T20 POLICY BRIEF

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Task Force 01

FIGHTING INEQUALITIES, POVERTY, AND HUNGER

Bridging the Gap: Innovative Approaches to Global Water and Sanitation Access

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Abstract

Access to safe drinking water and sanitation is a critical development challenge. Despite efforts, 3.5 billion people still lack access to safely managed sanitation and over 2 billion people consume contaminated drinking water. SDG indicator of SDG target 6 is crucial to be met for safeguarding human health and reducing inequalities, especially for women and children who often bear the burden of inadequate facilities.

Evidence shows that investing in sanitation and water treatment brings substantial returns, yet governments often fail to adequately prioritize and finance improvements. To address the crisis, equitable access, technology implementation, and resource mobilization are crucial. There are several approaches that could address the gap in water and sanitation efforts:

1. Institutionalizing access to clean water into public policy: In regions where water is delivered through piped systems or storage tanks, inline chlorination technologies can inexpensively provide access to safe drinking water. In areas where it will not be feasible for governments to provide piped water for some time, one way to deliver water treatment at scale is through existing maternal and child health (MCH) services, which already reach the vast majority of mothers and children, even in rural, low-income, high-mortality contexts. MCH clinics provide a free package of essential goods and services (e.g., bednets, vaccines). Free water treatment solutions could be integrated into this package at a very low cost.

2. Implementing the City-wide Inclusive Sanitation (CWIS): The approach aims to ensure everyone has access to safely managed sanitation by promoting a range of solutions—both onsite and sewered, centralized or decentralized—tailored to the realities of the world's burgeoning cities. CWIS means focusing on service provision and its enabling environment, rather than on building infrastructure. Certain G20 countries, such

as Japan, have fabricated technological solutions which allow citizens to access safely managed sanitation services without a sewer connection.

Authors of the policy brief advocate that the G20 countries should facilitate promotion of approaches such as CWIS and ILC technologies to achieve a future where poor sanitation and water treatment systems do not hinder human health, safety and economic participation.

Policy Brief

Access to safe drinking water and sanitation remains one of the most pressing development challenges in the world. Latest estimates show that 3.5 billion people still lack access to safely managed sanitation services[1]. Annually, over two billion people rely on fecal-laced contaminated water sources, and over 1.5 million people die from diarrheal diseases. Access to safe drinking water and sanitation are basic human rights and critical determinants of public health, particularly for vulnerable populations such as women and children.

Vulnerable populations are disproportionately impacted by a lack of basic services. Inadequate sanitation in public spaces limits women's and girls' participation in activities and increases their vulnerability to violence. For girls, the lack of safe, private toilets hinders educational participation, with one-third of schoolchildren lacking functional toilets. A study across four countries estimated the cost of neglected school sanitation at $1.9 billion. These issues are underreported and understudied, impeding progress. Some regions need to allocate 1-2% of national budgets to meet SDG targets for water and sanitation. However, governments rarely prioritize sanitation infrastructure due to taboos and lack of recognized importance, despite its critical impact on societal development and gender equality.

