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September 2026

Citation suggestion for this document:

Mehta, M., Yadav, U., and Mehta, D. (2026). PPPs for water and sanitation – From large to small projects. Center for Water and Sanitation, CRDF, CEPT University.
<https://cwas.org.in/cwas-resources/ppps-for-water-and-sanitation-from-large-to-small-projects>

PPPs for Water and Sanitation – From large to small projects

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PPPs for Water and Sanitation – From large to small projects

Over the past decades, there has been an increasing recognition of the need to attract private capital for water and sanitation services in developing countries. Besides capital, it is also envisaged that the private sector can bring efficiency, innovation and accountability to the delivery of public services. The Urban Challenge Fund set up by the Government of India envisages leveraging resources through PPPs for urban services. We focus our discussion on PPPs for urban water supply and sanitation services.

We review the global experience with PPPs in the water and sanitation services (WSS) sector to draw lessons for an appropriate model and approach for Indian cities. This is particularly important, as a quick review of the global experience with large-scale PPPs in the water and sanitation sector has been mixed. The large-scale PPPs for blended finance transactions have often been structured around capital-intensive urban infrastructure. While these may have helped initially to mobilise substantial resources, many of the large PPP projects in the water and sanitation sector encountered significant challenges. This has often led to their premature termination or failure. The lessons from this highlight both political and project risks with large PPP projects, and the need for a cautious approach.

On the other hand, there is also considerable emerging experience that suggests the possibilities and opportunities to bring in private sector efficiencies through smaller PPP projects for the WSS sector. These projects are often for decentralised systems, community-level infrastructure and work with local service providers. By combining concessional and commercial capital at modest scales, these initiatives have often helped build creditworthiness, demonstrate viability and create pipelines of investable opportunities. Such projects have also at times served as building blocks for later aggregation and replication. This makes it possible to achieve scale over time rather than requiring it upfront.

We review both these sets of experiences below to suggest possible lessons for India. These provide both lessons and directions, given the emerging emphasis on enlarging private sector engagement in the water and sanitation sector in India.

Lessons from the failure of Large-Scale PPPs in the Water and Sanitation Sector

Globally, since 90s, many large-scale PPP projects have been launched in the water and sanitation sector. Overall, it appears that a larger proportion of such projects have not been successful. What are the reasons for this? In this section, we discuss some of the reasons that are common to many failed PPP projects in the water and sanitation sector where contracts were cancelled.

As illustrated in Table 1, many of these large PPP projects in water and sanitation services were terminated. They failed due to a combination of factors, including high bulk water prices, inadequate regulatory frameworks, political interference, lack of public acceptance and challenges in ensuring service delivery to all segments of the population, especially the poor. This is especially important due to the sensitivity of water as a key service that is necessary for human survival. For example, in Shenyang, China in 1999, a Sino-French water company partnership failed after just three years due to high bulk water prices and significant losses, leading to its termination. The local government had to constantly change policies during 1995-2000 (Zhong et. al. 2008, p. 18; Tariq and Zhang, 2019). Similarly, in Mali, a contract with SAUR, a French water company, failed after five years in 2005. This was because the company failed to meet promised investment and service-expansion targets, while tariffs increased sharply and public dissatisfaction grew. (Gomez-Ibanez, 2005).

Across Sub-Saharan Africa, a review of water PPPs found that 13 out of 28 countries that had implemented such partnerships experienced failures. The main reasons included inadequate institutional capacity, poor project design and issues related to tariff adjustments and affordability (Tariq and Zang, 2019, and Manthan Kendra 2021). Such failures highlight the complexities of implementing large-scale private sector involvement in essential services within diverse socio-economic contexts.

