

## Original Article

# Public–Private Partnerships in Water Management: A Sustainable Business Model for Achieving SDG 6

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## Abstract

One of the most important development concerns of the twenty-first century is the worldwide task of guaranteeing universal access to clean water and sanitation, which is embodied in the Sustainable Development Goal 6 (SDG 6) of the UN. The demand on current infrastructure is further increased by population growth, urbanization, and climate change, and billions of people still lack access to appropriately managed water and sanitation services. A comprehensive strategy that incorporates institutional reform, financial sustainability, and technological innovation is needed to achieve SDG 6. In this regard, Public-Private Partnerships (PPPs) have become a viable option for increasing efficiency, guaranteeing accountability, and mobilizing resources in water management. PPPs are examined in this article as a viable business strategy for accomplishing SDG 6. It looks into how PPPs might help provide water and sanitation services by combining the advantages of both industries: the capital, technology, and managerial effectiveness of the private sector with the social responsibility and regulatory power of the public sector. In order to assess the advantages and difficulties of PPP implementation, the study synthesizes a large body of literature, institutional reports, and case studies, with a special emphasis on experiences in Asia, Latin America, and Africa. According to the report, PPPs can support SDG 6 by improving risk distribution, increasing investment flows, improving operational efficiency, and fostering innovation in service delivery. Nevertheless, PPP success is not assured. Numerous initiatives encounter obstacles include inadequate governance frameworks, subpar contract design, a dearth of regulatory supervision, problems with affordability, and opposition from the community. PPPs must preserve environmental sustainability through prudent water management, guarantee financial viability without sacrificing affordability, and advance social fairness by guaranteeing access for underserved groups in order to be a truly sustainable model. For sustainable PPPs in water management, this study suggests a four-pillar framework: (1) operational and financial efficiency; (2) environmental sustainability; (3) social inclusivity; and (4) institutional accountability. Research shows that PPPs perform best when they are incorporated into strong legal frameworks, backed by open procurement procedures, and overseen by impartial regulatory bodies. Furthermore, maintaining fairness requires combining public and private funding as well as pro-poor policies like targeted subsidies and lifeline tariffs. In the end, the article makes the case that PPPs are a strategic tool in an integrated water governance approach rather than a panacea. They are essential to the global endeavor to accomplish SDG 6 because, when properly planned and executed, they can close the funding gap, improve resilience, and spur innovation.

## Keywords

Infrastructure Development, Social Equity, Sustainable Business Models, Sustainable Development Goal 6 (SDG 6), Water Governance, Sustainability, Blended Finance, Public-Private Partnerships (PPPs), and Water Management

## INTRODUCTION

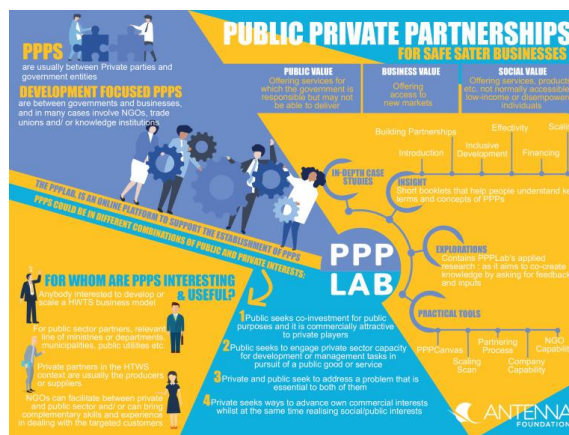
One of the most important human rights is the availability of clean water and proper sanitation, which is also essential to sustainable development. It supports environmental integrity, economic productivity, food security, and public health. However, global water security is still under jeopardy despite tremendous advancements in recent decades. The United Nations estimates that more than four billion people lack access to securely managed sanitation services, and more than two billion people lack access to safely managed drinking water. Ecological stability and human well-being are still under risk due to water scarcity, pollution, and poor distribution. Ensuring universal access to water and sanitation has emerged as a key concern of our time due to rising demand brought on by population expansion, industrialization, and climatic unpredictability. As part of the 2030 Agenda for Sustainable Development, the UN created Sustainable Development Goal 6 (SDG 6) to address this issue: "Ensure availability and sustainable management of water and sanitation for all." Achieving fair access to clean water, enhancing water quality, and encouraging effective water use in all sectors are the goals of SDG 6. However, reaching these lofty goals calls for significant financial investment, structural innovation in the delivery of water services, and political



commitment. According to World Bank estimates, low- and middle-income countries need to more than triple their present yearly investments on water supply and sanitation in order to reach SDG 6 commitments.

