosystems. To fulfill these ambitious targets, countries must prioritize investments in infrastructure, safeguard water-related ecosystems, and bolster institutional governance.[6]

This article underscores the criticality of SDG 6 for Sri Lanka, a nation rich in water resources yet vulnerable to challenges such as pollution, inadequate infrastructure, and institutional inefficiencies. Drawing insights from comparative jurisdictions such as Ecuador, India, and the European Union, the study benchmarks best practices and policy innovations.[7] It aims to evaluate the current initiatives undertaken by the Government of Sri Lanka, identify existing gaps, and propose strategic recommendations for achieving sustainable development through SDG 6. Further the study seeks to contribute to building a more resilient and equitable future by drawing lessons from best-practice benchmarks.

The structure of this paper is organized to comprehensively address the multifaceted challenges and opportunities associated with achieving Sustainable Development Goal (SDG) 6 in Sri Lanka. Section 2 provides a detailed overview of the global and national contexts of SDG 6, highlighting its relevance to Sri Lanka's socio-economic and environmental landscape. Section 3 delves into the current progress and challenges in implementing SDG 6, identifying key gaps and constraints in policy, infrastructure, and governance. Section 4 offers an in-depth analysis of these critical gaps, drawing comparisons with international best practices and identifying areas for improvement. Section 5 proposes strategic measures for enhancing SDG 6 implementation, emphasizing the importance of robust legal frameworks, governance reforms, infrastructure development, and community engagement. Section 6 outlines future directions and areas of research, focusing on climate resilience, innovative financing models, and the role of technology in water management. Finally, Section 7 concludes by summarizing key findings and presenting a call to action for achieving sustainable water and sanitation solutions in Sri Lanka.

Current State of SDG 6 Implementation in Sri Lanka

The implementation of Sustainable Development Goal (SDG) 6, which focuses on ensuring access to clean water and sanitation for all, is of paramount importance to Sri Lanka, given its growing population and water resource management challenges. Despite the country's abundant water resources, the infrastructure needed to manage and distribute water effectively remains a significant challenge. The water supply system is primarily concentrated in urban areas, where the majority of the population has access to treated drinking water. However, rural areas face considerable disparities in access to safe water, with many people relying on traditional wells and surface water sources that may be contaminated. According to the World Bank, while 92% of Sri Lanka's population has access to improved water sources, a large portion of rural residents still suffer from poor water quality, leading to health issues. The situation is exacerbated by a lack of adequate sanitation infrastructure, where the majority of rural areas continue to use pit latrines or open defecation, further contributing to water contamination and public health concerns.[8]

For Sri Lanka, an island nation with abundant yet increasingly vulnerable water resources, achieving SDG 6 is essential for long-term sustainability. The country's agrarian economy, which depends heavily on water-intensive rice and plantation crop production, is under pressure from water pollution, overextraction, and seasonal scarcity.[9] Moreover, rapid urbanization and inadequate wastewater treatment exacerbate water quality challenges.[10] Ensuring access to clean water and sanitation is not only critical for sustainable development but also fundamental for public health, environmental conservation, and poverty reduction. However, Sri Lanka's existing water governance frameworks are insufficiently equipped to tackle emerging challenges, including

[6] ibid
[7] United Nations, 'SDG 6: Clean Water and Sanitation' <https://sdgs.un.org/goals/goal6> [accessed 3 December 2024.]
[8] World Bank, 'Sri Lanka: Access to Safe Water and Sanitation' (World Bank, 2021) Paper No. 34521, p. 15 https://www.worldbank.org accessed 25 December 2024.
[9] United Nations Development Programme, *Integrated Water Resources Development in Sri Lanka* <https://srilanka.un.org >
[10] World Bank, 'Urbanization and Water Quality Challenges in Sri Lanka' (World Bank, 2021) Paper No. 34521, p. 22 https://www.worldbank.org accessed 25 December 2024.

industrial pollution, agricultural runoff, and climate-induced droughts.[11] Addressing these gaps requires comprehensive reforms to adapt to evolving environmental and socio-economic pressures effectively. Aligning with SDG 6 requires bridging these gaps by enhancing policy coherence, investing in rural and urban water infrastructure, and implementing sustainable practices.

According to the 2022 Sustainable Development Report, Sri Lanka's progress towards achieving Sustainable Development Goal 6 (SDG6) is considered moderate and may not be enough to reach the set target.[12] The report emphasizes that there are still significant challenges that require focused efforts to address effectively. According to a report published on the UN website, Sri Lanka is facing challenges in achieving water security. The need for action on water resilience is becoming more urgent as climate challenges continue to pose a threat.[13] According to a report published in October 2023, a large number of people, over 2 million, faced the negative effects of flooding, landslides, and a long-lasting drought between 2016 and 2017. Severe damage was reported in 19 out of 25 districts, leading to the loss of two entire harvest seasons and a significant shortage of water for agricultural, drinking, and household purposes.[14] According to the Sri Lanka Disaster Management Reference Handbook, October 2024, the identified problems remain unresolved due to various issues, including mismanagement and the lack of adequate funding to address these challenges.[15] Hence, it is crucial to pay attention to these lapses and make recommendations to improve and strengthen the procedures adopted to enhance the success of the Sri Lankan strategic mechanism.