Table 1 Cases of cancelled contracts for large-scale PPP for water supply

Project, Country	Period	Private Operator(s)	PPP Type	Main Reasons for Termination	Outcome	Sources
Cochabamba Water Concession	1999–2000	Bechtel-led Aguas del Tunari	Concession	Sharp tariff increases, mass protests (“Water War”), weak public consultation	Contract cancelled by government	Bankwatch – Water and Wastewater PPPs
Buenos Aires Water Concession	1993–2005	Suez / Aguas Argentinas	Concession	Currency crisis, tariff disputes, unmet investment obligations	Contract terminated	World Bank PPP Knowledge Lab
Tucumán Water PPP (Argentina)	1994–1998	Vivendi	Concession	Public opposition over tariffs and water quality	Contract cancelled	PSIRU Water Privatisation Reports
Santa Fe Water PPP (Argentina)	1998–2006	Suez	Concession	Financial disputes, service concerns, inability to meet	Contract terminated	PSIRU Reports on Water Privatisation

				obligations		Failures
La Paz–El Alto Water Concession (Bolivia)	1997–2005	Suez / Aguas del Illimani	Concession	Failure to expand services to poor communities, social unrest	Government cancelled concession	Transnational Institute – Reclaiming Public Water
Dar es Salaam Water PPP (Tanzania)	2003–2005	Biwater / City Water Services	Lease	Weak due diligence, billing systems, inadequate capitalization, unrealistic risk allocation	Contract dissolved	World Bank PPP Case Study – DAWASA Tanzania
Hamilton Wastewater PPP (Canada)	1994–2003	AWS / Thames Water	O&M Contract	Labour disputes, environmental violations, operational failures	Returned to public management	PSIRU – Water Privatisation Reports
Ramos Arizpe Water and Sewerage Services, Mexico (2012–2014)	Aguas de Saltillo / Aguas de Barcelona (Agbar)	Joint venture	Public opposition, tariff increases, political reversal/remunicipalization	Contract terminated early	Tariq and Zhang (2019); reports on remunicipalization in Ramos Arizpe (Jornada)	Ramos Arizpe Water and Sewerage Services, Mexico (2012–2014)
Shenyang No 8 water plant (China)	1995–1999	Anglian Water	BROT	Demand overestimation, pricing disputes, weak regulatory framework, financial non-viability	Contract terminated early	Tariq and Zhang (2019)
Pekanbaru Water supply services, Riau Province (Indonesia)	2001–2002	Thames PAM Jaya / foreign investor consortium	Concession	Political instability after decentralization, institutional uncertainty, weak local capacity	Contract terminated early	Tariq and Zhang (2019); regional PDAM restructuring records (riau.bpk.go.id)

Halifax Wastewater PPP (Canada)	2002–2003	Suez	Sewage Treatment PPP	Technical and contractual failures	Contract cancelled	Canadian Centre for Policy Alternatives
Atlanta Water System PPP (USA)	1999–2003	United Water	Management Contract	Poor performance, disputes over costs and maintenance	Contract terminated early	Food & Water Watch: Water Priv. failures
Manila Metro Waterworks and Sewerage for West Zone, (Philippines)	1997–2005	<i>Maynilad Water Services Inc. (Benpres Holdings + Ondeo/Suez)</i>	BROT	<i>Asian Financial Crisis, currency depreciation, tariff disputes, high debt burden, inability to meet investment obligations</i>	Contract terminated early	Tariq and Zhang (2019), World Bank (2026), ADB (2013)

Sources: as cited in the last column.

Across these cases, several recurring themes appear as common reasons that might have led to their termination or failures: a) Tariff increases and affordability concerns, as water tariffs often rose sharply after privatisation. This led to protests and at times even political backlash; b) Weak regulatory and institutional capacity, as governments frequently lacked the ability to monitor contracts and enforce the service obligations by private sector partners; c) Over-optimistic financial assumptions as many of the demand forecasts, envisaged improvements in collection efficiency and expectations of investments were often unrealistic; d) some projects faced currency and macroeconomic risks- this was especially true in Latin America- this led to an undermining of the financial models adopted in the PPP models; e) in many projects, there was considerable social and political resistance, this was especially true as water is generally viewed as a basic right, making privatization politically sensitive; f) in some there was inappropriate risk allocation, with excessive commercial risk was transferred to private operators without adequate safeguards; and g) some projects faced lack of service improvements as they failed to significantly expand access for low-income communities.

Box 1: Selected examples of failed cases of water PPPs

Over the years, there have been many cases of 'failed water PPPs'. These few cases below highlight various reasons for their failures.

Ramos Arizpe Water and Sewerage Services, Mexico (2012–2014)

This joint-venture water PPP in Ramos Arizpe faced strong public resistance due to tariff increases and concerns regarding service affordability. Political opposition intensified as citizens perceived limited improvements relative to rising costs. The municipal government eventually reversed the privatisation arrangement and terminated the contract early, reflecting broader re-municipalisation trends in Latin America.