This burden cannot be borne by governments alone. Their capacity to maintain service quality and grow infrastructure is hampered by governance issues, public utility inefficiencies, and budgetary restrictions. As a result, a lot of nations are looking to Public-Private Partnerships (PPPs) to close funding gaps and improve service effectiveness. PPPs are contractual agreements whereby governments and private organizations work together to plan, fund, construct, run, or maintain service and infrastructure systems. PPPs seek to integrate the efficiency, creativity, and investment potential of the private sector with the social responsibility and regulatory mission of the public sector in the context of water management.

PPPs in water management are justified by the use of competitive advantages. Modern technologies, performance-oriented management, and financial resources that governments might not have are frequently introduced by the private sector. In turn, the public sector makes sure that services continue to be affordable, equitable, and in line with the objectives of national policy. PPPs that are properly designed can thus encourage long-term sustainability by coordinating financial rewards with social and environmental results. PPPs in the water industry, however, have produced heated discussion and conflicting outcomes worldwide. PPPs have increased access to low-income populations, decreased non-revenue water, and enhanced efficiency in a number of cities, including Manila, Phnom Penh, and sections of Latin America. In other cases, however, tariff disputes, unfair treatment, and even contract terminations have resulted from badly drafted contracts and insufficient regulation. Opponents contend that privatizing water services runs the potential of commodifying a fundamental human need, which would result in inequality and social isolation. On the other hand, proponents stress that PPPs can expedite the attainment of SDG 6 and support public policy goals when appropriately regulated.



**Figure 1: Public-Private Partnerships in Water Management: A Sustainable Business Model for Achieving SDG 6**

PPPs are particularly difficult because of the complexity of water as an economic and social good. Water supply services have to strike a compromise between cost recovery and universal access, unlike telecoms or electricity. There are political and moral considerations in water pricing; if it is too low, utilities cannot make ends meet; if it is too costly, impoverished households are left out. PPPs must so function within a governance structure that promotes operational excellence and protects equity. Clear contract design, open regulation, efficient oversight, and stakeholder participation at all levels are necessary for this. International agencies including the World Bank, OECD, and UN-Water have stressed in recent years that PPPs should be seen as a component of a larger plan for reforming water administration rather than as a goal unto themselves. To guarantee long-term sustainability, they support integrated strategies that incorporate community involvement, business investment, and governmental funding. This entails creating performance-based contractual structures that incentivize efficiency and service quality, integrating environmental protections, and promoting innovation through smart technology (such as digital metering and water analytics).

PPPs have potential that goes beyond funding and service provision. PPPs have the potential to boost climate resilience, encourage technological innovation, and develop public institutions' ability when strategically applied. PPPs that use renewable energy for water treatment, wastewater recycling, or intelligent leak detection technology, for example, support resource efficiency and environmental sustainability. Additionally, they can promote information sharing and workforce development locally, enhancing institutional capacity for governance in the future. However, achieving these advantages necessitates a sustainable company plan that incorporates social inclusion, environmental responsibility, and financial viability. While a welfare-driven model might not be financially sustainable, a profit-driven PPP runs the risk of compromising equity. The key to striking a balance is to

design collaborations that use precisely calibrated contracts, regulatory frameworks, and open accountability systems to match corporate incentives with public goals.

Therefore, the main research question this study aims to address is: Can Public-Private Partnerships be a sustainable business model for accomplishing SDG 6? The study uses a mixed-method approach that combines institutional analysis, comparative case evaluation, and literature synthesis to address this. There are three goals:

- To evaluate current PPP experiences in the water sector critically in a variety of socioeconomic and geographic circumstances.
- To create a conceptual framework that connects the financial, social, and environmental sustainability aspects of SDG 6 to PPP success.
- To offer evidence-based policy suggestions for PPP management and design that promote resilient, sustainable, and equitable water systems.

By doing this, this article adds to the current policy discussion about finance and governance of sustainable infrastructure. It makes the case that although PPPs are not a panacea, they do have a lot of promise when used in conjunction with other strategies. PPPs may be an incredibly powerful tool for accomplishing SDG 6 and creating sustainable water futures if they are enshrined in strong legal frameworks, backed by open institutions, and directed by the values of accountability and inclusion.