Progress towards SDG 6's key targets has seen some improvements, particularly in urban areas. The government's efforts to extend water supply systems have resulted in increased coverage, with over 90% of the population in urban areas having access to piped water. However, in rural areas, the access rate remains lower, with many communities still lacking adequate sanitation and wastewater treatment facilities. The National Water Supply and Drainage Board (NWSDB) has made significant strides in addressing these issues through its various initiatives aimed at expanding the national water supply network and improving water quality. NWSDB's projects have targeted both urban and rural areas, working to build new treatment plants and extend pipelines to underserved regions.[16] However, challenges persist in reaching remote areas, where geographical factors and financial constraints hinder the expansion of infrastructure. Additionally, wastewater treatment is still inadequate, with over half of the wastewater in Sri Lanka going untreated, contaminating freshwater bodies and exacerbating water quality issues.[17].

Several key initiatives have been launched to address these challenges, particularly in rural areas. The Rural Water Supply and Sanitation Program (RWSSP) is one such initiative, which aims to improve access to clean drinking water and sanitation facilities for remote communities. The program has made considerable progress, with over 300,000 households benefiting from enhanced water supply and sanitation services. These efforts align with the SDG 6 target of universal access to water and sanitation by 2030. Furthermore, the government has implemented various policy frameworks to improve the governance of water resources, focusing on improving efficiency in water use, sanitation, and wastewater treatment. The establishment of the National

[11] ADB, 'Country Water Assessment: Sri Lanka' <https://www.adb.org > [accessed 3 December 2024]
[12]United Nations, 'Sri Lanka' (United Nations org,2022) <https://sustainabledevelopment.un.org/memberstates/ srilanka> [accessed 08 September 2024]

[13] UNDP Sri Lanka 'Accelerating Change to Achieve Water Security and Sustainability in Sri Lanka Celebrating World Water Day 2023' (March,2023) <https://www.undp.org/srilanka/blog/accelerating-change-achieve-water-security-and-sustainability-sri-lanka > [accessed 08 September 2024]

[14] World Bank, 'Impact of Natural Disasters on Water Resources in Sri Lanka' (World Bank, 2021) Paper No. 34521, p. 30 https://www.worldbank.org accessed 25 December 2024.

[15] World Food Programme Sri Lanka country brief, *Sri Lanka Disaster Management Reference Handbook* (October 2024) < www.cfe-dmha.org/> [accessed 5 Dec 2024].
[16] National Water Supply and Drainage Board (NWSDB), 'Annual Report on Water Supply and Sanitation Projects' (NWSDB, 2021) https://www.nwsdb.gov.lk accessed 25 December 2024.
[17] National Water Supply and Drainage Board, *Water Supply and Sanitation in Sri Lanka: Status Report* (2019)

Policy on Water Resources Management is a step towards more integrated and sustainable water management, addressing issues like water pollution, over-extraction, and climate change impacts.[18]

Despite these efforts, challenges remain in achieving SDG 6 in Sri Lanka. One of the major issues is the uneven distribution of water resources, with some regions suffering from water scarcity, particularly during drought periods, while others experience flooding and water quality degradation. The contamination of water sources due to agricultural runoff, poor sanitation practices, and industrial waste continues to undermine the quality of available water, posing significant risks to public health. Additionally, inadequate wastewater treatment infrastructure exacerbates the pollution of freshwater sources, especially in urban centers, where industrial activities and population density place greater strain on the existing systems. To meet the SDG 6 targets, it is essential to continue developing infrastructure, strengthen governance, and adopt more comprehensive and inclusive water management practices. While progress has been made, particularly through the work of the NWSDB and rural water supply schemes, much more needs to be done to ensure sustainable water resources and equitable access to clean water and sanitation across Sri Lanka.[19] To address these persistent challenges and advance towards the achievement of SDG 6, it is crucial to explore innovative solutions, policy reforms, and collaborative efforts that prioritize sustainable water resource management and equitable access for all communities.

Comparative Analysis with Ecuador, India, and the EU

This paper aims to conduct a comparative analysis by examining advanced water management systems implemented in Ecuador, India, and the European Union. By exploring the strengths, challenges, and outcomes of these systems, the study seeks to identify actionable insights and best practices that can be adapted to address similar water management issues in Sri Lanka. The ultimate objective is to provide informed recommendations to relevant authorities to enhance sustainable water resource management and establish a robust and equitable water governance framework in the country.

