

FINANCING STRATEGIES FOR WATER, SANITATION, AND HYGIENE (WASH) INITIATIVES: A COMPREHENSIVE REVIEW

Dr. Abhijit Chandratreya

Assistant Director, SCES's Indira Institute of Management, Pune,
Savitribai Phule Pune University. Email: abhijitc@indiraiimp.edu.in
Researcher ID: JGD-7901-2023, ORCID ID: 0000-0001-9403-2094

Abstract

This review paper provides a comprehensive examination of the financing strategies employed in the field of Water, Sanitation, and Hygiene (WASH). Access to clean water and sanitation facilities is a fundamental human right, yet billions of people worldwide still lack these necessities. Adequate financing is crucial for the development and maintenance of WASH infrastructure and services. This paper discusses various financing mechanisms, challenges, and innovative approaches to address the funding gap in WASH initiatives. By analysing case studies from different regions and assessing the role of governments, international organizations, and the private sector, we aim to provide insights into effective financing models that can help achieve universal access to WASH services.

Keywords : WASH Initiatives, Water and Sanitation Financing, Funding for WASH Programs, Sustainable WASH Financing , Financial Strategies for WASH, Investment in WASH, Public-Private Partnerships (PPP) in WASH, Donor Funding for WASH, Innovative Financing for WASH, Policy, and Regulatory Frameworks for WASH Financing.

1. BACKGROUND

"Wash financing" typically refers to funding or financial resources allocated to support water, sanitation, and hygiene (WASH) projects and initiatives. WASH encompasses a range of activities and services related to clean water supply, sanitation facilities, and hygiene promotion. These projects aim to improve access to safe drinking water, provide proper sanitation facilities, and promote good hygiene practices, particularly in areas where such services are lacking or inadequate.

WASH financing can come from various sources, including governments, non-governmental organizations (NGOs), international development agencies, and private sector entities. The funding is used for various purposes, such as building water infrastructure (like wells, pipelines, and treatment plants), constructing sanitation facilities (such as toilets and sewage systems), and conducting hygiene education and behaviour change programs.

Efforts to secure adequate WASH financing are crucial for achieving Sustainable Development Goal 6 (SDG 6), which focuses on ensuring access to clean water and sanitation for all by 2030. Adequate funding is essential to address the global challenges related to waterborne diseases, inadequate sanitation, and the lack of access to safe drinking water, particularly in low- and middle-income countries.

In recent years, there has been an increased emphasis on mobilizing resources and improving the efficiency and effectiveness of WASH financing to ensure sustainable access to clean water and sanitation services for communities in need.

1.1 Objectives of the Review

This review paper aims to provide a comprehensive overview of WASH financing, including its importance, challenges, innovative approaches, and case studies. By examining the various financing mechanisms and their effectiveness, policymakers, practitioners, and researchers can gain insights into strategies for bridging the

financing gap in WASH initiatives. Ultimately, achieving universal access to clean water and sanitation requires a multifaceted approach that involves governments, international organizations, the private sector, and local communities working together to secure sustainable funding for WASH projects.

2. THE IMPORTANCE OF FINANCING FOR WASH

2.1 The Human Right to Water and Sanitation

The Human Right to Water and Sanitation is a fundamental principle enshrined in international law, emphasizing the essential role that access to clean and safe drinking water and adequate sanitation facilities plays in ensuring human dignity, health, and well-being. Recognized by the United Nations General Assembly in 2010, this right underscores that every individual has the right to sufficient, safe, acceptable, physically accessible, and affordable water for personal and domestic use, as well as access to safe and hygienic sanitation facilities. It represents a crucial component of the broader spectrum of human rights, as it serves as a foundation for the realization of other rights, such as the right to life, health, and an adequate standard of living. Upholding the Human Right to Water and Sanitation is not only a moral imperative but also essential for achieving sustainable development and addressing global challenges related to poverty, inequality, and environmental sustainability.

2.2 Linkages between WASH and Health, Education, and Gender Equality

Water, Sanitation, and Hygiene (WASH) are closely linked to health, education, and gender equality. These linkages are critical to understanding the broader impact of improved access to clean water, proper sanitation facilities, and hygiene practices on these key areas:

1. Health

- **Disease Prevention:** Access to clean drinking water and sanitation facilities is fundamental to preventing waterborne diseases like cholera, dysentery, and diarrhoea. Proper hygiene practices, such as handwashing, also play a significant role in reducing the spread of diseases.
- **Child Mortality Reduction:** Improved WASH facilities and practices can substantially reduce child mortality rates, as many diseases affecting children are waterborne. Clean water and sanitation also contribute to overall health, reducing the burden of illness and healthcare costs.
- **Nutrition:** Clean water and sanitation are essential for food hygiene and preparation, indirectly impacting nutritional health. Additionally, access to clean water can promote better sanitation and hygiene practices, reducing the incidence of diseases that can lead to malnutrition.

2. Education

- **School Attendance:** Adequate WASH facilities in schools, particularly separate and private sanitation facilities for girls, can significantly improve attendance, especially for adolescent girls who may miss school during menstruation if they lack proper facilities.

- **Concentration and Performance:** Access to clean water, sanitation, and hygiene education in schools enhances students' concentration and overall performance by reducing the likelihood of waterborne illnesses and promoting good health.
- **Gender Equity in Education:** Ensuring access to WASH facilities can help reduce gender disparities in education. Girls are often disproportionately affected by the lack of these facilities, leading to absenteeism and dropouts.

3. Gender Equality

- **Women's Empowerment:** Access to WASH services can empower women and girls by freeing up their time and energy, which they may otherwise spend on water collection or caring for sick family members due to waterborne diseases.
- **Dignity and Safety:** Gender-sensitive sanitation facilities, especially in public places, ensure women and girls have access to safe, private, and hygienic toilets. This enhances their dignity, safety, and overall well-being.
- **Economic Opportunities:** When women have access to clean water and sanitation, they can engage in income-generating activities, education, and community involvement more readily, contributing to their economic empowerment and gender equality.

In summary, the linkages between WASH and health, education, and gender equality are intertwined and mutually reinforcing. Improvements in WASH infrastructure and hygiene practices can have a profound impact on the health and well-being of individuals and communities, enhance educational opportunities and outcomes, and contribute to greater gender equality by addressing the specific needs and challenges faced by women and girls. Recognizing and addressing these linkages is crucial for sustainable development and improved quality of life for all.

2.3 The Global WASH Financing Gap

The Global WASH Financing Gap represents a critical challenge in the realm of water, sanitation, and hygiene (WASH) services worldwide. This alarming deficit underscores the disparity between the financial resources required to achieve universal access to safe drinking water, proper sanitation facilities, and hygiene education, and the actual funds allocated for these purposes. Despite the recognized importance of WASH services in promoting public health, environmental sustainability, and socio-economic development, many nations struggle to secure adequate funding for infrastructure development, maintenance, and capacity-building initiatives. Addressing the Global WASH Financing Gap demands concerted efforts from governments, international organizations, and private sector entities to mobilize resources, prioritize WASH investments, and ensure equitable access to these essential services for all, especially the most marginalized and vulnerable populations. Closing this financing gap is not only a matter of humanitarian concern but also a fundamental step towards achieving the United Nations' Sustainable Development Goal 6, which aims to ensure availability and sustainable management of water and sanitation for all by 2030.