## **LITERATURE REVIEW AND THEORETICAL FRAMEWORK**

Debates over governance and financing methods have changed as a result of the increasing acknowledgement of water as a public benefit and an economic asset. Due to financial constraints, technical inefficiencies, and governance deficiencies, traditional public-sector management has frequently struggled to provide effective, equitable, and sustainable water services (Bakker, 2010). As a result, PPPs, or public-private partnerships, have become more well-known as substitute mechanisms that combine efficiency from the private sector with public control. The theoretical foundations, empirical data, and developing policy frameworks around PPPs in water management are examined in this literature review, with an emphasis on how they contribute to the achievement of Sustainable Development Goal 6 (SDG 6)—universal access to clean water and sanitation.

### **A. Developing PPPs in the Water Industry**

PPP is contractual agreements that share responsibility for infrastructure finance, development, operation, and maintenance, allowing the private sector to engage in the delivery of public services (Grimsey & Lewis, 2004). PPPs maintain public ownership while assigning operational or investment responsibilities to private organizations, in contrast to pure privatization. This covers formats including concessions, lease or affermage contracts, management contracts, build-operate-transfer (BOT) agreements, and joint ventures in the water sector (Marin, 2009). The World Bank (2017) asserts that PPPs are designed to increase efficiency and cost-effectiveness by distributing risks to the party most qualified to handle them. Similar to this, the OECD (2022) stresses that PPPs should match commercial incentives with public policy objectives, making sure that affordability or access are not jeopardized by financial viability. The main justification is to use private funding and technical know-how to supplement governmental resources, particularly in developing nations with inadequate infrastructure.

### **B. PPPs and Goal 6 of the Sustainable Development Agenda**

SDG 6 is crucial for maintaining ecosystems, human health, and economic stability, according to the UN (2023). It emphasizes how annual investments of more than \$100 billion are needed to achieve universal water access, which is well above what the public can now afford. PPPs are being seen more and more as tools to close this investment gap and advance sustainable management techniques (OECD, 2020). However, accomplishing SDG 6 through PPPs requires balancing three goals: social inclusion, environmental preservation, and financial sustainability. Hodge and Greve (2017) assert that governance frameworks that strike a balance between efficiency improvements and social responsibility are essential to PPP success. By enhancing service quality, cutting non-revenue water, increasing coverage, and using cutting-edge technology like smart metering and leak detection, PPPs can effectively advance SDG 6 (Marin, 2009; World Bank, 2020). However, caution is also emphasized in the literature. PPPs run the potential of weakening equity if business goals take precedence over social goals. Research on water concessions in Jakarta, Dar es Salaam, and Buenos Aires shows that poorly managed PPPs can result in service disparities, tariff increases, and public outrage (Hall, Lobina, & Motte, 2015). Therefore, institutional architecture, regulatory monitoring, and contractual integrity are more important for achieving SDG 6 than the PPP model itself.

### **C. Perspectives on Economics and Governance**

Economically speaking, PPPs are made to maximize efficiency through private management experience, competitive bidding, and lifecycle cost optimization (Engel, Fischer, & Galetovic, 2014). PPPs have enhanced water continuity and decreased operational inefficiencies, according to empirical data from cities like Manila and Phnom Penh (World Bank, 2020). For example, Manila Water used performance-based management and focused

infrastructure investment to reduce non-revenue water from over 60% to less than 12% in under ten years (Shirley & Menard, 2002). PPPs do, however, also have long-term contractual rigidities and significant transaction costs (Hodge, 2018). Failures may result from inadequate stakeholder participation, regulatory capacity, or feasibility assessments. The Cochabamba (Bolivia) water concession's termination in 2000, for instance, after massive demonstrations against price hikes, highlights the significance of affordability protections and public legitimacy (Bakker, 2010). These examples show that when it comes to deciding PPP outcomes, governance quality is just as important as financial design.

PPPs question established lines between the state and the market from the perspective of governance. They require independent regulation, stakeholder participation, and transparent procurement (Koppenjan & Enserink, 2009). According to the literature, "institutional readiness" is a requirement since PPPs can worsen inequality or corruption in the absence of clear regulations, accountability systems, and competent regulators (Yescombe, 2014). To guarantee accountability and sustainability, PPP frameworks must incorporate social safeguards, environmental requirements, and performance measures.