Ecuador Constitutional Right and Community-Based Water Management policy

Ecuador offers a compelling example for nations striving to achieve Sustainable Development Goal (SDG) 6, particularly through its progressive constitutional recognition of water as a fundamental human right. Article 12 of the Constitution of Ecuador explicitly declares, “The human right to water is indispensable and cannot be privatized under any circumstances”[20]. This legal provision not only elevates water governance to a national priority but also establishes robust mechanisms to ensure equitable access while safeguarding water resources from commercial exploitation.[21]

A cornerstone of Ecuador's water governance is its emphasis on community-based management, encapsulated in its *juntas de agu* or water boards. These decentralized systems empower local stakeholders to engage directly in managing water distribution, conservation, and sustainable usage. This participatory approach reduces the risks of over extraction and misuse while promoting accountability at the grassroots level[22]. By fostering inclusivity, Ecuador’s governance model aligns with the broader principles of equity and sustainability that underpin SDG 6.[23]

Moreover, Ecuador’s water governance framework is enriched by the integration of indigenous knowledge systems. Communities draw on ancestral practices, particularly in managing *páramo* wetlands, which are vital for water storage and ecosystem balance. This symbiosis between traditional and modern conservation methods enhances the resilience of water management policies in the face of climate change.[24]

[18] Ministry of Water Supply, *Annual Report 2018* (Sri Lanka Ministry of Water Supply, 2018)
[19] Asian Development Bank, *Sri Lanka: Country Water Assessment* (2019)
[20] Constitution of Ecuador, 2008.
[21] UNGA Resolution 64/292, 2010.
[22] Boelens R, Bustamante R, and Perreault T, *Water Justice* (Cambridge University Press 2015).
[23] Ramirez F, *Buen Vivir: Social Philosophy for Sustainable Development* (Global Exchange 2010).
[24] Kauffman CM and Martin PL, 'Scaling Up Buen Vivir: Globalizing Local Environmental Governance from Ecuador' (2014) 24 *Environmental Policy and Governance* 215.

The constitutional recognition of water rights has been reaffirmed through landmark judicial decisions. In the **Quimsacocha Mining Case**, the Constitutional Court upheld the primacy of water rights over industrial exploitation, demonstrating the judiciary's commitment to safeguarding this essential resource.[25] Similarly, the **Río Blanco Mining Case** emphasized the necessity of free, prior, and informed consent for communities affected by projects that could jeopardize water sources, reinforcing the right to water as inviolable.[26]

Ecuador's prohibition of water privatization, mandated by its constitution, further underscores its commitment to equitable access. This stands in stark contrast to global trends where privatization often results in limited access for marginalized populations.[27] The **Guayaquil Water Management Case**, for instance, highlighted the detrimental effects of privatized water services, ultimately influencing the broader reforms enshrined in the 2008 Constitution.[28]

Ecosystem protection is another critical pillar of Ecuador's approach to water governance. Through initiatives led by the *National Water Secretariat (SENAGUA)*, the country prioritizes the restoration and conservation of vital ecosystems such as *páramo* wetlands.[29] The **Vilcabamba River Case** illustrates the judicial application of these principles, where the Constitutional Court ruled against activities harming the river's ecosystem, emphasizing the symbiotic relationship between environmental protection and water rights.[30]

While challenges remain in scaling and sustaining community-based systems, Ecuador's participatory governance model demonstrates how constitutional frameworks can integrate social, environmental, and cultural dimensions to achieve equitable and sustainable water resource management.[31] This approach serves as a benchmark for aligning national governance priorities with global sustainability goals.

Lessons for Sri Lanka on Integrating Local Communities in Water Governance

Sri Lanka, with its rich hydrological networks and dependency on water-intensive agriculture, faces mounting challenges due to water pollution, overextraction, and seasonal scarcity. The lessons from Ecuador underscore the importance of constitutional and legislative backing for water rights. By embedding water as a fundamental right within its legal framework, Sri Lanka can prioritize equitable access, particularly for marginalized communities reliant on shared water resources.[32]

Moreover, adopting community-based governance systems akin to Ecuador's *juntas de agua* can help decentralize water management in Sri Lanka. Establishing local water committees empowered to oversee usage, enforce regulations, and resolve conflicts can enhance accountability and foster sustainable practices. Importantly, integrating the knowledge and practices of local farming and fishing communities can contribute to adaptive water management strategies that are culturally and ecologically relevant.[33]

Sri Lanka can also draw from Ecuador's focus on participatory governance to strengthen the involvement of women and underrepresented groups in decision-making processes. Ensuring that community voices are amplified in the formulation and implementation of water policies is crucial for achieving SDG 6 targets in an inclusive and sustainable manner.[34]

[25] Constitutional Court of Ecuador, Case No. 0008-09-IN, 2009
[26] Constitutional Court of Ecuador, Case No. 001-10-SIN-CC, 2010
[27] Bakker K, *Privatizing Water: Governance Failure and the World's Urban Water Crisis* (Cornell University Press 2010).
[28] Rodríguez-de-Francisco and Boelens, 2014
[29] SENAGUA, *Informe Anual 2020* (Secretaría Nacional del Agua 2020).
[30] Constitutional Court of Ecuador, Case No. 11121-09-10-10 (2011).
[31] Boelens R and Vos J, 'The Danger of Naturalizing Water Policy Concepts: Water Productivity and Efficiency Discourses from Field Irrigation to Virtual Water Trade' (2012) 108 *Agricultural Water Management* 16.
[32] de Silva and Jayawardene, *Water Resource Management in Sri Lanka: Challenges and Opportunities*, Routledge 2018.
[33] Siriwardhana, *Water Law and Policy in South Asia: Balancing Equity and Efficiency*, Cambridge University Press 2020.
[34] UNESCO, *World Water Development Report: Leaving No One Behind*, 2019 <https://www.unesco.org> [accessed 3 December 2024].