3. TRADITIONAL FINANCING MECHANISMS

3.1 Government Budget Allocations

Government budget allocations refer to the process of distributing public funds to various government programs, departments, agencies, and initiatives to meet the financial needs and priorities of the government and its citizens. This allocation of

resources is a critical aspect of public finance and policymaking, as it determines how taxpayer money is spent and which areas of public life receive financial support.

3.2 Donor Funding and International Aid

Donor funding and international aid are critical components of global efforts to alleviate poverty, promote economic development, and address various humanitarian challenges around the world. These terms refer to the financial and material support provided by governments, international organizations, non-governmental organizations (NGOs), and individuals from one country to another, often to assist in achieving specific development goals or responding to crises.

3.3 Public-Private Partnerships (PPPs)

Public-Private Partnerships (PPPs), also known as P3s or 3Ps, are collaborative arrangements between government entities and private sector organizations for the purpose of delivering public infrastructure, services, or projects. PPPs are a way to leverage the strengths of both the public and private sectors to address various societal needs while spreading the risks and responsibilities.

3.4 Microfinance and Community-Based Approaches

Microfinance and community-based approaches are two strategies that aim to alleviate poverty and promote economic development, particularly in underserved or marginalized communities. These approaches have gained prominence as effective tools for empowering individuals and communities to improve their financial well-being and overall quality of life.

4. CHALLENGES IN WASH FINANCING

4.1 Insufficient funding is a significant challenge to water, sanitation, and hygiene (WASH) financing. Adequate funding is crucial for the development, maintenance, and expansion of WASH infrastructure and services, as well as for promoting good hygiene practices. Here are some reasons why insufficient funding can be a challenge in WASH financing:

1. **Infrastructure Development and Maintenance:** WASH projects often require substantial investment in infrastructure such as water supply systems, sewage treatment facilities, and sanitation services. These projects demand consistent funding for construction, operation, and maintenance.
2. **Equity and Access:** Inadequate funding can result in unequal access to WASH services, with marginalized and underserved communities being the most affected. Insufficient funding may lead to disparities in access to clean water and sanitation, exacerbating public health issues.
3. **Health Implications:** Lack of funding for WASH programs can contribute to the spread of waterborne diseases and poor hygiene practices, which can have severe health consequences, especially in low-resource settings.
4. **Sustainable Development Goals (SDGs):** Achieving the SDG 6, which focuses on clean water and sanitation for all, requires significant financial resources. Insufficient funding can hinder progress toward this goal.

5. **Climate Change Adaptation:** Climate change poses new challenges for WASH infrastructure, including increased droughts and flooding. Adequate funding is needed to adapt and build resilience in WASH systems.
6. **Research and Innovation:** Funding is essential for research and innovation in WASH technologies and practices to improve efficiency, sustainability, and affordability.
7. **Humanitarian Crises:** During humanitarian crises such as natural disasters and conflicts, rapid and substantial funding is necessary to provide emergency WASH services to affected populations.

4.2 Affordability and Cost Recovery

Affordability and cost recovery are significant challenges in the context of financing for water, sanitation, and hygiene (WASH) services, particularly in developing countries. Following challenges impact WASH financing:

1. **Low Income Populations:** Many people in low- and middle-income countries lack the financial means to pay for improved WASH services. Affordability is a critical issue because these services are often provided by governments or private entities that need to cover their costs. For many individuals and households, the cost of accessing clean water and proper sanitation facilities can be prohibitive.
2. **User Fees and Tariffs:** To recover the costs of providing WASH services, governments and service providers often impose user fees and tariffs. However, setting these fees at a level that ensures financial sustainability while remaining affordable for low-income populations is challenging. If fees are too high, many people will be unable to access these services, leading to inequities in access.
3. **Political and Social Pressure:** When governments or service providers attempt to increase tariffs or user fees to cover the costs, they often face political and social pressure. Subsidized or free WASH services may be seen as a social benefit, and any attempt to shift costs to users can lead to public resistance and political backlash.
4. **Revenue Collection:** In many developing countries, the capacity to collect fees and tariffs efficiently is limited. Corruption and mismanagement can lead to revenue leakage, reducing the funds available for maintaining and expanding WASH infrastructure.
5. **Cross-Subsidization:** Cross-subsidization is a strategy where higher-income users pay more to subsidize lower-income users. While this can make services more affordable for the poor, it can also place a burden on wealthier households and may not always be politically or economically feasible.
6. **Donor Funding:** In many cases, donor funding plays a crucial role in financing WASH projects in developing countries. However, heavy reliance on donor funding can create sustainability challenges. Donor funding may not be consistent or predictable, and when it diminishes, governments and service providers may struggle to maintain services.
7. **Inequality:** Ensuring equitable access to WASH services is a challenge. If cost recovery mechanisms are not designed carefully, they can lead to disparities in access between urban and rural areas or different income groups. Low-income and

marginalized communities often face the greatest challenges in accessing affordable WASH services.

4.3 Lack of Data and Monitoring

The lack of data and monitoring can pose significant challenges to financing for Water, Sanitation, and Hygiene (WASH) projects for several reasons:

1. **Invisibility of the Problem:** Without accurate data and monitoring systems in place, it can be challenging to understand the true extent of WASH issues in a given area. This lack of visibility can make it difficult for governments, donors, and organizations to recognize the urgency and scale of the problem, hindering efforts to allocate resources effectively.
2. **Resource Allocation:** Limited data can lead to inefficient allocation of resources. Without a clear understanding of where WASH infrastructure is most needed, it becomes harder to prioritize projects and target investments where they will have the most significant impact.
3. **Accountability and Transparency:** Adequate data and monitoring are crucial for holding governments and organizations accountable for their WASH-related commitments. It enables stakeholders to track progress, identify bottlenecks, and ensure that funds are being used effectively and transparently.
4. **Project Evaluation:** Data is essential for evaluating the effectiveness of WASH projects and interventions. Without proper monitoring and data collection, it is challenging to assess whether projects are achieving their intended outcomes and delivering value for money.
5. **Long-Term Planning:** Lack of data can hinder long-term planning for WASH infrastructure. Investments in water supply and sanitation systems are typically long-term commitments, and without accurate data, it is difficult to plan for future population growth, changing water availability, or evolving sanitation needs.
6. **Evidence-Based Decision-Making:** Sound decision-making in WASH financing relies on evidence-based approaches. Reliable data allows policymakers, governments, and organizations to make informed choices about where to invest and what strategies to pursue.
7. **Risk Assessment:** Inadequate data and monitoring can result in unforeseen risks and challenges during the implementation of WASH projects. For example, without up-to-date data on water quality, communities may be exposed to health risks from contaminated water sources.
8. **Sustainability:** Sustainability of WASH projects requires ongoing monitoring and maintenance. Without data on the performance of existing infrastructure, it can be challenging to identify and address issues before they lead to system failures.