#### **D. Environmental and Social Aspects**

Beyond economics, social justice and environmental sustainability are also aspects of water governance. Vulnerable communities run the danger of being excluded from PPPs that neglect affordability. Water is a human right, according to academics like Hall and Lobina (2012), and privatized models need to have pro-poor features like cross-subsidization plans, targeted subsidies, or lifeline rates. Accessibility and safety must not be sacrificed for financial sustainability, according to the World Health Organization (WHO, 2022). Ecosystem preservation and climate resilience should be incorporated into sustainable PPPs from an environmental perspective. PPP contracts should incorporate resource efficiency, wastewater recycling, and circular economy principles, according to the OECD (2020) and UNESCO (2023). Examples include wastewater reuse projects that reduce the extraction of freshwater or PPP-led desalination plants that employ renewable energy. These models are in line with SDGs 13 (climate action) and 6.4 (efficient water usage).

However, in traditional PPPs, which prioritize financial rewards, environmental performance is sometimes overlooked. In order to align PPPs with global sustainability targets, it is becoming more and more clear that performance contracts must incorporate sustainability measures, such as energy consumption, water loss reduction, or greenhouse gas emissions (UNEP, 2021).

#### **E. New Developments and Trends in PPP Design**

Large-scale concessions have given way to mixed finance and performance-based models in recent policy evolution. To reduce project risk, blended finance mixes private investment, donor grants, state funds, and concessional loans (OECD, 2022). In Asia and Africa, where full-cost recovery is still politically and economically difficult, these hybrid techniques are becoming more and more common. Output-based aid (OBA), another new trend, pays private operators only when they meet predetermined service goals, including more household connections or better water quality (World Bank, 2019). In a similar vein, climate-resilient PPPs are becoming more popular. They improve water security in the face of climate unpredictability by combining green infrastructure, nature-based solutions, and adaptive management techniques (UNEP, 2021). Through smart water technologies—IoT-enabled monitoring, real-time data analytics, and AI-driven maintenance systems—digitalization further improves PPP performance by increasing transparency and efficiency (WEF, 2022). Through measurable outcomes, these innovations foster long-term sustainability and increase public trust.

#### **F. Conceptual Structure**

Based on existing research, this study evaluates PPPs' contribution to SDG 6 using a four-pillar sustainable business model framework:

- Operational and Financial Viability: guaranteeing dependable service delivery, appropriate risk sharing, and cost effectiveness.
- Stakeholder participation, affordability, and equal access are all ensured by social inclusivity.
- Integrating pollution prevention, climate adaptability, and resource efficiency is known as environmental sustainability.
- Establishing transparent governance, regulations, and performance monitoring systems is known as institutional accountability.

PPPs are positioned by this concept as institutional ecosystems rather than only financial agreements. It acknowledges that the way actors, incentives, and regulations interact over time determines sustainable results. This study attempts to ascertain whether and how PPPs may be designed to function as sustainable business models for achieving SDG 6 by assessing them using these four interrelated aspects.

## METHODOLOGY

The sustainability of Public-Private Partnerships (PPPs) in water management and their alignment with SDG 6 are investigated in this study using a mixed-methods approach that combines document synthesis, comparative case analysis, and analytical modeling.

### A. Synopsis of Papers and Literature

A comprehensive analysis of scholarly articles, agency reports, and policy documents released between 2010 and 2025 was carried out. The World Bank PPP Knowledge Lab, the OECD Water Governance Initiative assessments, the UNESCO World Water Development Reports (WWDR), and peer-reviewed publications like *Water Policy* and *Journal of Environmental Management* are examples of core sources. Studies that provided quantitative performance evaluations, governance frameworks, and institutional assessments of PPPs were given priority in the study. The World Bank (2023) and UNESCO (2022) studies provided fundamental insights that were utilized to conceptualize best practices in sustainable water management partnerships and to support empirical arguments.

### B. Comparative Case Analysis

Three case studies representing various PPP outcomes and institutional environments were chosen for comparison:

- Manila, Philippines: An example of a successful dual PPP concession arrangement in terms of operational efficiency and service development.
- Brazil's sanitation reforms provide as an example of how legislative frameworks and regulatory changes support sustained PPP scaling.
- Regional experiences in Latin America: Offering international perspectives on social inclusion, tariff regulation, and service quality.
- Evaluation reports, scholarly assessments, and resources from the Global Water Partnership (gwp.org) were used to gather case data.