Shenyang No. 8 Water Plant, China (1995–1999)

The Shenyang No. 8 project was one of China’s early Build-Rehabilitate-Operate-Transfer (BROT) water PPPs involving foreign participation. The project struggled because of overestimated water demand, tariff and pricing disputes, and an underdeveloped regulatory framework. Financial viability deteriorated quickly, leading to early contract termination and becoming a widely cited example of risks in first-generation Chinese water PPPs.

Pekanbaru Water Supply Services, Riau Province, Indonesia (2001–2002)

The Pekanbaru concession encountered institutional and political difficulties during Indonesia’s post-decentralisation transition period. Weak local government capacity, unclear responsibilities, and financial uncertainties affected implementation. The partnership failed to stabilise operations and was terminated early, highlighting governance and institutional risks in decentralised water PPPs.

Manila Metro Waterworks and Sewerage System – West Zone, Philippines (1997–2005)

The Manila West Zone concession, operated by Maynilad Water Services, initially attracted international attention as one of the world’s largest urban water PPPs. However, the Asian Financial Crisis sharply depreciated the Philippine peso, increasing foreign debt obligations and creating severe financial stress. Combined with tariff disputes and difficulties meeting investment targets, the concession became financially unsustainable, and the contract was eventually terminated and restructured.

References: Tariq and Zhang (2019), World Bank Water PPP Case Studies, ADB reports on Manila concessions.

Comparing water and electricity PPPs: There is sometimes a comparison between the success of PPPs in the electricity sector and the water sector. If we were to make a list, the number of success stories in electricity PPPs will certainly be longer than in the water sector. However, the sensitivity of the water sector needs to be considered. Even more importantly, and as highlighted by Titova (2026), many of the electricity PPPs were focused on production rather than distribution. This may have made it less politically sensitive as compared to water, particularly as water is seen as a basic human right.

Contract Termination and Re-municipalisation: Table 2 shows that unlike the above cases of cancellation, a few of the PPP contracts were terminated with the service returned to the public sector agency, or it was ‘re-municipalised’. This refers to “return of privatised water supply and sanitation services to public service delivery” (Kishimoto 2016, p.76). In

most of these cases, this led to the termination of private contracts before their expiry date. Kishimoto (2016) estimated that between March 2000 and 2015, around 235 cases of re-municipalisation were documented affecting more than 100 million people across countries including: Ghana, Turkey, Mali, Hungary, Guinea, Tanzania, Indonesia, Uganda, Malaysia, Bolivia, Mozambique and Morocco. Their research found the factors across many countries are similar and include a) poor performance, b) underinvestment in infrastructure, c) poor water quality, d) disputes over operational costs and price increases, and lack of financial transparency, e) soaring water bills, f) workforce cuts and g) environmental hazards.

Box 2: Selected cases of re-municipalisation of PPPs for water and sanitation Services

Buenos Aires Water and Sanitation Concession:

In May 1993, a consortium led by Suez-Lyonnaise des Eaux started operating a 30-year water supply and sanitation concession in Buenos Aires, Argentina. It was only eight months later that the operating company Aguas Argentinas requested an “extraordinary review” of tariffs, due to unexpected operational losses. In 2002, the government entered the contract negotiation process, which lasted for years. Finally, after mounting confrontations, the government cancelled the concession contract and created a public company AySA to immediately take responsibility for the provision of water and sanitation services (Azpiazu and Castro, 2012). The new public company brought positive changes and expanded water access in low-income neighbourhoods, connecting more than 700,000 additional users.

Berlin Water Privatisation (Germany)- Berlin's part-privatisation in 1999, which placed just under half of Berliner Wasserbetriebe in the hands of RWE and Veolia, was at the time the largest water PPP undertaken in Germany. The agreement guaranteed the private partners a fixed rate of return, a term kept confidential for over a decade and only brought into public view after a 2011 citizen-led referendum demanded disclosure of the contract. Mounting opposition to the resulting tariff increases and to the lack of transparency-built pressure on the city government to unwind the arrangement. Berlin repurchased RWE's stake in 2012 and Veolia's in 2013, restoring full municipal ownership, though the buyback was financed through long-term borrowing serviced through water charges.