EU lessons from the Water Framework Directive

The European Union (EU) represents a benchmark in comprehensive water management through its Water Framework Directive (WFD), adopted in 2000. The WFD provides an integrated framework for protecting and enhancing water quality across member states, emphasizing sustainable water use and ecosystem preservation. It mandates that all EU countries achieve "good status" for surface and groundwater bodies, combining robust legal and institutional measures with a focus on ecosystem-based management.[35]

A hallmark of the WFD is its emphasis on pollution control, including both point-source pollutants from industrial and urban sources and diffuse pollution from agricultural activities. Member states are required to implement strict water quality standards, monitor pollutants, and adopt advanced technologies for wastewater treatment and contamination management. For example, the EU Urban Wastewater Treatment Directive (91/271/EEC) complements the WFD by specifying requirements for sewage treatment in urban areas to prevent nutrient overloads and eutrophication.[36]

Moreover, the WFD integrates cross-border water governance, recognizing the interdependence of shared water bodies. River Basin Management Plans (RBMPs) are central to the Directive, requiring countries to collaborate on managing transboundary rivers and aquifers effectively. This transnational approach ensures comprehensive monitoring and harmonized action plans, addressing pollution control and water allocation challenges across borders.[37]

Application of Advanced Technologies

The EU has also been at the forefront of leveraging advanced technologies for water management. Initiatives such as the Horizon 2020 and LIFE+ programs promote research and innovation in areas like water recycling, desalination, and smart monitoring systems. These technologies enhance the efficiency of water management systems while mitigating the impacts of climate change on water resources.[38]

Lessons for Sri Lanka

For Sri Lanka, the EU's WFD highlights the importance of integrating pollution control, quality standards, and advanced technologies into water governance frameworks. Adopting a river basin management approach could address issues of fragmented water governance, promoting coordination among regional and local authorities. Incorporating stringent pollution standards, coupled with monitoring and enforcement mechanisms, can prevent industrial effluents and agricultural runoff from contaminating vital water resources.[39]

Furthermore, Sri Lanka can benefit from the EU's investment in research and technology. Developing smart water management systems tailored to local climatic and hydrological conditions would enhance resilience against seasonal water scarcity and pollution-related challenges. Learning from the EU’s experience with public-private partnerships could also help mobilize resources and foster innovation in water infrastructure development.[40]

Comparative Analysis with India

India provides an insightful case study for achieving Sustainable Development Goal (SDG) 6 through its multi-tiered governance, legislative measures, and large-scale policy initiatives. The **Water (Prevention and Control of Pollution) Act, 1974**, serves as the cornerstone of India’s water governance framework. It established State and Central Pollution Control Boards with authority to enforce water quality standards and regulate pollution from industrial and municipal sources.[41] Complementing this is the **Environment**

[35] Directive 2000/60/EC of the European Parliament and of the Council < https://ec.europa.eu/> [accessed 1 December 2024].
[36] Urban Wastewater Treatment Directive 91/271/EEC <https://ec.europa.eu/> [accessed 7 December 2024].
[37] Directive 2000/60/EC of the European Parliament and of the Council <https://ec.europa.eu/> [accessed 3 August 2024].
[38] European Commission, *Horizon 2020 Projects for Water Innovation*, 2018 <https://ec.europa.eu> [accessed 8 August 2024].
[39] Siriwardhana, *Water Law and Policy in South Asia: Balancing Equity and Efficiency*, Cambridge University Press 2020.
[40] UNESCO, *World Water Development Report*, 2019 <https://www.unesco.org>[accessed 3 December 2024].
[41] Water (Prevention and Control of Pollution) Act 1974 (India) <https://legislative.gov.in/> [accessed 7 December 2024].

(Protection) Act, 1986, which grants the central government extensive authority to formulate regulations addressing water quality and management, including pollutant discharge norms.[42]

India's **National Water Policy (2012)** provides a strategic vision for equitable water access, sustainable resource use, and environmental conservation. Although non-binding, it guides state-level water policies and prioritizes integrated water resource management and climate resilience.[43]

The **Swachh Bharat Mission (SBM)** launched in 2014, has been a landmark initiative targeting improved sanitation. It eradicated open defecation by mobilizing resources for the construction of millions of toilets, particularly in rural areas. This policy has demonstrated that coordinated national strategies coupled with community participation can significantly impact public health and sanitation infrastructure, directly advancing SDG 6.[44]

The **Jal Jeevan Mission**, another ambitious program, focuses on providing piped water supply to all rural households by 2024. Overseen by the Ministry of Jal Shakti, it integrates domestic and international funding to strengthen water supply systems, demonstrating a robust financial commitment to SDG 6.[45]

Decentralized Governance and Sectoral Initiatives Water governance in India operates under a decentralized system, as water is a state subject under the Indian Constitution. This allows states to tailor water policies to local conditions, although it also creates disparities in implementation and enforcement across states. Institutions such as the **Central Pollution Control Board (CPCB)** and **State Pollution Control Boards (SPCBs)** ensure compliance with water quality standards, while the Ministry of Jal Shakti coordinates national programs.[46]