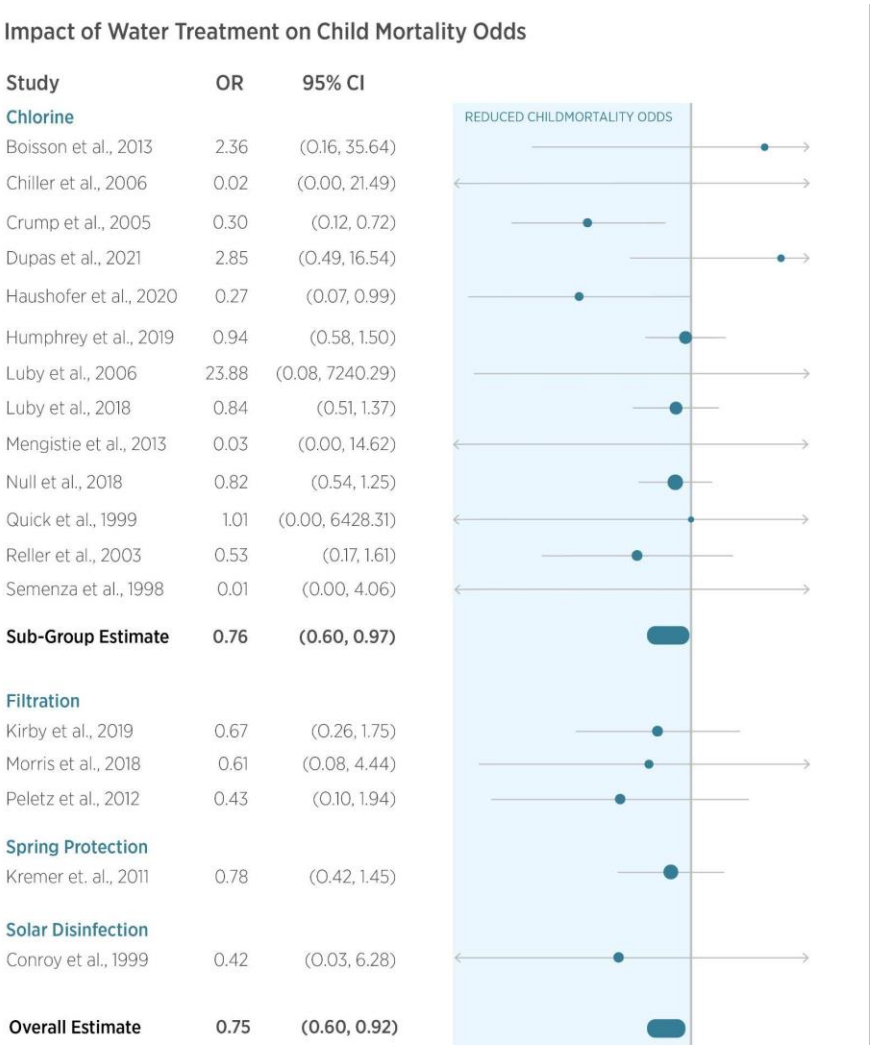
Contaminated drinking water is a major driver of child morbidity and mortality and a serious threat to the health of pregnant women in low- and middle-income countries. Every year 1.7 billion cases of diarrhea affect children younger than 5 years. Diarrheal

[1] “Sanitation,” The World Bank, last modified November 10, 2023, https://www.worldbank.org/en/topic/sanitation

disease is a major cause of child mortality in low- and middle-income countries and microbiological contamination of water through fecal matter is one of the primary drivers of diarrheal disease.

Extreme weather events, such as cyclones, floods, and heavy rainfall, can spread pathogens into water sources, causing spikes in diseases like cholera. Droughts can force people to use less safe water sources, further increasing the risk of waterborne illnesses. Rising temperatures can accelerate the growth of pathogens in water, amplifying the health risks associated with contaminated water sources.

A meta-analysis combining data from 15 randomized evaluations finds that water treatment reduces child mortality by around a quarter. It costs approximately $27-$66 per DALY averted, or $2,000- $5,000 per child death averted. This is well below the $100/DALY threshold that generally qualifies interventions for inclusion on the WHO and DCP-3's lists of highest-priority health interventions. This ranks water treatment among the most cost-effective health approaches available, comparable to childhood vaccination and malaria prevention. The evidence for chlorination and other water treatment methods have been proven to be effective in reducing the concentration of diarrheal pathogens and caregiver-reported diarrhea. As climate change exacerbates the risk of waterborne diseases, ensuring access to water treatment can enhance the resilience of communities to the health impacts of climate change. Over the past two decades, global norms within the health sector have shifted toward free delivery of a package of maternal and child health products, such as vaccines, anti-malaria bed nets, and antenatal care, contributing to significant reductions in child mortality. This suggests that a similar shift towards free provision of water treatment is possible if low-cost and scalable approaches are developed and proven effective.



Traditional centralized wastewater management in high-income countries has effectively reduced waterborne diseases, but implementing centralized systems remains a critical challenge in low and middle-income countries due to high costs and resource demands. As a result, low and middle-income countries either have no WASH systems or rely on cheaper onsite systems, which, while more affordable, come with their own set of problems, including lower efficacy, user acceptance, and difficulties in managing fecal sludge. To address global sanitation needs in low and middle-income countries, we need to deploy best-in-class systems where possible while also, especially in developing regions, reimagining WASH services where financing and implement capacity are constrained (e.e. toilet design, in-line chlorination, point-of-use---------- water

treatment and new approaches to urban sanitation services). New solutions should be practical, cost-effective, and scalable.

According to the World Health Organization calculations, every dollar invested in sanitation brings a return of 5.5 USD, lower health costs, improved productivity, and reduced cases of premature death[2]. Examples from Asian countries such as Cambodia, Indonesia, the Philippines, and Vietnam show a large potential economic impact of improved sanitation, as a dollar invested in sanitation yields at least a five-fold return in increased productivity[3].