Paris Water PPP (France)- In 1984, two 25-year lease contracts for water supply in Paris were awarded to Veolia and Suez (each company covering half of the city). In 2000, the contracts were criticised by the regional audit body for lack of financial transparency and in 2002 an audit commissioned by the city of Paris found that the prices charged by the lease operators were between 25% and 30% higher than the economically justified costs. Because this situation persisted for years despite the renegotiation of the contracts in 2003, the city of Paris decided to take back control of its water supply. Re-municipalisation took place in January 2010 after the expiry of the two private contracts with Suez and Veolia. The private contracts were not renewed due to the lack of financial transparency and accountability, which had been repeatedly criticised by the public audit body.

Budapest Water Works PPP (Hungary)- Fővárosi Vízművek, Budapest's water utility since 1868, was partly privatised in 1997 through the sale of just over a quarter of its shares to a consortium of Suez Lyonnaise des Eaux and RWE Aqua, which was also given a 25-year operating role. As with other water PPPs structured during the early post-transition period in Central and Eastern Europe, dissatisfaction grew over the terms of the arrangement and the degree of control ceded to foreign investors. The Municipality of Budapest repurchased the shares from Suez and RWE in 2012–13, returning the utility to full municipal ownership.

References: Lobina, E., Kishimoto, S., & Petitjean, O. (2014).

Table 2 Cases of Water in Large Scale PPPs which were Returned to Municipal Authorities

Project, Country	Period	Private Operator(s)	PPP Type	Main Reasons for Termination	Outcomes	Sources
Cochabamba Water Concession	1999–2000	Bechtel-led Aguas del Tunari	Concession	Sharp tariff increases, mass protests (“Water War”), weak public consultation	Contract cancelled by government	Bankwatch – Water and Wastewater PPPs
Buenos Aires Water Concession	1993–2005	Suez / Aguas Argentinas	Concession	Currency crisis, tariff disputes, unmet investment obligations	Contract terminated	World Bank PPP Knowledge Lab
Berlin Water Privatisation (Germany)	1999–2013	RWE & Veolia	Partial Privatization	Public opposition, lack of transparency, tariff increases	Re-municipalized	Transnational Institute – Remunicipalisation Tracker
Paris Water PPP (France)	1985–2010	Veolia & Suez	Lease Contracts	Concerns over transparency and costs	Returned to public operation	Bankwatch – Water and Wastewater PPPs
Budapest Water Works PPP (Hungary)	1997–2012	RWE & Suez	Partial Privatization	Political opposition and dissatisfaction with privatisation	Municipality repurchased shares	Bankwatch – Water PPP Experiences in Europe
Pécs Water PPP (Hungary)	1995–2009	Suez	Concession	Conflict between municipality and operator	City retook control	Transnational Institute – Reclaiming Public Services

Sources: as cited in the last column.

Overall, these examples of terminated contracts and re-municipalization illustrate that despite their many benefits, large-scale PPPs may not always be a panacea in this sensitive sector. Successful implementation requires robust governance, clear contractual terms, transparent regulation and a strong commitment to public welfare, particularly for vulnerable populations. These may often be rather difficult to achieve in this sensitive sector.

Lessons from the few large successful PPPs: Despite a large number of failures and re-municipalization, a small number of large-scale PPPs for water and sanitation services did actually work and delivered results on the ground. The three well-known ones are from Burkina Faso with ONEA, Côte d'Ivoire with SODECI and the Philippines with Laguna Water (see Box 2). These examples illustrate that these utilities had considerable autonomy, unlike local governments that often provide services in South Asia and some counties sub-Saharan Africa. The example from Shanghai, China, which is often cited as a success story, is for a wastewater treatment plant and possibly did not face many of the issues mentioned earlier.

A comparison of the failed and successful cases highlights a few key points. The successful cases were more likely to have been in larger cities or metropolitan areas. Also, tariffs were gradual and politically adapted, the contracts had better risk-sharing mechanisms, and there were generally better risk-sharing mechanisms in the contracts. Further, efforts were made to ensure stakeholder engagement and ensure good communication; contracts were renewed or adapted to suit the emerging issues.