India’s significant investment in water and sanitation reflects its commitment to achieving SDG 6. The central government has provided extensive funding for the Swachh Bharat Mission and Jal Jeevan Mission, supported by contributions from state governments and private partnerships. International organizations like the World Bank and Asian Development Bank supplement domestic efforts with financial and technical assistance, a feature less prevalent in Sri Lanka.[47]

Lessons for Sri Lanka

India’s experience offers Sri Lanka valuable lessons in addressing its water management challenges. The integration of robust legal frameworks with participatory governance can enhance policy effectiveness. Sri Lanka can adopt a decentralized approach to tailor water policies to regional needs, inspired by India’s state-level initiatives. Furthermore, mobilizing substantial financial resources through public-private partnerships and international assistance can strengthen infrastructure and service delivery in water and sanitation.

Programs like the Swachh Bharat Mission demonstrate the importance of community involvement and grassroots action, which can be adapted to Sri Lanka's socio-cultural context. Similarly, the Jal Jeevan Mission’s focus on ensuring equitable access to safe drinking water aligns with Sri Lanka’s objectives under SDG 6. Learning from India’s comprehensive legislative measures and large-scale implementation strategies can help Sri Lanka bridge gaps in its water governance and accelerate progress toward sustainable development.

Identifying Gaps in Sri Lanka's Approach

The Sustainable Development Act, No. 19 of 2017 represents Sri Lanka’s commitment to integrating sustainable development principles into national governance frameworks. Enacted to align with the United Nations’ 2030 Agenda for Sustainable Development, the Act aims to coordinate and monitor the achievement

[42] Environment (Protection) Act 1986 (India) https://envfor.nic.in/[accessed 3 December 2024].
[43] Ministry of Water Resources, National Water Policy 2012 <https://mowr.gov.in/> [accessed 3 October 2024].
[44] Government of India, 'Swachh Bharat Abhiyan' <https://swachhbharatmission.gov.in/ [accessed 13 December 2024].
[45] Ministry of Jal Shakti, 'Jal Jeevan Mission' <https://jalshakti-ddws.gov.in/> [accessed 3 December 2024]
[46] Central Pollution Control Board, 'Annual Report 2022-23' https://cpcb.nic.in/ [accessed 3 December 2024]
[47] World Bank, 'India: Achieving Clean Water and Sanitation'< https://worldbank.org/ >[accessed 3 December 2024]

of Sustainable Development Goals (SDGs), including SDG 6: Clean Water and Sanitation. This legislation established the Sustainable Development Council (SDC) as the primary institutional mechanism to oversee sustainable development efforts across various sectors.[48]

However, despite this legislative foundation, significant gaps remain in Sri Lanka's ability to fully implement SDG 6. The SDC's efforts are constrained by fragmented governance structures**,** limited enforcement mechanisms, and resource constraints. While the Act mandates the preparation of a National Policy and Strategy on Sustainable Development and emphasizes the importance of collaboration between public and private sectors, its operational impact on water and sanitation management has been limited. The absence of stringent water quality standards, inadequate infrastructure, and a lack of comprehensive data systems further exacerbate these challenges.[49] Drawing insights from comparative case studies offers a pathway to overcoming these challenges and advancing toward sustainable water and sanitation management in Sri Lanka.

Policy and Legal Frameworks

Sri Lanka's current water governance policies face significant challenges in addressing the growing issues of water pollution and inadequate sanitation. The National Environmental Act (NEA), although foundational, does not provide sufficiently stringent water quality standards or robust enforcement mechanisms to effectively prevent industrial and agricultural pollution.[50] While recent revisions to discharge standards and the introduction of ambient water quality standards in 2019 represent some progress, they remain insufficient to address the complexity of water pollution in Sri Lanka.[51] These standards primarily focus on immediate pollutants but do not comprehensively tackle long-term environmental damage or include effective monitoring and penalty systems, which are crucial for ensuring compliance.

In comparison, Ecuador's constitutional recognition of water as a fundamental human right offers a stark contrast, providing a legal foundation that prioritizes the equitable distribution and sustainable management of water resources.[52] The absence of such explicit recognition in Sri Lanka's legal framework weakens its commitment to safeguarding water access for all citizens. Despite water governance being acknowledged as a priority within Sri Lankan policy, this lack of a constitutional right to water has implications for the prioritization of water issues in the legal and policy agenda.[53] Without this constitutional guarantee, water issues in Sri Lanka risk being treated as secondary concerns, leading to inconsistencies in enforcement and a lack of coordinated action at the national level.

While Sri Lanka does not explicitly recognize access to water as a fundamental right in its Constitution, the legal framework does imply certain protections related to water access. Notably, in the **Chunnakam Case** (2013), the Supreme Court drew on the Directive Principles of State Policy, which emphasize the state's responsibility to ensure the equitable distribution of resources. In this case, the Court recognized that the state's duty to provide water access falls within the broader obligations of protecting public health and ensuring environmental sustainability.[54] This decision, though not an outright recognition of water as a constitutional right, reflects an implied duty by the state to secure access to water in a manner that supports public welfare and environmental integrity.