Benefits created by improved water and sanitation are not monetized easily, and projects have weak investment viability due to challenges in preparing bankable projects. Benefits are not visible after a short period, and investors prefer measurable returns. Water-related project execution monitoring poses a challenge as well[4]. Individual countries from G20 show that holistic approaches can provide solutions. From 2000 to 2020, 2.4 billion people gained access to managed sanitation services, which is well above the 1.7 billion population gain over this period. Some of the G20 countries have shown exceptional progress, such as India, as toilet access increased from 44% to 100% between 2015 and 2020[5].

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[2] "Sanitation," World Health Organization, last modified March 22, 2024, https://www.who.int/news-room/fact-sheets/detail/sanitation#:~:text=A%20WHO%20study%20in%202012,productivity%20and%20fewer%20premature%20deaths.

[3] Kelkar and Seetha Ram (2021): 1

[4] "Financing a Water Secure Future", OECD, 2022 https://doi.org/10.1787/a2ecb261-en

[5] Mahdavan, Srinivasan and Seetha Ram (2023): 1

It is impossible to meet the global SDG targets without universal access to sanitation and water treatment services. SDG indicator 6.2.1 shows that only 57% of the world's population has access to safely managed sanitation services. Sub-Saharan Africa has the lowest portion of 24%, followed by Latin America and the Caribbean (49%), and Central and Southern Asia (51%)[6]. Similarly, significant proportions of low- and lower-middle-income country populations lack access to safe drinking water. In many rural areas, water delivered from tanks or standpipes is untreated, and households do not have access or awareness of point-of-use water treatment.

Here's a one-sentence version of that paragraph:

> Since 2020, the G20 has initiated annual water dialogues addressing critical WASH issues, with each presidency focusing on different aspects. Despite these efforts, G20 leaders still need to develop actionable solutions for the global sanitation and water crisis.

Institutionalizing access to clean water into public policy

In-line chlorination is a technology for automatically disinfecting water at shared water collection points. ILC technologies present a promising avenue, particularly in regions with existing piped water infrastructure. Pilots run by Evidence Action in India and Kenya demonstrate the feasibility and scalability of this approach, with the potential to save

[6] Indicator | SDG 6 Data." n.d. Sdg6data.org. https://sdg6data.org/en/indicator/6.2.1a.

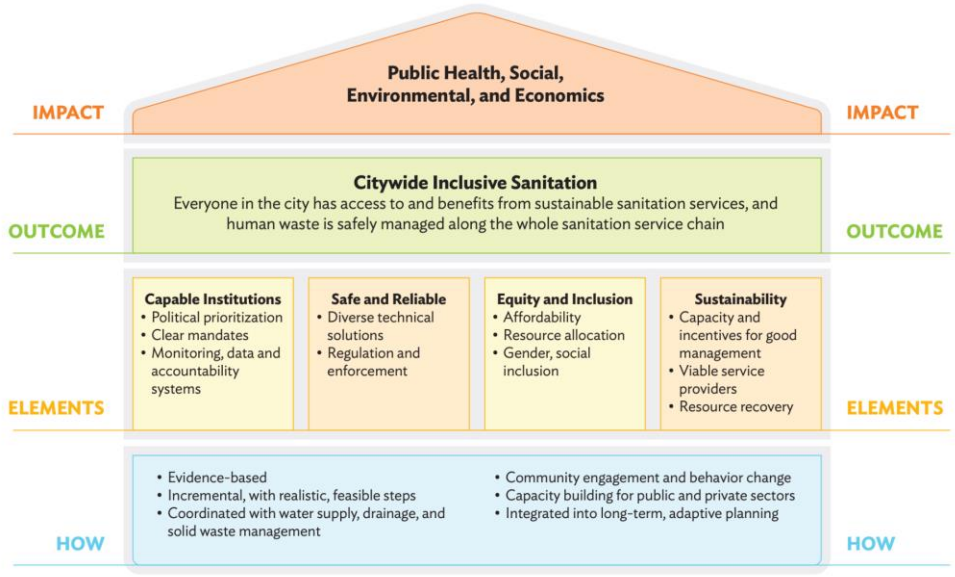
thousands of lives annually. Investing in innovative technologies like ILC devices can significantly reduce the burden of waterborne diseases and preventable deaths.