### C. Analytical Synthesis

Four sustainability pillars—financial and operational efficiency, environmental management, social inclusivity, and institutional accountability—were used as the basis for an analytical framework. The synthesis of findings and the formulation of policy recommendations were guided by these pillars.

### D. Limitations

Because the study uses secondary data, findings may not be as applicable in different places due to contextual differences in governance or hydrological circumstances.

Component	Data Sources / References	Analytical Purpose	Expected Output
Literature Synthesis	UNESCO (2022) <i>World Water Development Report</i> ; World Bank (2023) <i>PPP Knowledge Lab</i> ; OECD (2021) <i>Water Governance Reports</i>	Identify global PPP trends, institutional practices, and SDG 6 linkages	Conceptual grounding for sustainable PPP model
Case Study 1 – Manila, Philippines	ADB (2020); World Bank (2019); Peer-reviewed PPP assessments	Evaluate efficiency, customer satisfaction, and tariff regulation outcomes	Operational performance benchmarking
Case Study 2 – Brazil's Sanitation Law Reforms	Government of Brazil (2020); OECD (2022) Policy Review	Examine impact of legal frameworks and regulatory modernization	Governance and legal lessons
Case Study 3 – Latin America Regional Review	GWP.org (2021); Inter-American Development Bank (2020)	Assess regional PPP trends, social equity, and environmental impact	Cross-national sustainability assessment
Analytical Framework (Four-Pillar Model)	Derived from synthesized literature and case evaluations	Integrate financial, operational, environmental, and social findings	Framework for sustainable PPP business model
Validation and Limitations	Secondary data triangulation via institutional sources	Ensure reliability and identify contextual gaps	Policy implications and recommendations

## CASE STUDIES AND COMPARATIVE ANALYSIS

To achieve Sustainable Development Goal 6 (SDG 6), which is to ensure that everyone has access to and can sustainably manage water and sanitation, this section examines representative experiences with Public-Private Partnerships (PPPs) in water management.

### A. Manila Water (Philippines) — Operational Turnaround with Caveats

One of the most prominent instances of PPP success in the water industry is Manila Water, which is often mentioned. By splitting the Metropolitan Waterworks and Sewerage System (MWSS) service area into two zones— East and West—and awarding them to private concessionaires through competitive bidding, the Philippine government started a significant sector reform in 1997. Metro Manila's persistent inefficiencies, poor service coverage, and sporadic supplies were the targets of the reform. After the reform, the Manila Water Company-managed East Zone concession saw significant gains in customer satisfaction, water quality, and service continuity. Within 20 years, non-revenue water (NRW) dropped from more than 60% to less than 15%. The utility's operations were upgraded through investments in digital monitoring, metering, leakage control, and pipeline rehabilitation. Significantly more piped connections were available, which nearly matched SDG 6's goal of providing access to safe and reasonably priced drinking water.

But the Manila experience also highlights important cautions. The availability of bulk water resources, tariff adjustment procedures, and explicit concession frameworks were necessary for the success. Stability was periodically disturbed by political meddling and contract renegotiations. Furthermore, in the absence of focused pro-poor initiatives, peri-urban and informal settlements frequently continued to receive inadequate services. According to the World Bank (2019) and GWP (2021), PPP success in water distribution depends not just on operational effectiveness but also on social inclusion and ongoing regulatory control to avoid disparities in affordability and access.

### B. Latin America and Brazil — Legal Reform Enabling PPPs

PPPs in water and sanitation have long been tested in Latin America, with varying degrees of success in each nation. A number of early privatization initiatives in the 1990s faced opposition because of weak regulatory frameworks, unfair access, and tariff increases. A second wave of change, however, has attempted to strike a balance between increased institutional and social protections and corporate involvement. In this sense, Brazil's 2020 Sanitation Law (Law No. 14,026/2020) marks a significant change in policy. The law allowed municipalities and regional consortia to grant private operators long-term concessions by opening the water and sanitation industry to competitive tendering. Crucially, it precisely aligns with SDG 6 goals by requiring universal service targets by 2033. In order to unify contract performance requirements and promote blended financing models that combine public and private resources, the law also created a national regulatory framework under the National Water and Sanitation Agency (ANA).



By making risk distribution more transparent, enhancing procurement transparency, and guaranteeing accountability through quantifiable performance criteria, this change boosted investor trust, according to OECD (2022) and World Bank (2023) evaluations. Since then, the private sector has become more involved; millions of people who were previously shut out of official water networks are now covered by new PPP contracts. The main takeaway from Brazil and Latin America in general is that institutional and legal reform is frequently a need for long-term PPP success. Attracting responsible private investments while protecting public interests and accomplishing SDG 6's universal service goals requires strict regulatory oversight, transparent contract design, and explicit social inclusion demands.