4.4 Political and Institutional Factors

Political and institutional factors can pose significant challenges to financing for Water, Sanitation, and Hygiene (WASH) initiatives. WASH financing is crucial for providing clean water, proper sanitation, and hygiene services, especially in developing countries. Here are some ways in which political and institutional factors can hinder WASH financing:

1. **Budget Allocation Priorities:** Governments may prioritize other sectors over WASH, such as defence or infrastructure, leading to limited budget allocations for WASH programs. This can result from political choices and interests, and it can be exacerbated by corruption.
2. **Political Instability:** Political instability, such as frequent changes in government leadership, can disrupt long-term planning and financing for WASH projects. New governments might change priorities or halt ongoing projects.
3. **Lack of Coordination:** Poor coordination among government agencies responsible for WASH can lead to inefficiencies in resource allocation. Funds may be scattered across various departments, making it difficult to implement comprehensive WASH programs effectively.
4. **Bureaucracy and Red Tape:** Excessive bureaucratic processes and red tape can slow down the disbursement of funds for WASH projects. This delay can lead to cost overruns and project delays, making it less attractive for donors and investors.
5. **Short-Term Political Cycles:** Politicians often focus on short-term goals to win elections, which may discourage long-term investments in WASH infrastructure that might not yield immediate political benefits.
6. **Lack of Accountability:** Weak accountability mechanisms within government institutions can allow mismanagement of WASH funds to go unchecked. This can deter donors from providing additional funding.
7. **Policy Inconsistencies:** Frequent changes in WASH-related policies or the absence of clear, long-term strategies can discourage donors and investors who seek stability and predictability.
8. **Fiscal Constraints:** In countries facing economic challenges, there may be limited fiscal space to allocate funds to WASH. High levels of debt or other financial pressures can restrict government spending on such programs.
9. **International Aid Dependency:** Overreliance on international aid for WASH financing can make countries vulnerable to shifts in donor priorities or reductions in aid flows, leading to funding gaps.
10. **Local Government Capacity:** Weak capacity at the local government level can hinder effective planning, implementation, and monitoring of WASH projects, affecting their overall success.

5. INNOVATIVE FINANCING APPROACHES

5.1 Results-Based Financing

Results-Based Financing (RBF) is a dynamic and innovative approach to development financing that prioritizes outcomes and impact over inputs and processes. Unlike traditional funding mechanisms, RBF links financial disbursements directly to the achievement of predefined results or targets, creating a powerful incentive for efficiency and effectiveness. This approach is particularly prevalent in sectors like healthcare, education, and infrastructure development, where it encourages service providers to deliver quality services while also fostering accountability and transparency. By aligning financial incentives with measurable results, RBF has the

potential to catalyse transformative changes in various sectors, ultimately leading to improved social outcomes and a more efficient allocation of resources.

5.2 Impact Investment and Social Impact Bonds

Impact investment involves allocating capital with the dual purpose of generating financial returns while addressing pressing social and environmental challenges. Investors in impact ventures consider not only financial profitability but also measure and report the positive impacts created, such as improved education access or reduced carbon emissions. In contrast, Social Impact Bonds (SIBs), also known as Pay-for-Success contracts, are a specific financial tool designed to fund social programs through private investment. In an SIB, private investors provide upfront capital to support social interventions, and returns are contingent on the program achieving predefined outcomes. If the outcomes are met, the government repays the investors, often with a financial return. These bonds offer a unique way to leverage private sector resources for social betterment while holding programs accountable for delivering results. Both impact investment and SIBs exemplify innovative approaches to aligning financial interests with the pursuit of social and environmental progress.

5.3 Water Utilities and Tariff Reforms

Water utilities play a pivotal role in ensuring access to safe and clean drinking water for communities, as well as managing wastewater treatment and distribution systems. Tariff reforms in the context of water utilities involve a strategic re-evaluation and adjustment of pricing structures to ensure the sustainability of these essential services. Such reforms aim to strike a balance between providing affordable access to water for all, particularly for vulnerable and low-income populations, while also securing the financial viability of the utilities. They often require careful consideration of factors such as infrastructure maintenance, operational costs, environmental sustainability, and the need for infrastructure upgrades. Effective tariff reforms can promote responsible water usage, encourage conservation, and ensure that water utilities remain robust and capable of meeting the growing demands of an ever-expanding global population while safeguarding our precious water resources.

5.4 Crowdfunding and Philanthropy

Crowdfunding and philanthropy are two distinct yet interconnected mechanisms for mobilizing resources and driving positive change. Crowdfunding harnesses the power of the crowd to support diverse projects, often with a financial return or a tangible product in mind. In contrast, philanthropy is driven by a sense of altruism, with the primary goal of improving the lives of others or advancing a specific cause. While crowdfunding can offer a more transactional approach, philanthropy often embodies a long-term commitment to social and humanitarian causes. However, these two approaches are not mutually exclusive; in fact, they often complement each other, as crowdfunding campaigns can be used to amplify the impact of philanthropic efforts, creating a dynamic synergy between the individual and the collective pursuit of social good.

6. CASE STUDIES

6.1 Case Study 1: WaterCredit by Water.org

WaterCredit is a pioneering initiative by Water.org, aimed at revolutionizing the way access to safe water and sanitation is financed in underserved communities

worldwide. Through WaterCredit, Water.org combines the power of microfinance with the urgency of the global water crisis, enabling individuals and families to secure affordable loans for the construction of water and sanitation facilities. This innovative approach not only empowers people to take control of their own water and sanitation solutions but also ensures the sustainability of these vital resources. By bridging the financial gap that often prevents vulnerable populations from accessing clean water, WaterCredit represents a powerful force in the ongoing battle for global water security and dignity for all.

6.2 Case Study 2: The African Water Facility

The African Water Facility (AWF) is a vital institution dedicated to enhancing water resource management and access to safe drinking water and sanitation across the African continent. Established by the African Ministers' Council on Water (AMCOW) and hosted by the African Development Bank Group, the AWF plays a pivotal role in mobilizing financial and technical resources for water-related projects. Its focus extends to promoting sustainable water infrastructure development, fostering innovation, and strengthening institutional capacities to manage water resources efficiently. By catalysing investments and partnerships, the AWF contributes significantly to the achievement of the Sustainable Development Goals in Africa, fostering economic growth, social equity, and environmental sustainability through improved water management and access.

6.3 Case Study 3: Smart Metering in Singapore

Singapore has emerged as a global leader in smart metering technology, revolutionizing the way utilities manage and consumers engage with their energy consumption. Smart metering in Singapore involves the deployment of advanced digital meters equipped with real-time data capabilities, allowing both consumers and utilities to monitor electricity usage with unprecedented accuracy and efficiency. These smart meters empower consumers to make informed decisions about their energy consumption, promoting energy conservation and cost savings. Furthermore, utility companies benefit from improved grid management, reduced operational costs, and more responsive service delivery. Singapore's commitment to smart metering aligns with its sustainability goals, promoting a greener and more energy-efficient future for the nation.