In areas where it will not be feasible for governments to provide piped water for some time, one way to deliver water treatment at scale is through existing maternal and child health (MCH) services, which already reach the vast majority of mothers and children, even in rural, low-income, high-mortality contexts. According to UNICEF, in 2020, around 87% of pregnant women globally received at least one antenatal care visit, providing an opportunity to integrate water treatment interventions. Studies in Kenya and Malawi have demonstrated that water treatment can be targeted and delivered efficiently with other routine maternal and child health services. This approach is effective in reaching those most at risk (pregnant women and young children), substantially reducing illness and generating consistent take-up over an extended period. Vouchers redeemable for free water treatment represent a low-cost, scalable solution that aligns with existing health infrastructure.

Integrating new approaches to sanitation

The approach aims to ensure everyone has access to safely managed sanitation by promoting a range of solutions—both onsite and sewered, centralized or decentralized—tailored to the realities of the world's burgeoning cities. CWIS means focusing on service provision and its enabling environment, rather than on building infrastructure.

The traditional approach in sanitation with conventional sewerage and wastewater treatment has long been considered the 'business as usual' solution, which has limited capacity to achieve universal safely managed sanitation.[7]



Source: Asian Development Bank.

The evolving concept of City-wide Inclusive Sanitation (CWIS) offers citizens access to affordable, safe, contamination-free sanitation services through the integration of sewered and non-sewered sanitation systems[8]. Such an approach is especially important when low-income countries and communities cannot offer universal sanitation access to all citizens through sewered systems in one go.

Examples show the affordability of non-sewered systems. Non-sewered systems typically use different onsite sanitation systems such as pits and septic tanks while

[7] City-wide Inclusive Sanitation (CWIS) Initiative, World Bank (n.d.) https://www.worldbank.org/en/topic/sanitation/brief/citywide-inclusive-sanitation

[8] "What is city-wide inclusive sanitation and why is it needed", ADB (2021), https://www.adb.org/publications/citywide-inclusive-sanitation-needed

sewered connections refer to pipe networks connected to households and transported to a treatment point. For instance, cost-benefit analysis from Mahalaxmi Municipality, Nepal compares the cost of three different scenarios: 100% sewered, 100% non-sewered and hybrid - a combination of sewered (30%) and non-sewered (70%). The study found that the direct cost (including capital expenditure) of the sewered sanitation deployment scenario is about 20 times higher than the non-sewered sanitation scenario, and the hybrid scenario, which combines both systems, is about 1.3 times lower than the sewered sanitation scenario. Moreover, the capital expenditure of the sewered sanitation scenario is 1.8 times the cost of the non-sewered scenario and 1.01 times the cost of the hybrid scenario[9].

G20 Case Study from Japan

G20 countries such as Japan have prototyped unique technology to domestically treat wastewater from kitchens, toilets, baths, and so-called “Johkasou”, which is an advanced technology of onsite facility that operates at the place where water is used[10]. In Japan's low-density areas where public sewerage systems are impractical, Johkasou treats both black and grey water economically, fulfilling the country's wastewater management needs in non-sewer areas[11]. The government subsidized 40% of the costs while the rest was paid by the households. 40% was equivalent to the environmental benefit of treating non-fecal domestic wastewater.[12]

[9] Basyal et al. (2023)

[10] Ebie, (2012). Overseas Expansion of Japan's Johkasou. https://www-cycle.nies.go.jp/eng/column/page/201910_01.html

[11] Endo and Koga (2021) :1

[12] Setiawati, Song, Hashimoto (2022)

Towards tackling water and sanitation disparities, G20 policymakers should consider:

- **Sustained long-term investment and community engagement:** Scaling up effective water and sanitation interventions requires sustained investment, supportive policies, and community engagement. Integrating these efforts with climate resilience strategies is crucial [13].
- **Cultural and social acceptance:** Introducing new water treatment and sanitation methods may face resistance or skepticism from some communities, especially if they are unfamiliar with treatment (including taste and odor in the case of water treatment) or perceive them as a threat to traditional practices.
- **Sectoral Coordination:** Program implementation also may require coordination and collaboration among various sectors, including health, water, and environmental agencies, as well as different levels of government and non-governmental organizations[14].