In this context, the revised discharge standards and the introduction of ambient water quality standards, though steps in the right direction, are not adequately comprehensive or enforceable. The revised discharge standards, although they now include more stringent parameters for industrial waste disposal, do not sufficiently address the cumulative impacts of industrial pollution over time, nor do they provide mechanisms for effective

[48] Sri Lanka Sustainable Development Act, No. 19 of 2017.
[49] Sri Lanka Sustainable Development Act, No. 19 of 2017; World Bank, *Sri Lanka Water and Sanitation Program 2021*, <https://www.worldbank.org/>[accessed 4 December 2024].
[50] Perera A, 'Analysis of Water Pollution Policies in Sri Lanka: Legal Gaps and Environmental Impacts' (2020) 3 *Environmental Governance Journal* 22.
[51] National Environmental Act, 2020.
[52] Constitution of Ecuador, 2008.
[53] Gunawardena P, 'Water Governance in Sri Lanka: Addressing the Gaps in Policy and Legal Frameworks' (2021) 5 *Sri Lanka Journal of Environmental Law* 45.
[54] Supreme Court of Sri Lanka, Case No. SC/FR 96/2012, 2013.

monitoring or enforcement.[55] Furthermore, the ambient water quality standards introduced in 2019, while a step forward, primarily focus on short-term indicators of water quality, such as chemical contaminants, and fail to address broader ecological and socio-economic factors that influence the sustainability of water resources. These standards also lack clarity on how they will be enforced at the local level, where pollution from agriculture and small-scale industries is most pronounced.

While Ecuador's approach to water governance has proven effective due to its constitutional framework and community-based management practices,[56] Sri Lanka must draw on these lessons to strengthen its legal infrastructure. Incorporating a constitutional right to water could potentially provide a clear legal mandate that would enhance policy coherence and enforceability in tackling the complex challenges of water management. Additionally, an integrated approach that incorporates stricter water quality standards, combined with improved enforcement and community-based management practices, could support the broader goal of achieving SDG 6 in Sri Lanka.

Infrastructure Deficiencies

The inadequacy of wastewater treatment facilities in Sri Lanka significantly contributes to water pollution. Industries and urban centers discharge untreated or partially treated effluents into water bodies, degrading their quality and threatening public health. Rural and underserved urban areas experience limited access to safe water and sanitation services, exacerbating inequalities. Such infrastructural deficiencies demand targeted investments and capacity-building efforts.[57]

Funding and Resource Allocation

Mobilizing financial resources for SDG 6 projects remains a pressing challenge for Sri Lanka. Limited domestic funding, compounded by economic instability, restricts the government's ability to prioritize water-related initiatives. International funding mechanisms, such as those employed in India through the Jal Jeevan Mission, could serve as models. However, Sri Lanka must strengthen its resource mobilization strategies, including public-private partnerships and international collaboration.[58]

Data Collection and Monitoring

Sri Lanka lacks comprehensive systems for tracking progress on SDG 6 indicators. The Sustainable Development Council (SDC), tasked with monitoring SDG implementation, struggles with outdated and inconsistent data, particularly in rural areas. This impairs the ability to assess progress and implement corrective measures. Improved data collection and real-time reporting systems are essential for effective monitoring.[59]

Community Involvement and Awareness

Public participation in water governance remains limited in Sri Lanka, with awareness campaigns often failing to reach marginalized communities. Lessons from Ecuador, which emphasizes community-based water management systems, highlight the importance of involving local stakeholders in water resource planning and decision-making. Grassroots engagement is crucial for fostering sustainable practices and ensuring inclusivity in achieving SDG 6 targets.[60]

Performance of the Sustainable Development Council (SDC)

The SDC's efforts to integrate SDG principles into national policies have faced structural and institutional challenges. Fragmentation among government agencies and the Council's limited enforcement power hinder

[55] National Environmental Act, 2020.
[56] Boelens R, Bustamante R, and Perreault T, *Water Justice* (Cambridge University Press 2015).
[57] Asian Development Bank, *Sri Lanka Water Sector Assessment* [accessed 4 December 2024].
[58] Government of India, *Jal Jeevan Mission Guidelines* [accessed 4 December 2024].
[59] Sustainable Development Act No. 19 of 2017, Sri Lanka Government Gazette [accessed 8 December 2024].
[60] Constitución de la República del Ecuador, Art. 12 [accessed 4 December 2024].

the effective implementation of SDG 6 initiatives. Moreover, delays in reporting progress and insufficient public awareness further constrain its impact. Strengthening the SDC's mandate and enhancing its resource allocation are necessary steps to address these systemic issues.[61]

Resource and Capacity Constraints

The financial and technical capacity of the SDC and other implementing agencies is inadequate for addressing the multifaceted challenges of water governance. Budgetary constraints limit infrastructure development and public outreach efforts, while a lack of technical expertise impairs policy formulation and enforcement. Addressing these limitations requires targeted investments in capacity-building and technical training.[62]

Political and Economic Context

Political instability and economic challenges have disrupted the continuity of SDG-related initiatives in Sri Lanka. Shifting priorities and leadership changes impede the sustained implementation of water and sanitation projects. Additionally, the focus on short-term economic recovery often diverts resources from long-term sustainability goals, exacerbating the gaps in achieving SDG 6.[63]

By addressing these critical gaps and drawing on international best practices, Sri Lanka can align its policies and strategies with SDG 6, ensuring sustainable and equitable access to clean water and sanitation for all.