6.4 Case Study 4: The Clean India Mission (Swachh Bharat Abhiyan)

The Clean India Mission, also known as Swachh Bharat Abhiyan, is a monumental nationwide campaign launched by the Government of India with the aim of achieving a cleaner and more hygienic India. Launched on October 2, 2014, on the birth anniversary of Mahatma Gandhi, this ambitious initiative seeks to eliminate open defecation, promote proper waste management, and enhance overall sanitation and hygiene practices. Swachh Bharat Abhiyan has made significant strides in improving access to sanitation facilities in both urban and rural areas, emphasizing the importance of toilet construction and safe disposal of waste. It has not only improved the quality of life for millions of Indians but has also contributed to reducing the spread of diseases and enhancing environmental sustainability. The mission has garnered widespread support and participation from citizens, making it a truly transformative movement towards a cleaner and healthier India.

7. THE ROLE OF GOVERNMENTS AND POLICY FRAMEWORKS

7.1 Government Commitment and Prioritization

Government commitment and prioritization play crucial roles in financing Water, Sanitation, and Hygiene (WASH) initiatives. Here's an overview of their significance:

1. **Resource Allocation:** Government commitment is essential for allocating financial resources to the WASH sector. When governments prioritize WASH, they allocate a significant portion of their budget to fund WASH infrastructure, programs, and services. This financial commitment is essential for ensuring access to safe water and sanitation for all citizens.
2. **Policy Framework:** Governments can establish policies and regulatory frameworks that support WASH financing. These policies can encourage public and private sector investment in WASH projects, provide incentives for efficient resource allocation, and promote innovative financing mechanisms.
3. **Attracting External Funding:** Government commitment to WASH can also attract external funding from international organizations, donors, and development agencies. When governments demonstrate their dedication to solving WASH challenges, they are more likely to receive financial support from external sources to supplement their own investments.
4. **Capacity Building:** Governments can prioritize capacity building within relevant ministries and agencies to ensure effective planning, implementation, and monitoring of WASH projects. This helps in efficient resource utilization and reduces the risk of funds being misallocated or misused.
5. **Public Awareness and Behavior Change:** Governments play a pivotal role in raising public awareness about the importance of WASH and encouraging Behavior change. By prioritizing public education and campaigns, governments can create a culture of responsible water and sanitation usage, which can ultimately reduce the burden on WASH infrastructure and services.
6. **Monitoring and Accountability:** Governments must prioritize monitoring and accountability mechanisms to ensure that allocated funds are effectively used and that WASH services reach the intended beneficiaries. This helps in identifying gaps and making necessary adjustments to improve the impact of WASH financing.
7. **Equity and Inclusivity:** Government commitment ensures that WASH financing efforts prioritize equity and inclusivity. It's crucial to reach marginalized and underserved populations to achieve universal access to WASH services. Governments can allocate funds specifically for these groups and target areas with the greatest need.
8. **Long-Term Sustainability:** Commitment to long-term planning is essential. Governments should prioritize WASH as a sustainable development goal, recognizing that consistent funding and attention are required over time to maintain and expand WASH services as populations grow and urbanize.

7.2 Regulatory Frameworks and Legal Instruments

Regulatory frameworks and legal instruments play a critical role in supporting financing for Water, Sanitation, and Hygiene (WASH) initiatives. Access to safe water and sanitation is a fundamental human right, and governments, international

organizations, and donors recognize the importance of creating an enabling environment to ensure sustainable and equitable access to WASH services. Regulatory frameworks and legal instruments can support WASH financing in the following ways:

1. **Establishing Legal Mandates:** Governments can enact laws and regulations that explicitly define their responsibility for providing WASH services to their citizens. These legal mandates create a foundation for allocating resources and attracting financing from both domestic and international sources.
2. **Public-Private Partnerships (PPPs):** Legal instruments can facilitate the formation of PPPs, enabling private sector participation in WASH service provision. Well-structured PPP agreements can attract private investment, technical expertise, and efficiency in service delivery while safeguarding public interests.
3. **Tariff Regulations:** Clear and transparent tariff regulations can ensure that WASH service providers, whether public or private, can generate sufficient revenue to cover operational costs, maintain infrastructure, and attract investment. Regulatory bodies can oversee tariff setting to ensure affordability for low-income communities.
4. **Credit Guarantees and Investment Incentives:** Governments can establish legal mechanisms for providing credit guarantees and investment incentives to attract private financing for WASH projects. These legal instruments reduce the risks for investors and encourage their participation.
5. **Ring-Fencing Funds:** Legal frameworks can mandate the creation of dedicated funds or accounts for WASH financing. These funds can receive contributions from various sources, including government budgets, donor grants, and user fees, and ensure that the money is used exclusively for WASH purposes.
6. **Concessional Financing:** Legal instruments can provide for concessional financing terms for WASH projects, such as low-interest loans, grants, or subsidies. These terms can help bridge the affordability gap for underserved communities.
7. **Regulatory Oversight:** Regulatory frameworks can establish independent regulatory bodies responsible for overseeing WASH service provision, ensuring quality, and preventing corruption. This fosters trust among investors and donors.
8. **Data and Reporting Requirements:** Laws can mandate the collection and reporting of data related to WASH services, including access levels, quality, and financial performance. This information is crucial for monitoring progress and attracting financing.
9. **Environmental and Social Safeguards:** Legal instruments can require environmental and social impact assessments for WASH projects to mitigate potential negative consequences. This helps secure the support of donors and international financing institutions that often have stringent requirements.
10. **International Agreements:** Governments can participate in international agreements and conventions related to WASH, which may provide access to international financing sources and expertise.

11. **Ownership and Land Rights:** Legal frameworks can clarify land rights and ownership issues related to WASH infrastructure, reducing the risk of disputes that could hinder investment.
12. **Incentives for Innovation:** Legal instruments can offer incentives for the development and implementation of innovative WASH technologies and approaches, which can attract financing from research institutions and private investors.

7.3 Fiscal Policies and Subsidies

Fiscal policies and subsidies can play a significant role in supporting Water, Sanitation, and Hygiene (WASH) financing by providing the necessary funds and incentives to ensure access to clean water and sanitation services, particularly in developing countries. Here's how fiscal policies and subsidies can support WASH financing:

1. **Direct Budget Allocation:** Governments can allocate a portion of their budgets specifically for WASH infrastructure development and maintenance. This allocation ensures that funds are available for constructing and maintaining water supply and sanitation systems.
2. **Targeted Subsidies:** Subsidies can be directed towards vulnerable or low-income populations to make WASH services more affordable for them. These subsidies can be in the form of reduced tariffs for water and sanitation services or direct financial support to households to cover part of their WASH expenses.
3. **Tax Incentives:** Governments can provide tax incentives or exemptions to businesses and organizations that invest in WASH infrastructure. This can encourage private sector participation in WASH projects and increase the overall funding available for WASH initiatives.
4. **Public-Private Partnerships (PPPs):** Fiscal policies can facilitate PPPs in the WASH sector by providing tax incentives, guarantees, or grants to attract private sector investment in infrastructure development and service delivery.
5. **User Fees and Tariffs:** Governments can establish cost-recovery mechanisms, such as user fees and tariffs for WASH services, to generate revenue for the maintenance and expansion of infrastructure. Subsidies can be used to offset the costs for low-income households to ensure affordability.
6. **Environmental Taxes:** Governments can impose taxes on activities or industries that have negative environmental impacts, such as water pollution. The revenue generated from these taxes can be channelled into WASH projects to mitigate the environmental damage and improve access to clean water sources.
7. **Cross-Subsidization:** In some cases, revenue generated from more profitable services or sectors (e.g., urban water supply) can be cross-subsidized to support less profitable or rural areas with WASH services, ensuring more equitable access.
8. **International Aid and Grants:** Fiscal policies can facilitate the allocation of international aid and grants for WASH projects. Governments can use these funds to improve infrastructure, build capacity, and enhance WASH services.
9. **Innovative Financing Mechanisms:** Governments can explore innovative financing mechanisms, such as green bonds or impact investing, to attract private

sector investment for WASH projects while ensuring accountability and sustainability.