The G20 countries can play a pivotal role in facilitating knowledge sharing, capacity building, and financial support to adopt and implement innovative solutions. Collaborative efforts involving governments, international organizations, local communities, and the private sector, with leadership from the G20, will be essential in realizing the full potential of innovative technologies, advancing toward a future where poor sanitation and water treatment do not hinder human health, safety, and economic participation.

[13] Wibowo, Bennon, Seetha Ram (2023)

[14] ” Sustainability assessment of rural water service delivery models findings of a multi-country review”, World Bank (2017)

References

Asian Development Bank. *What Is City-wide Inclusive Sanitation and Why Is It Needed?* Asian Development Bank, 2021. https://www.adb.org/publications/citywide-inclusive-sanitation-needed.

Bassi, Nitin, Teuku Riefky, and Yusuf Kabir. "Improving access to safely managed drinking water services: recommendations for G20 emerging economies." *T20 Policy Brief*, July 2023. https://t20ind.org/wp-content/uploads/2023/07/T20_PB_TF6_6165_SafelyManagedDrinkingWater_n.pdf.

Basyal, Isha, Kabita Bade Shrestha, Shirish Singh, Bhusan Raj Shrestha, Krishna Ram Yendyo, and Roshan Raj Shrestha. "Cost–Benefit Analysis of Sewered and Non-Sewered Sanitation Interventions in Mahalaxmi Municipality, Nepal." Asian Development Bank Institute, July 19, 2023. https://doi.org/10.56506/RARG9041.

Biden, Sam. "Closing Gender Gaps in Water, Sanitation and Hygiene (WASH): Challenges, Progress and Equitable Access." *Human Security Centre* (blog), August 1, 2023. http://www.hscentre.org/economic-development/closing-gender-gaps-water-sanitation-hygiene-wash-challenges-progress-equitable-access/.

City-wide Inclusive Sanitation (CWIS) Initiative (overview). World Bank (n.d.). https://www.worldbank.org/en/topic/sanitation/brief/citywide-inclusive-sanitation

Dupas, Pascaline, Vivian Hoffmann, Michael Kremer, and Alix Peterson Zwane. "Targeting Health Subsidies through a Nonprice Mechanism: A Randomized Controlled Trial in Kenya." *Science* 353, no. 6302 (August 26, 2016): 889–95. https://doi.org/10.1126/science.aaf6288.

Dupas, Pascaline, Basimenye Nhlema, Zachary Wagner, Aaron Wolf, and Emily Wroe. "Expanding Access to Clean Water for the Rural Poor: Experimental Evidence from

Malawi." Working Paper. Working Paper Series. National Bureau of Economic Research, July 2020. https://doi.org/10.3386/w27570.

Ebie, Y. "Overseas Expansion of Japan's Johkasou (Decentralized Domestic Wastewater Treatment System) | Online Articles | Material Cycles Division | NIES." *National Institute for Environmental Studies*, January 2012. https://www-cycle.nies.go.jp/eng/column/page/201910_01.html.

Endo, Seisaku, and Shuki Koga. "Johkasou – Wastewater Management in a Local Municipality in Japan." *ADBI Development Case Study*, October 20, 2021. https://www.adb.org/publications/johkasou-wastewater-management-japan.

"Evidence Action's In-Line Chlorination Program — General Support (July 2022) | GiveWell." Accessed June 4, 2024. https://www.givewell.org/research/grants/evidence-action-ILC-july-2022.

Haushofer, Johannes, Michael Kremer, Ricardo Maertens, and Brandon Joel Tan. "Water Treatment and Child Mortality: Evidence from Kenya." Cambridge, MA: National Bureau of Economic Research, November 2021. https://doi.org/10.3386/w29447.

"Indicator | SDG 6 Data." Accessed June 4, 2024. https://sdg6data.org/en/indicator/6.2.1a.

Indonesia Water Portal. "G20: Efforts to Inclusive and Sustainable Recovery Solutions." Accessed June 4, 2024. https://www.indonesiawaterportal.com/news/g20-efforts-to-inclusive-and-sustainable-recovery-solutions.html.

IPCC. "IPCC — Intergovernmental Panel on Climate Change," 2023. https://www.ipcc.ch/.

Kelkar, Vedanti, and K.E. Seetha Ram. "A Literature Review Evaluating New Approaches to Resolving the Sanitation Challenge in Developing Asia," no. 976 (July 9,

2019). https://www.adb.org/publications/evaluating-new-approaches-resolving-sanitation-challenge-developing-asia.