Strategies for Improving SDG 6 Implementation in Sri Lanka

The Sustainable Development Goal (SDG) 6 emphasizes "Clean Water and Sanitation for All," representing a critical global priority for health, sustainability, and development. For Sri Lanka, where water resources play a pivotal role in agriculture, industry, and community well-being, achieving SDG 6 is both a necessity and a challenge. Thus, it is imperative to focus on strategic measures for enhancing the implementation of SDG 6 in Sri Lanka by addressing critical gaps in policy frameworks, infrastructure development, governance mechanisms, funding strategies, and community engagement initiatives.

Strengthening Policy and Legal Frameworks

One of the foundational strategies for improving SDG 6 implementation involves enhancing Sri Lanka's policy and legal structures. The country’s current framework, governed by the National Environmental Act and water-related statutes, lacks comprehensive provisions for water quality standards, sanitation governance, and enforcement mechanisms.

To address these gaps, Sri Lanka should enact comprehensive water and sanitation legislation modeled on the European Union’s Water Framework Directive, which integrates water quality standards, pollution control, and cross-border water management.[64] The new legislation should establish clear accountability measures and enforcement protocols to ensure compliance by industries and municipalities. Additionally, recognizing access to clean water as a constitutional right would align Sri Lanka with global norms and strengthen legal recourse for affected communities, as seen in Ecuador's constitutional recognition of water as a fundamental right.[65]

Infrastructure Development

Sri Lanka's progress toward SDG 6 is hindered by inadequate infrastructure for wastewater treatment and rural water supply. Urban centers discharge untreated industrial effluents into water bodies, while rural areas suffer from a lack of access to piped water and sanitation systems.

[61] UNDP, *Sri Lanka’s SDG Progress Reports* [accessed 14 Novmber 2024]
[62] Asian Development Bank, *Building Capacity for Water Resource Management* [accessed 4 December 2024].
[63] World Bank, *Sri Lanka Country Economic Update* [accessed 4 December 2024].
[64] Directive 2000/60/EC of the European Parliament and of the Council, <https://ec.europa.eu/> [accessed 4 December 2024].
[65] Constitución de la República del Ecuador, Art. 12, <https://www.constituteproject.org/> [accessed 4 December 2024].

Investments in wastewater treatment plants, particularly in industrial zones and urban areas, are critical for reducing pollution and improving water quality. Similarly, expanding rural water supply systems to underserved areas would address disparities in access. Technologies such as rainwater harvesting and water recycling can be promoted as cost-effective solutions to alleviate water scarcity and improve resilience against climate-induced droughts. Lessons can be drawn from India's Jal Jeevan Mission, which emphasizes the provision of piped water to rural households through innovative funding and technology partnerships.[66]

Enhancing Governance and Institutional Capacity

Effective governance is essential for achieving SDG 6. Sri Lanka's institutional landscape for water management suffers from fragmentation and lack of coordination among various ministries and agencies. To address this, the government should establish a centralized body dedicated to overseeing SDG 6 progress. This body could function as a coordinating mechanism, integrating efforts from the Ministry of Environment, Department of Water Supply, and regional authorities.

Capacity-building initiatives are equally vital. Training programs for water resource managers, policymakers, and local officials would improve technical expertise and policy implementation. Drawing inspiration from the European Union's integrated water management approach, Sri Lanka can streamline governance processes to ensure efficient use of resources and avoid duplication of efforts.[67]

Funding and Partnerships

Achieving SDG 6 requires substantial financial resources, which remain a significant challenge for Sri Lanka given its economic constraints. Public-private partnerships (PPPs) offer a viable solution for infrastructure development, bringing in private sector investment and technical expertise. These partnerships have proven successful in India's Swachh Bharat Mission, which mobilized resources for sanitation infrastructure and behavioral change campaigns.[68]

Additionally, Sri Lanka can seek international funding and technical assistance from organizations such as the World Bank, the Asian Development Bank, and UNDP. These institutions provide grants, concessional loans, and knowledge-sharing platforms for water and sanitation projects. Strengthening domestic resource mobilization through tax reforms and budgetary allocations for SDG 6 programs is also crucial.

Community Participation and Education

The success of SDG 6 initiatives depends on the active involvement of local communities. Sri Lanka should prioritize engaging communities in decision-making and implementation processes. This approach has been effective in Ecuador's community-based water management systems, which empower local stakeholders to take ownership of water governance.[69]

Public awareness campaigns play a critical role in promoting water conservation and sanitation. Educational programs targeting schools, community groups, and industries can foster a culture of responsible water usage. Collaborations with non-governmental organizations and civil society can amplify these efforts, ensuring that marginalized communities are not left behind

Future Directions and Areas of Research

The successful achievement of Sustainable Development Goal (SDG) 6, focusing on clean water and sanitation, demands not only addressing current gaps but also planning for future challenges. Therefore, it is crucial to prioritize future directions and areas of research that contribute to sustainable water management in Sri Lanka, ensuring alignment with global best practices and adapting to evolving environmental challenges.