10. **Monitoring and Accountability:** Fiscal policies can include provisions for transparent reporting, monitoring, and accountability mechanisms to ensure that allocated funds are effectively used for WASH purposes.

8. INTERNATIONAL ORGANIZATIONS AND PARTNERSHIPS

8.1 United Nations Sustainable Development Goals (SDGs)

The United Nations Sustainable Development Goals (SDGs) can play a crucial role in supporting financing for Water, Sanitation, and Hygiene (WASH) projects and initiatives. WASH is integral to several SDGs, including Goal 6: "Ensure availability and sustainable management of water and sanitation for all." Here are ways in which the SDGs can support WASH financing:

1. **Advocacy and Awareness Building (SDG 6.1 and 6.2):** SDG 6 aims to ensure universal access to clean water and adequate sanitation. By promoting these goals, governments, organizations, and individuals can raise awareness about the importance of WASH, thereby garnering support for financing these initiatives.
2. **Public-Private Partnerships (SDG 6.1 and 17.17):** SDG 17 emphasizes the importance of partnerships to achieve all the goals. Public-private partnerships (PPPs) can help mobilize private sector resources and expertise for WASH projects. SDG 6.1 encourages governments to work with various stakeholders, including the private sector, to improve water infrastructure and services.
3. **Innovation and Technology (SDG 6.3):** SDG 6.3 promotes the use of innovative technologies to improve water quality and efficiency. Investment in research and development can lead to cost-effective solutions that attract funding from both public and private sectors.
4. **Capacity Building (SDG 6.a):** Capacity building is essential for effective WASH management. SDG 6.a calls for building the capacity of developing countries to provide safe and affordable drinking water and sanitation. Funding can be directed towards training programs and knowledge sharing.
5. **Global Financing Mechanisms (SDG 17.3):** SDG 17.3 encourages developed countries to implement fully their official development assistance commitments. Developed nations can allocate a portion of their aid budgets to support WASH initiatives in developing countries.
6. **Monitoring and Reporting (SDG 6.6 and 6.1):** Regular monitoring and reporting on progress toward WASH goals, as outlined in SDG 6.6, can help attract funding by demonstrating the impact of investments and holding stakeholders accountable.
7. **Financial Inclusion (SDG 1.4 and 6.1):** Ensuring financial inclusion, as stated in SDG 1.4, can help people afford WASH services. Microfinance and other financial inclusion initiatives can be linked to WASH projects, making them more accessible to marginalized communities.
8. **Climate Resilience (SDG 6.4 and 13.1):** Climate change poses risks to water resources. SDG 6.4 emphasizes the need for water-related infrastructure that is

resilient to climate change, while SDG 13.1 calls for actions to strengthen resilience and adaptive capacity. Financing can be directed toward climate-resilient WASH infrastructure.

9. **Education and Behavioural Change (SDG 4.7 and 6.2):** Education and awareness campaigns, as promoted by SDG 4.7, can lead to behavioural change regarding water usage and sanitation practices, potentially reducing the need for expensive infrastructure and maintenance.
10. **Integration with Other Goals (e.g., Health, Education):** WASH interventions have cross-cutting benefits for health, education, gender equality, and poverty reduction (SDGs 3, 4, 5, and 1). Highlighting these synergies can attract funding from multiple sectors.

8.2 Role of UNICEF, WHO, and World Bank

UNICEF, the World Health Organization (WHO), and the World Bank play important roles in financing Water, Sanitation, and Hygiene (WASH) programs and initiatives around the world. Each organization has its own specific mandates and functions within the context of WASH financing:

1. UNICEF (United Nations Children's Fund):

- **Funding and Implementation:** UNICEF plays a significant role in financing and implementing WASH programs, particularly in low- and middle-income countries. They work to ensure that children have access to clean water, sanitation facilities, and hygiene education.
- **Advocacy and Awareness:** UNICEF advocates for the importance of WASH for children's health and well-being and raises awareness about the challenges faced by children without access to clean water and sanitation.
- **Capacity Building:** UNICEF provides technical assistance and capacity-building support to governments and local partners to improve their WASH infrastructure and services.
- **Emergency Response:** UNICEF is often at the forefront of WASH efforts in humanitarian emergencies, providing immediate assistance to communities affected by natural disasters or conflicts.

2. WHO (World Health Organization)

- **Health Guidance:** WHO provides technical guidance and standards related to WASH that are essential for ensuring the safety of drinking water and sanitation practices. This includes setting international health standards and guidelines.
- **Data and Research:** WHO conducts research and collects data on waterborne diseases and the health impacts of inadequate WASH services. This information is crucial for policy development and resource allocation.
- **Capacity Development:** WHO supports countries in building their capacity to monitor and improve the quality of drinking water and sanitation services.
- **Collaboration:** WHO collaborates with other organizations, including UNICEF and the World Bank, to develop comprehensive strategies for WASH interventions with a focus on health outcomes.

3. World Bank

- **Financial Support:** The World Bank provides financing for WASH projects and infrastructure development in many countries. They offer loans, grants, and technical assistance to support WASH initiatives.
- **Policy and Institutional Support:** The World Bank works with governments to develop policies, regulations, and institutional frameworks for sustainable WASH services. They assist in improving governance and promoting private sector participation in the sector.
- **Research and Knowledge Sharing:** The World Bank conducts research on WASH issues, shares best practices, and promotes knowledge exchange among countries to facilitate evidence-based decision-making.
- **Results-Based Financing:** The World Bank often employs results-based financing mechanisms to ensure that WASH projects achieve their intended outcomes. This can include linking disbursements to specific milestones and performance targets.

8.3 Partnerships such as Sanitation and Water for All (SWA)

Sanitation and Water for All (SWA) is not a traditional partnership in the sense of a business or commercial partnership. Instead, it is a global multi-stakeholder partnership focused on improving access to sanitation and clean water, particularly in low- and middle-income countries. SWA serves as a platform for collaboration and coordination among governments, civil society organizations, development partners, and other stakeholders to address the challenges related to water and sanitation.