Kremer, Michael, Stephen Luby, Ricardo Maertens, Brandon Tan, and Witold Więcek. "Water Treatment and Child Mortality: A Meta-Analysis and Cost-Effectiveness Analysis." SSRN Scholarly Paper. Rochester, NY, January 17, 2023. https://doi.org/10.2139/ssrn.4071953.

Madhavan, Anand, Sujatha Srinivasan, and K.E. Seetha Ram. *Accountability Mechanisms for Inclusive City-Level Public Services in Asia*. Asian Development Bank, 2023. https://www.adb.org/publications/accountability-mechanisms-for-inclusive-city-level-public-services-in-asia.

Makutsa, Philip, Kilungu Nzaku, Paul Ogutu, Peter Barasa, Sam Ombeki, Alex Mwaki, and Robert E. Quick. "Challenges in Implementing a Point-of-Use Water Quality Intervention in Rural Kenya." *American Journal of Public Health* 91, no. 10 (October 2001): 1571–73. https://doi.org/10.2105/AJPH.91.10.1571.

Ministry of Foreign Affairs of the Republic of Indonesia. "G20 Bali Leaders Declaration Bali Indonesia 15 16 November 2022 | Portal Kementerian Luar Negeri Republik Indonesia." Accessed June 4, 2024. https://kemlu.go.id/portal/en/read/4171/siaran_pers/g20-bali-leaders-declaration-bali-indonesia-15-16-november-2022.

OECD. *Financing a Water Secure Future*. Paris: Organisation for Economic Co-operation and Development, 2022. https://www.oecd-ilibrary.org/environment/financing-a-water-secure-future_a2ecb261-en.

Patel, Natasha. "India Sanitation Coalition - Facilitating Sanitation Advancements In India," June 1, 2023. https://www.indiasanitationcoalition.org/blogs/the-g20-

presidency-and-its-impact-on-indias-sdg-agenda-in-the-75-th-year-of-its-independence.html.

Pickering, Amy J., Yoshika Crider, Sonia Sultana, Jenna Swarthout, Frederick GB Goddard, Syed Anjerul Islam, Shreyan Sen, Raga Ayyagari, and Stephen P. Luby. "Effect of In-Line Drinking Water Chlorination at the Point of Collection on Child Diarrhoea in Urban Bangladesh: A Double-Blind, Cluster-Randomised Controlled Trial." *The Lancet Global Health* 7, no. 9 (September 1, 2019): e1247–56. https://doi.org/10.1016/S2214-109X(19)30315-8.

Setiawati, Santi, Ji Min Song, and Kazushi Hashimoto. "The Financial and Institutional Mechanism of the Sanitation and Wastewater Management System: Learning from the Japanese Experience." ADBI Policy Briefs. ADBI Policy Briefs. Asian Development Bank Institute, December 9, 2022. https://doi.org/10.56506/SDMV4349.

Stanford University. "Policy Change Studio." Accessed June 4, 2024. https://fsi.stanford.edu/masters-degree/capstone.

"The Economist Group - 'Toilet Loss' in Schools Costs $1.9B, Finds New Four-Country Study from Economist Impact." Accessed June 4, 2024. https://www.economistgroup.com/group-news/economist-impact/toilet-loss-in-schools-costs-usd1-9b-finds-new-four-country-study-from.

UNICEF DATA. "Antenatal Care." Accessed June 4, 2024. https://data.unicef.org/topic/maternal-health/antenatal-care/.

Wibowo, Dwiky, Michael Bennon, and Ke Seetha Ram. "Long-Term Financing for City-Wide Inclusive Sanitation." Asian Development Bank Institute, April 25, 2023. https://doi.org/10.56506/YVXB6984.

World Bank Group. "Sustainability Assessment of Rural Water Service Delivery Models Findings of a Multi-Country Review." *World Bank*, August 1, 2017.

https://documents.worldbank.org/en/publication/documents-reports/documentdetail/271221503692975915/Sustainability-assessment-of-rural-water-service-delivery-models-findings-of-a-multi-country-review.

World Health Organization. “Drinking-Water,” September 13, 2023. https://www.who.int/news-room/fact-sheets/detail/drinking-water.

World Health Organization. “Population Using Safely Managed Sanitation Services (%).” Accessed June 4, 2024. https://www.who.int/data/gho/indicator-metadata-registry/imr-details/4820.

World Health Organization. “Sanitation,” March 22, 2024. https://www.who.int/news-room/fact-sheets/detail/sanitation.

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