### C. Failed or Problematic PPPs — Where Risks Materialize

Not all PPPs in the water industry have produced favorable outcomes, despite major achievements. Several case studies show that social resistance, inadequate regulatory ability, and badly drafted contracts can erode anticipated performance benefits. For instance, a number of PPPs in Latin America and Africa were abruptly canceled because of worries about affordability, political disagreements, or irrational revenue projections. Inadequate feasibility studies, a lack of community involvement, and a restricted ability to adjust to macroeconomic

shifts like inflation or exchange rate variations are typical risk concerns. Long-term concession agreements, which typically last 20 to 30 years, are especially susceptible to changes in political leadership that affect service standards or tariff policy. As seen in failed initiatives in Bolivia and Tanzania, public backlash can undermine trust and legitimacy when cost recovery is aggressively sought without affordability provisions.

According to assessments by the OECD (2021) and ALNAP (2022), thorough project planning, open procurement, and well specified risk-sharing procedures are necessary for PPPs to be successful. Targeted social programs, cross-subsidies, and lifeline pricing all contribute to ensuring fair access while preserving financial viability. Furthermore, the danger of contract breakdowns can be reduced by independent regulatory bodies and dispute-resolution procedures. Important lessons can be learned from these failures: PPPs must be context-specific and are not a one-size-fits-all solution. Partnerships that actually achieve SDG 6 rather than worsen inequality or financial risk must ensure institutional preparedness, preserve regulatory independence, and include social protection measures.

#### **D. Recent Trends and Innovation in PPPs for Water Security**

PPPs in water management are changing quickly on a worldwide scale to meet the interconnected problems of urbanization, climate change, and budgetary restraints. The World Bank (2023) and OECD (2022) have recorded recent developments that highlight the rise of creative PPP models that incorporate technology, sustainability, and resilience. Shorter, performance-based contracts, such management contracts and operation & maintenance (O&M) agreements, are one significant trend. These contracts tie compensation to quantifiable results like energy efficiency, service continuity, and a decrease in water loss. These approaches enable more flexibility in response to shifting circumstances and more equitable risk distribution. Another innovation is the use of blended finance structures, which combine private money, concessional loans, and state grants to make projects feasible while keeping costs down. Viability gap funding (VGF) and guarantees are being used more and more by development finance institutions (DFIs) to reduce investment risk and draw in responsible private investment. Furthermore, nature-based solutions like watershed restoration and digital water technologies like smart metering and demand management predictive analytics are being included into climate-focused PPPs.

By combining several industries—agriculture, energy, and the environment—under a single resilience framework, this evolution demonstrates a systems approach to water security. Governments can guarantee that private involvement directly supports SDG 6 and associated objectives like SDG 13 (climate action) and SDG 9 (industry, innovation, and infrastructure) by incorporating social justice and climate resilience into PPP contracts. In the end, the innovation trajectory emphasizes that PPPs are evolving into strategic tools for resilience-building and sustainable water governance rather than only being financial mechanisms.

### **FINDINGS: WHEN PPPS SUPPORT SDG 6**

According to a review of the literature and comparative case studies, when certain enabling conditions are met, Public-Private Partnerships (PPPs) can be extremely effective in achieving Sustainable Development Goal 6 (SDG 6), which is to ensure that everyone has access to and sustainably manages water and sanitation. How well governance, finance, and social inclusion mechanisms are incorporated into project design and execution is just as important to the success of PPPs in water management as the effectiveness of the private sector. When PPPs most successfully correspond with SDG 6 aims, the following six interconnected conditions are summarized.

#### **A. Strong Legal and Regulatory Structures**

Establishing strong legal and regulatory frameworks that offer clarity, accountability, and transparency is the first step towards effective PPP performance. To make sure that private involvement advances rather than impedes the public interest, strong institutions are essential. According to the OECD (2022), nations with sophisticated water governance systems—which are distinguished by autonomous regulators, open tariff-setting procedures, and well-defined performance criteria—generally attain more sustainable results. Legal authority is required for regulatory bodies or empowered municipal authorities to enforce environmental standards, keep an eye on service quality, and strike a balance between affordability and cost recovery. Contract disputes, tariff shocks, or unequal service distribution can result from a lack of such control, as the experiences of Brazil and the Philippines show. Legal modernization, on the other hand, can boost investor trust, draw in blended finance, and match PPP performance with national development targets, as demonstrated by changes such as Brazil's 2020 Sanitation Law. In addition to decreasing corruption potential and increasing efficiency, transparent and competitive procurement procedures also help to establish public trust and legitimacy, two important preconditions for the advancement of SDG 6.