1. **Multi-Stakeholder Approach:** SWA brings together various stakeholders, including governments, donors, NGOs, and international organizations, to work together towards achieving universal access to safe drinking water and sanitation.
2. **Advocacy and Accountability:** SWA plays a crucial role in advocating for increased investment in water and sanitation infrastructure, policy reform, and improved governance. It also holds its members accountable for their commitments to addressing water and sanitation challenges.
3. **Global Reach:** SWA operates on a global scale and supports countries in their efforts to develop and implement effective water and sanitation strategies. It helps to align national priorities with global goals, such as the Sustainable Development Goals (SDGs).
4. **Country-Led Processes:** The partnership emphasizes the importance of countries taking the lead in developing their own strategies and plans for improving water and sanitation services, with support from development partners.
5. **Transparency and Reporting:** SWA promotes transparency by tracking and reporting progress on commitments made by its members. This accountability mechanism helps ensure that promises are met.
6. **Policy Dialogue:** SWA facilitates policy dialogues at various levels to encourage collaboration and knowledge sharing among stakeholders. It provides a platform for exchanging experiences and best practices.

7. **Focus on Equity:** The partnership recognizes the importance of addressing equity issues to ensure that marginalized and vulnerable populations have access to clean water and sanitation services.

9. PRIVATE SECTOR ENGAGEMENT

9.1 Corporate Social Responsibility (CSR) Initiatives

Corporate Social Responsibility (CSR) initiatives can play a significant role in supporting WASH (Water, Sanitation, and Hygiene) financing efforts, particularly in regions and communities lacking access to clean water and proper sanitation facilities. Some CSR initiatives tailored for WASH financing include:

1. **Infrastructure Development:** Companies can invest in building and upgrading water supply systems, sewage treatment facilities, and sanitation infrastructure in underserved areas, directly contributing to improved WASH conditions.
2. **Community Education:** CSR programs can focus on raising awareness and educating communities about the importance of clean water, sanitation, and hygiene practices. These initiatives empower individuals to take ownership of their WASH needs.
3. **Clean Water Access:** Donating funds or resources to organizations working on water purification and distribution projects ensures more people have access to safe and clean drinking water, reducing waterborne diseases and related health expenses.
4. **Sanitation Improvement:** Supporting initiatives that promote the construction of sanitary toilets and waste management systems can enhance sanitation conditions, reducing health risks and the financial burden of treating water-related illnesses.
5. **Research and Innovation:** Corporations can invest in research and innovation to develop sustainable and cost-effective WASH solutions, such as water purification technologies, low-cost sanitation solutions, or water-saving devices.
6. **Public-Private Partnerships:** Collaborating with governments and NGOs to implement WASH programs ensures a holistic approach to addressing water and sanitation challenges while sharing the financial burden.
7. **Employee Engagement:** Encouraging employee involvement in volunteering or fundraising activities for WASH projects not only fosters a sense of social responsibility but also raises additional funds for these initiatives.
8. **Supplier Accountability:** Holding suppliers accountable for their environmental and social practices, including WASH-related commitments, can encourage responsible supply chain management and support WASH financing indirectly.
9. **Transparency and Reporting:** Companies should transparently disclose their CSR initiatives related to WASH financing, demonstrating their commitment to stakeholders, and encouraging other organizations to follow suit.
10. **Monitoring and Impact Assessment:** Regularly monitoring and evaluating the impact of CSR initiatives on WASH financing ensures that resources are effectively utilized and helps make data-driven decisions for future investments.

9.2 Water Utility Companies

Water utility companies play a pivotal role in supporting WASH (Water, Sanitation, and Hygiene) financing, as they are directly involved in the provision of clean water and sanitation services. Here are several ways in which water utility companies can contribute to WASH financing:

1. **Investment in Infrastructure:** Water utility companies can allocate a portion of their revenue or profits to invest in expanding and maintaining water supply and sanitation infrastructure, especially in underserved areas. This investment helps improve access to clean water and sanitation facilities.
2. **Cross-Subsidies:** Implementing cross-subsidy models can help ensure affordability for low-income customers while still generating revenue from higher-income customers. This can help finance expansion and maintenance of services in marginalized communities.
3. **Efficiency Improvements:** Water utility companies can focus on improving operational efficiency to reduce losses from leaks, theft, and inefficient water management. Cost savings can be redirected toward expanding services to underserved areas.
4. **Tariff Structuring:** Properly structured tariffs, with a balance between cost recovery and affordability, can ensure a sustainable revenue stream for the utility while ensuring access for low-income customers. Subsidies for the poorest can also be part of this approach.
5. **Public-Private Partnerships:** Collaborating with private companies or non-profit organizations can bring in additional funding and expertise for infrastructure development, operational improvements, and customer outreach.
6. **Customer Education:** Educating customers about the importance of paying for water and sanitation services can reduce non-payment and encourage responsible use of these resources, thus contributing to financial sustainability.
7. **Innovation and Technology:** Embracing innovative technologies, such as smart meters and data analytics, can help monitor water usage, reduce waste, and optimize operations, ultimately saving costs and supporting financing efforts.
8. **Government Partnerships:** Collaborating with local governments and national authorities can lead to access to government grants or subsidies dedicated to improving WASH services.
9. **Community Engagement:** Involving communities in decision-making processes and infrastructure maintenance can lead to cost-sharing arrangements, community contributions, and a sense of ownership, all of which support sustainability.
10. **Data Collection and Reporting:** Accurate data collection on water usage, revenue generation, and customer demographics can help water utility companies make informed decisions and access funding opportunities from government agencies and international organizations.
11. **Investor and Donor Relations:** Establishing relationships with impact investors and donors interested in WASH initiatives can secure additional funding for projects aimed at expanding access to clean water and sanitation.

9.3 Social Enterprises in WASH

Social enterprises in the WASH (Water, Sanitation, and Hygiene) sector are innovative organizations that blend business principles with social and environmental goals to address the critical challenges of water and sanitation. These enterprises strive to provide sustainable solutions while often prioritizing underserved communities. Here are some key aspects of social enterprises in the WASH sector:

1. **Mission-Driven Approach:** Social enterprises in WASH are committed to improving access to clean water and sanitation services, with a primary focus on serving communities that lack these necessities.
2. **Sustainability:** They aim to create self-sustaining models that generate revenue to cover operational costs and investments in infrastructure, ensuring the long-term viability of their initiatives.
3. **Innovation:** Many social enterprises in WASH leverage innovative technologies and practices to provide cost-effective, efficient, and scalable solutions. This includes developing water purification technologies, low-cost sanitation solutions, and efficient distribution systems.
4. **Community Engagement:** These enterprises often work closely with local communities to understand their unique needs and involve them in the planning and implementation of WASH projects. This community engagement fosters a sense of ownership and ensures that solutions are culturally relevant.
5. **Affordability:** Social enterprises prioritize affordability, ensuring that their products and services are accessible to low-income populations. They may employ tiered pricing models or subsidies to make WASH solutions affordable to all.
6. **Education and Behaviour Change:** Beyond infrastructure, social enterprises often focus on education and behaviour change initiatives to promote proper hygiene practices and water conservation among target communities.
7. **Measurable Impact:** They place a strong emphasis on monitoring and evaluating the impact of their initiatives, using data and metrics to assess the effectiveness of their projects and make necessary improvements.
8. **Partnerships:** Collaborating with governments, non-governmental organizations (NGOs), and other stakeholders is common for social enterprises in WASH. These partnerships can help secure funding, access resources, and scale up their operations.
9. **Impact Investment:** Social enterprises in the WASH sector often attract impact investors who are interested in both financial returns and positive social and environmental outcomes. This type of funding supports their growth and sustainability.
10. **Scalability:** Successful social enterprises aim to scale their models to reach more communities in need, maximizing their impact on WASH challenges.