[66] Government of India, Jal Jeevan Mission Guidelines, <https://jalshakti-ddws.gov.in/> [accessed 4 December 2024].
[67] Directive 2000/60/EC, <https://ec.europa.eu/> [accessed 4 December 2024].
[68] Government of India, Swachh Bharat Mission Guidelines, <https://swachhbharatmission.gov.in/>[accessed 14 November 2024].
[69] Constitución de la República del Ecuador, Art. 12, <https://www.constituteproject.org/> [accessed 4 December 2024].

Integrating Climate Resilience into Water and Sanitation Strategies

Climate change is one of the most significant threats to water security, influencing the availability, distribution, and quality of water resources. Rising temperatures, erratic rainfall patterns, and increased frequency of extreme weather events have exacerbated water scarcity and compromised sanitation systems.

Future strategies must incorporate climate resilience into water and sanitation planning. This includes developing adaptive infrastructure such as flood-resistant sanitation systems and drought-tolerant water supply networks. Incorporating nature-based solutions like wetland restoration and afforestation can enhance water cycle regulation and mitigate climate impacts.

Research should focus on assessing the vulnerability of water resources to climate risks and identifying regional climate adaptation measures. Additionally, integrating climate resilience into national water policies and aligning these policies with international frameworks like the Paris Agreement can strengthen Sri Lanka's preparedness for climate-induced challenges.[70]

Exploring Innovative Financing Models for SDG 6-Related Projects

Achieving SDG 6 requires substantial financial investment, which is challenging for a developing economy like Sri Lanka. Exploring innovative financing models is essential to bridge funding gaps and ensure the long-term sustainability of water and sanitation projects.

Public-private partnerships (PPPs) can be instrumental in leveraging private sector investment and expertise for infrastructure development. Blended finance, combining public funds, private investment, and development aid, can also optimize resource allocation. Mechanisms such as water tariffs, impact bonds, and microfinancing can mobilize resources while promoting accountability.

Future research should evaluate the effectiveness of these models in similar contexts and identify their applicability to Sri Lanka. Studies could also explore the potential of carbon credits and green bonds to fund water and sanitation initiatives, drawing lessons from global examples like India's Jal Jeevan Mission and the European Union's financing mechanisms.[71]

Evaluating the Impact of Technology and Data-Driven Solutions on Water Management

Technological advancements and data-driven solutions offer transformative potential for water management. Innovations such as Geographic Information Systems (GIS), remote sensing, and IoT-based water quality monitoring enable real-time tracking of water resources and efficient decision-making.

In the Sri Lankan context, deploying digital tools for monitoring water pollution and predicting climate impacts can enhance governance and resource allocation. For instance, machine learning algorithms can analyze water usage patterns and optimize distribution networks, while mobile applications can engage communities in reporting water issues.

Research should assess the scalability and cost-effectiveness of these technologies in Sri Lanka. Furthermore, developing a comprehensive data-sharing framework that integrates inputs from government agencies, industries, and local communities is crucial for informed policymaking. Lessons can be drawn from the European Union's integration of advanced technologies under the Water Framework Directive and India's digital initiatives in water governance.[72]

[70] UNFCCC, *Paris Agreement* 2015, <https://unfccc.int/>[accessed 4 December 2024].
[71] Government of India, *Jal Jeevan Mission Guidelines*, <https://jalshakti-ddws.gov.in/> [accessed 4 December 2024].
[72] Directive 2000/60/EC, <https://ec.europa.eu/> [accessed 4 December 2024]; Government of India, *Jal Jeevan Mission Guidelines*,< https://jalshakti-ddws.gov.in/>[accessed 4 December 2024].

CONCLUSION

Sri Lanka faces a multifaceted set of challenges in achieving SDG 6, including fragmented policy frameworks, insufficient infrastructure, and limited financial resources. These challenges are further compounded by emerging threats such as climate change and rapid urbanization. However, the country also has significant opportunities to leverage its abundant water resources, committed governance structures, and growing public awareness to make meaningful progress.

Lessons from comparative case studies in Ecuador, India, and the European Union underscore the importance of comprehensive legal frameworks, community-driven approaches, and advanced technologies in addressing water and sanitation challenges. Sri Lanka can draw on these examples to strengthen its water governance systems, enhance public-private partnerships, and implement innovative solutions tailored to its unique context.

Achieving SDG 6 requires a collaborative effort involving the government, the private sector, and civil society. Policymakers must prioritize integrated water management and climate-resilient infrastructure, while the private sector can contribute through ethical practices and investment in sustainable technologies. Civil society's role in advocacy, awareness-building, and community engagement is equally critical to fostering inclusive and effective solutions.

This call to action emphasizes the need for coordinated strategies and shared responsibility. By adopting global best practices and addressing domestic gaps, Sri Lanka can pave the way toward sustainable water management and ensure equitable access to clean water and sanitation for all, fulfilling its commitment to SDG 6 and broader sustainable development objectives.

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