#### **B. Superior Project Planning and Risk Distribution**

The success or failure of a PPP is largely determined on the caliber of project preparation. Renegotiation, cost overruns, or even project collapse are frequently caused by inadequate feasibility assessments, imprecise risk distribution, or unrealistic demand predictions. For water projects to be bankable and sustainable, thorough pre-

contract evaluations, including technical, financial, and environmental due diligence, are crucial, according to the World Bank's PPP Knowledge Lab (2023). Each party, whether public or private, is guaranteed to manage risks that they are most capable of handling when risks are allocated appropriately. For example, while governments maintain legislative, political, and macroeconomic risks, private operators may take on operational efficiency and tax collection concerns. Financial viability gaps can be closed by mechanisms like sovereign guarantees and viability gap finance (VGF), which allow socially important initiatives to draw private investment without putting consumers at unnecessary risk. The Manila instance demonstrates how well-crafted concession agreements that are founded on regular tariff adjustment clauses and reasonable performance standards may maintain long-term profitability. Conversely, unsuccessful PPPs frequently have the opposite characteristics: rigid contracts, unclear negotiation procedures, and inadequate feasibility studies. Therefore, good project planning, open bidding, and fair risk-sharing are crucial PPP pillars that support SDG 6's sustainable and equitable objectives.

### **C. Targeted Equity Subsidies and Blended Finance**

Sustainability in water PPPs must take into account social equality and universal access in addition to operational effectiveness and financial returns. Low-income and marginalized communities are frequently missed by purely commercial models. PPPs must include targeted subsidies and public funding tools that guarantee affordability without compromising economic viability in order to reduce exclusion concerns. Blended finance—the strategic use of public funding, grants, concessional loans, and private investment—can lower capital costs for vital services, according to the OECD (2021) and World Bank (2020). Governments can increase coverage in underserved areas while preserving service affordability by combining public and private funding. In order to guarantee that the idea of "water for all" stays at the heart of PPP operations, tools like lifeline tariffs, cross-subsidies, and direct subsidies to low-income homes are essential.

For example, socialized connection projects in Manila made piped water available to low-income residents in informal settlements, greatly enhancing their quality of life and health. In a similar vein, Brazil's sanitation reforms require PPP contracts to include universal service commitments, guaranteeing that private operators will extend coverage even in low-revenue areas. Thus, blended financing and pro-poor tools guarantee that PPPs fulfill the fundamental goal of SDG 6—equitable and inclusive access—while also achieving financial sustainability.

### **D. Contracting Based on Performance and Using Measurable KPIs**

One of the biggest developments in the governance of the water sector is the move to performance-based PPP contracts. Modern PPPs place more emphasis on service delivery outcomes—which are quantified by well-defined Key Performance Indicators (KPIs)—than only infrastructure development. Reductions in non-revenue water, enhancements in supply continuity, service coverage extension, customer satisfaction, and environmental standard compliance are examples of typical KPIs. Contracts that tie incentives or compensation to quantifiable results foster a culture of performance among private operators and raise public accountability. Third-party auditors or independent monitoring organizations are essential for verifying findings and guaranteeing openness. For instance, in order to improve visibility and confidence, the World Bank and OECD advise that PPP contracts incorporate comprehensive reporting procedures and easily accessible public dashboards.

The success of the concession model in Manila was largely dependent on performance goals for network growth, water quality, and leak reduction. On the other hand, unclear contracts and inadequate oversight enabled service degradation and public discontent in failed PPPs. SDG 6's quantifiable success indicators are thus directly supported by performance-based contracting, which is based on quantifiable, transparent KPIs and is a vital tool for coordinating private sector efficiency with public service outcomes.