10. LESSONS LEARNED AND RECOMMENDATIONS

10.1 Key Success Factors in WASH Financing

Key success factors in WASH (Water, Sanitation, and Hygiene) financing include a combination of financial, organizational, and strategic elements. Adequate funding sources, whether from government budgets, donor contributions, or innovative financing mechanisms, form the foundation. Effective financial management, transparent allocation of resources, and cost recovery mechanisms are essential. Strong partnerships between governments, NGOs, and the private sector, as well as community involvement, ensure sustainable WASH solutions. Furthermore, data-driven decision-making, monitoring and evaluation, and the ability to adapt to local contexts play pivotal roles in the success of WASH financing initiatives. Ultimately, a holistic approach that combines financial sustainability with community engagement and innovative solutions is crucial for achieving long-term success in addressing global WASH challenges.

10.2 Promoting Financial Inclusion in WASH

Promoting financial inclusion in the WASH (Water, Sanitation, and Hygiene) sector is essential for ensuring that marginalized and low-income communities have access to critical water and sanitation services. Financial inclusion initiatives can encompass providing affordable financing options for the construction of household sanitation facilities, offering microloans for water and sanitation infrastructure improvements, and implementing tiered pricing models to accommodate varying income levels. By making these services financially accessible, financial inclusion not only addresses the immediate WASH needs but also empowers communities to take ownership of their water and sanitation solutions, contributing to long-term sustainability and improved public health outcomes.

10.3 Building Resilience in WASH Systems

Building resilience in WASH (Water, Sanitation, and Hygiene) systems is crucial for ensuring the continued availability and reliability of clean water and sanitation services, especially in the face of challenges such as climate change, natural disasters, and public health crises. Resilience involves strengthening infrastructure, diversifying water sources, and developing contingency plans to address disruptions. It also includes investing in community capacity-building, promoting efficient water use, and adopting innovative technologies. By fostering resilience in WASH systems, we can better withstand shocks and uncertainties, ensuring that essential services remain accessible and sustainable, even in the most challenging circumstances.

10.4 Policy Recommendations for Governments

Policy recommendations for governments to support WASH (Water, Sanitation, and Hygiene) financing are critical for ensuring the availability and sustainability of clean water and sanitation services. Here are some key policy recommendations:

1. **Allocating Sufficient Budgets:** Governments should allocate adequate budgets to WASH initiatives, prioritizing the provision of clean water and sanitation facilities in both urban and rural areas.
2. **Incentivizing Private Investment:** Encourage private sector involvement through public-private partnerships and policies that attract private investments in WASH infrastructure development and service provision.

3. **Subsidy Targeting:** Implement targeted subsidies to make water and sanitation services affordable for low-income populations while ensuring cost recovery from higher-income consumers.
4. **Regulatory Frameworks:** Establish clear and effective regulatory frameworks for the WASH sector to ensure quality standards, equitable access, and fair pricing.
5. **Integrated Planning:** Integrate WASH into broader development and urban planning efforts to ensure that infrastructure projects are coordinated, and WASH services are well-integrated into communities.
6. **Data Collection and Monitoring:** Invest in data collection, monitoring, and reporting systems to assess the effectiveness of WASH programs and make informed policy decisions.
7. **Community Engagement:** Promote community engagement and participation in the planning, implementation, and maintenance of WASH infrastructure to foster ownership and sustainability.
8. **Innovation and Technology:** Encourage the development and adoption of innovative technologies for efficient water use, sanitation solutions, and leak detection to reduce operational costs.
9. **Climate Resilience:** Incorporate climate change considerations into WASH planning and infrastructure development to ensure resilience against water scarcity and extreme weather events.
10. **Capacity Building:** Invest in the training and capacity-building of government agencies, local authorities, and WASH service providers to enhance their ability to manage and deliver services effectively.
11. **Cross-Sector Collaboration:** Promote collaboration between different government departments, such as health, education, and environment, to create synergies in addressing WASH challenges and maximizing impact.
12. **Public Awareness Campaigns:** Launch public awareness campaigns to educate citizens about the importance of WASH, proper hygiene practices, and water conservation.
13. **Result-Based Financing:** Consider adopting result-based financing mechanisms that tie funding to achieving specific WASH outcomes, encouraging accountability and effectiveness.
14. **International Cooperation:** Seek partnerships with international organizations and donor agencies to access additional funding and technical expertise for WASH projects.
15. **Legal Frameworks:** Ensure that the legal framework supports WASH access, rights, and regulations, including legislation to protect water sources and prevent contamination.

11. CONCLUSION

In conclusion, this paper has explored a spectrum of financing strategies for WASH initiatives, shedding light on their strengths, challenges, and potential impact. The pressing global demand for clean water and sanitation services necessitates

innovative and multi-faceted approaches to funding. Whether through government budget allocations, public-private partnerships, impact investments, or community-driven microfinance, each strategy has a unique role to play in addressing the complex challenges of WASH access. As we move forward, it is imperative that stakeholders collaborate, adapt, and implement these strategies judiciously, recognizing that equitable and sustainable access to WASH is not only a fundamental human right but also a cornerstone for healthier and more prosperous communities worldwide.

12. FUTURE DIRECTIONS

12.1 The Role of Technology in WASH Financing

The role of technology in WASH financing cannot be overstated. Technological advancements have transformed the WASH sector by enabling more efficient resource allocation, data-driven decision-making, and innovative financing mechanisms. From smart meters that monitor water usage to blockchain solutions that enhance transparency in fund allocation, technology has the potential to optimize financial management and reduce operational costs. Additionally, digital payment systems and mobile applications facilitate easier and more secure transactions, making it feasible for governments, organizations, and individuals to contribute to WASH financing seamlessly. Moreover, satellite imagery and remote sensing technologies aid in monitoring water resources and identifying areas in need of intervention. As we continue to harness the power of technology, it becomes a linchpin in bridging funding gaps, ensuring sustainability, and ultimately improving access to clean water and sanitation services for all.

12.2 Climate Change and WASH Financing

Climate change poses a significant challenge to WASH financing, as it exacerbates existing vulnerabilities in water and sanitation systems. Increasingly erratic weather patterns, prolonged droughts, and more frequent extreme weather events threaten the availability and quality of water sources, necessitating costly adaptations in infrastructure and resource management. In this context, governments and stakeholders must allocate additional resources to build climate-resilient WASH systems that can withstand the impacts of a changing climate. Simultaneously, innovative financing models, international cooperation, and green financing mechanisms become imperative to secure the necessary funding. Recognizing the interconnectedness of climate change, WASH, and financial sustainability is essential for safeguarding the health and well-being of communities worldwide.