### **E. Participation of Stakeholders and Social Safety Measures**

Another crucial requirement for long-lasting PPP results is meaningful stakeholder engagement. Due of the highly social nature of water services, ignoring community involvement can lead to resistance, mistrust, or even confrontation. According to the OECD Water Governance Initiative (2022), PPPs that are created with early and ongoing participation from consumer groups, civil society organizations, and impacted communities have a higher chance of producing results that are fair and well-received. Transparency and responsiveness are ensured by social safeguards such public consultations, grievance redress procedures, and citizen monitoring platforms. Perceptions of secrecy or isolation from decision-making processes have frequently been the root of popular opposition to privatization. Thus, maintaining legitimacy requires proactive communication regarding project goals, tariff arrangements, and social activities. The social sustainability of PPPs is further improved by acknowledging the disproportionate impact of water scarcity on women and underprivileged groups and incorporating gender-sensitive techniques. In the end, inclusive governance increases community ownership, lowers opposition, and guarantees that PPPs actually further the participation, equity, and justice tenets of SDG 6.

## F. Combining Climate Resilience with Water Resource Management

Last but not least, PPPs support SDG 6 best when included into larger frameworks for climate resilience and water resources management. Projects that prioritize water supply over source sustainability, wastewater treatment, or ecosystem health run the risk of sacrificing long-term security for short-term profits. PPPs that include energy-efficient technology, wastewater recycling, and sustainable water abstraction limitations are encouraged by the UNESCO World Water Development Report (2022). Nature-based solutions, like flood control and watershed restoration, are now being incorporated into the design and operation stages of climate-resilient PPPs. Systemic water security is also improved by cross-sectoral integration with urban planning, energy, and agriculture. PPPs can provide co-benefits, such as lowering carbon footprints, increasing resilience to floods and droughts, and boosting ecosystem services, by coordinating with national climate adaptation programs and SDG 13 (Climate Action). PPPs may effectively contribute to long-term water sustainability and resource management, which are key components of SDG 6, by integrating environmental and resilience characteristics.

## G. Synthesis

In conclusion, PPPs work best to achieve SDG 6 when they are part of ecosystems of comprehensive governance that integrate environmental stewardship, community involvement, fair finance, and strict regulation. The line separating transactional PPPs and long-term collaborations that actually provide widespread, reasonably priced, and robust water services is defined by the convergence of these six enabling circumstances.

## CONCLUSION

One of the most difficult and pressing issues facing the world today is achieving Sustainable Development Goal 6 (SDG 6), which calls for universal access to and sustainable management of water and sanitation. The results of this study show that, when planned and carried out within a strong, open, and inclusive governance framework, public-private partnerships (PPPs) can be a scalable and sustainable business model for accomplishing SDG 6. PPPs have the ability to improve service efficiency, increase coverage, and introduce cutting-edge technologies, but their success is not certain in the absence of the proper institutional conditions, as demonstrated by the comparative case studies of Manila, Brazil, and Latin America. Strong legal and regulatory frameworks, thorough project planning, fair risk distribution, blended finance mechanisms, performance-based contracting, stakeholder engagement, and integration with climate-resilient water resource management are the six enabling conditions that the study identifies as being necessary for PPPs to effectively align with SDG 6. Together, these requirements guarantee that PPPs provide long-term social, environmental, and financial sustainability in addition to immediate efficiency savings.

Additionally, the data emphasizes that PPPs are not a panacea. PPPs have the potential to increase inequality and fiscal risk in environments with inadequate regulatory monitoring or limited governance capabilities. Governments must thus take a calculated, situation-specific strategy that strikes a balance between private sector innovation and public responsibility. This entails setting up impartial oversight organizations, encouraging openness in contract administration and procurement, and guaranteeing community involvement throughout the whole project lifecycle. From a strategic perspective, PPPs provide avenues for resilience-building and technology innovation in addition to financial leverage. A move toward integrated, climate-resilient water governance is shown by the growing use of blended finance, digital water solutions, and nature-based approaches. These methods increase the impact of scarce public resources by promoting co-investment between government organizations, commercial enterprises, and development finance organizations. In the end, turning PPPs into partnerships for sustainability—where financial gains are balanced with social justice and environmental preservation—is the way to accomplish SDG 6. PPPs can change from transactional contracts into tools of transformative water governance by including the four-pillar model: institutional accountability, social inclusivity, environmental sustainability, and financial efficiency.

In summary, collaborative governance that capitalizes on the strengths of all stakeholders is more important for the future of global water management than privatization versus public control. PPPs may close the funding gap, increase resilience, and guarantee that everyone has access to clean and reasonably priced water, which is a basic human right and a pillar of sustainable development and human dignity, when they are planned with openness, inclusivity, and foresight.

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