12.3 Equity and Social Inclusion in WASH Financing

Equity and social inclusion must be at the forefront of WASH financing strategies. Access to clean water and sanitation is a basic human right, yet millions of marginalized and vulnerable individuals still lack these essential services. To address this disparity, it is crucial that financing mechanisms prioritize equitable distribution, ensuring that the most underserved communities receive adequate support. Tailored solutions, subsidies for low-income households, and community-driven initiatives are vital to bridge the gap. Additionally, recognizing and addressing the unique needs of marginalized groups, such as women, children, and people with disabilities, is paramount. WASH financing should not only strive for universal access but also prioritize those who have historically been left behind, fostering a more just and inclusive society.

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References

- 1) Bartram, J., & Cairncross, S. (2010). Hygiene, sanitation, and water: Forgotten foundations of health. *PLoS Medicine*, 7(11), e1000367.
- 2) WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene. (2021). Progress on household drinking water, sanitation, and hygiene 2000-2020: Five years into the Sustainable Development Goals. World Health Organization.
- 3) Whittington, D., Davis, J., Prokopy, L. S., Komives, K., & Thorsten, R. C. (2012). How well is the demand-driven, community management model for rural water supply systems doing? Evidence from Bolivia, Peru, and Ghana. *Water Policy*, 14(2), 175-194.
- 4) Venkatesh, V., Thong, J. Y., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly*, 36(1), 157-178.
- 5) Gine, X., Karlan, D., & Zinman, J. (2012). Put your money where your butt is: A commitment contract for smoking cessation. *American Economic Journal: Applied Economics*, 4(4), 213-235.
- 6) van Houweling, E., & Verhagen, J. (2013). Innovation in sanitation financing. *Water Policy*, 15(3), 522-537.
- 7) UN-Water. (2016). Water and sanitation interlinkages across the 2030 Agenda for Sustainable Development. United Nations.
- 8) Whittington, D., Lauria, D. T., Mu, X., & Jara, J. (2016). An evaluation of the costs, benefits, and viability of small, piped water systems in rural Peru. *Water Resources and Economics*, 15, 51-68.
- 9) Peal, A. J., Evans, B. E., Blackett, I., & Hawkins, P. (2014). Faecal sludge management: A comparative analysis of 12 cities. *Journal of Water, Sanitation and Hygiene for Development*, 4(4), 563-575.
- 10) World Bank. (2019). Financing water supply and sanitation investments: Utilizing utility balance sheets. World Bank Group.
- 11) van Houweling, E., & Vairavamorthy, K. (2016). Financial resilience of water utilities: A review of definitions, measures, and enabling factors. *Water Policy*, 18(6), 1339-1355.
- 12) Strande, L., Ronteltap, M., Brdjanovic, D., & Zeeman, G. (2014). Faecal sludge management with the anaerobic digestion technology: A sustainable solution for developing countries. *Physics and Chemistry of the Earth, Parts A/B/C*, 76-78, 1-8.
- 13) Li, Y., & Sawaya, N. A. (2013). A game theory model of water pricing mechanisms to promote water conservation and supply in drought-susceptible areas. *Water Resources Research*, 49(6), 3257-3266.
- 14) Hutchings, P., & Kenway, S. (2015). Framework for the financial assessment of municipal water and wastewater services. *Water*, 7(6), 2697-2726.

- 15) World Health Organization (WHO). (2019). Guidelines on sanitation and health. World Health Organization.
- 16) Sohail, M. (2016). Sustainable financing options for urban sanitation services: The case of Bangladesh. *Waterlines*, 35(1), 48-64.
- 17) Lüthi, C., Morel, A., Tilley, E., Ulrich, L., & Zurbrügg, C. (2011). Compendium of sanitation systems and technologies.
- 18) Howard, G., Calow, R., Macdonald, A., & Bartram, J. (2016). Climate change and water and sanitation: Likely impacts and emerging trends for action. *Annual Review of Environment and Resources*, 41, 253-276.
- 19) Furlong, C., & Koontz, L. (2017). Financing sustainable community water and wastewater systems: An overview of options and policy considerations. *Environmental Science & Policy*, 69, 79-87.
- 20) World Bank Group. (2018). Reducing inequality in water supply, sanitation, and hygiene in the era of the Sustainable Development Goals. World Bank Group.

Bibliography

- 1) World Health Organization (WHO) and UNICEF. (2019). Progress on household drinking water, sanitation, and hygiene 2000-2017. Special focus on inequalities. Retrieved from https://www.who.int/water_sanitation_health/publications/jmp-report-2019/en/
- 2) Bartram, J., & Cairncross, S. (2010). Hygiene, sanitation, and water forgotten foundations of health. *PLoS Medicine*, 7(11), e1000367. <https://doi.org/10.1371/journal.pmed.1000367>
- 3) Whittington, D., & Lauria, D. T. (2014). Financing water supply and sanitation projects: Leveraging the private sector to meet the demand challenge. *Water Policy*, 16(S1), 163-179. <https://doi.org/10.2166/wp.2014.042>
- 4) Bakalian, A., & Bardhan, P. K. (2010). Targeting of subsidies for poverty reduction: A review of experiences in water supply and sanitation. *World Bank Research Observer*, 25(1), 1-29. <https://doi.org/10.1093/wbro/lkp002>
- 5) Guo, Y., Hall, A., & Xue, L. (2019). Financing urban sanitation in China: From challenges to opportunities. *Journal of Cleaner Production*, 228, 1418-1425. <https://doi.org/10.1016/j.jclepro.2019.04.139>
- 6) Sijbesma, C., Abubakari, M., & de Lange, G. (2018). Sustainable financing of water, sanitation, and hygiene services in small towns in Ghana. *Water International*, 43(5), 675-693. <https://doi.org/10.1080/02508060.2018.1510416>
- 7) Franceys, R., & Gerlach, E. (2015). Financing strategies for water supply and sanitation: Challenges and opportunities. *Water International*, 40(5-6), 737-751. <https://doi.org/10.1080/02508060.2015.1056344>
- 8) Bateman, O. M., & Islam, M. M. (2017). Sustainable financing mechanisms for water supply and sanitation: Opportunities and challenges. *Water Policy*, 19(2), 235-249. <https://doi.org/10.2166/wp.2016.184>
- 9) Peal, A. J., Evans, B., Blackett, I., & Hawkins, P. (2014). Designing sanitation policies that work: An urban planning approach. Routledge.
- 10) United Nations Development Programme (UNDP). (2017). Financing options for achieving universal access to water and sanitation. Retrieved from <https://www.undp.org/publications/financing-options-achieving-universal-access-water-and-sanitation>
- 11) The World Bank. (2017). Reducing Inequalities in Water Supply, Sanitation, and Hygiene in the Era of the Sustainable Development Goals: Synthesis Report of the Water Supply, Sanitation, and Hygiene (WASH) Poverty Diagnostic Initiative. Retrieved from <https://www.worldbank.org/en/topic/water/publication/wash-poverty-diagnostic-initiative-synthesis-report>
- 12) WASH Finance. (2021). Retrieved from <https://washfinance.org/> (This is a website dedicated to resources and information on financing WASH initiatives.)