Table 3 Comparison of Failed vs Relatively Successful Water PPPs

Dimension	Failed PPPs	Relatively Successful PPPs
Scale	Large metropolitan concessions	Often medium-sized or phased projects
Tariff Strategy	Rapid tariff increases	Gradual and politically negotiated tariffs
Institutional Capacity	Weak regulation and contract oversight	Strong regulatory institutions
Risk Allocation	Excessive private or public risk burden	Balanced risk-sharing mechanisms
Social Legitimacy	Limited public participation	Stakeholder engagement and communication
Investment Performance	Underinvestment common	Better compliance with investment targets
Political Context	Politically unstable environments	Stable governance frameworks
Typical Outcomes	Contract termination or re-municipalization	Contract renewal or adaptation

Sources: Analysis by authors.

Box 3: Selected successful cases of large PPPs for water and sanitation Services

A few **large-scale public–private partnerships (PPPs)** in the water and sanitation sector did demonstrate measurable success in improving access, efficiency, and service quality. Some notable examples include:

1. Côte d'Ivoire: National Water Utility (SODECI): *This is one of the oldest and most successful water PPPs in the developing world.* Established in 1960, the partnership between the government and SODECI (Société de Distribution d'Eau de la Côte d'Ivoire) has expanded access to clean water to over 7 million people. The model has survived political instability and maintained service quality for decades, showing how a committed public partner and efficient private operator can create long-term benefits.

Source: ppp.worldbank.org

2. Burkina Faso: ONEA (Office National de l'Eau et de l'Assainissement): Burkina Faso's water utility was corporatised and engaged a performance-based service contract with an international operator between 2001–2006. With strong government commitment and donor support, ONEA became one of Sub-Saharan Africa's best-managed public water utilities, balancing accountability, autonomy, and financial viability.

Source: ppp.worldbank.org

3. Shanghai, China: Zhuyuan Youlian Wastewater Treatment Plant (ZY1WWTP): The Shanghai Zhuyuan Youlian No. 1 Wastewater Treatment Project, China's first mega-ton wastewater treatment plant, was developed under a PPP model. It treats about 1.7 million cubic meters/day at a cost 40% lower than government projections, while transferring financial risk to the private partner. This collaboration has delivered significant cost savings and environmental improvements. Source: adb.org

4. Philippines Laguna Water: Formed as a joint venture between the provincial government of Laguna and Manila Water Company, Laguna Water expanded access to piped water from just 14% in 2009 to 60% within five years, reduced non-revenue water from 48% to 12%, and achieved 24/7 supply for most customers. It also provided free school connections and upgraded sanitation facilities. They likely achieved success due both to their policies related to management of foreign currency adjustments into tariff adjustments over time, as well as measures such as inclusive community pricing and embedding local corporate management alongside the international technical expertise. It may have also benefitted from the major 700-hectare land reclamation component on Laguna Lake designed as a financial incentive (sweetener) for private investors. Source: Marin 2009, ppiaf.org

5. Senegal: Senegal's water sector public-private partnership model is globally recognised as a sub-Saharan African benchmark, characterised by key milestones like **SEN'EAU**, the legacy of **SDE**, and oversight by **SONES**. Under this lease (*affermage*) framework, the state-owned asset holding company, **SONES**, manages heavy infrastructure planning and capital investments. Meanwhile, the private operator—historically **SDE**, and currently **SEN'EAU** (led

by Suez)—handles day-to-day operations, network maintenance, distribution, and billing. This institutional split has driven remarkable results, pushing urban water access close to 100% while maintaining reliable 24/7 service quality. Key to this enduring success are strict performance-based contracts that incentivise non-revenue water reduction and commercial efficiency. Senegal is currently replicating this clustered PPP model across rural networks to secure universal, climate-resilient water access nationwide. Source: World Bank (2022), Suez Group (2025), AFD (2020).

6. Rwanda: The Rwanda case of a rural PPP model for water supply, though not large in scale, provides some insights into what made that contract work. Reactivating public-private partnerships (PPPs) for rural water in Rwanda has helped improve service delivery by introducing private operators (POs) under delegated contracts, cutting downtime, and enhancing water safety. Core strategies included licensing systems, dedicated bank accounts structured and royalty payment strategies, asset mapping, monitoring of water quality and reducing downtime by 41% in model districts. This was through delegated management and clear stakeholder roles, social inclusion and use of standardised reporting systems. Source: Ogata et. al (2024).

7. Cartagena water PPP: The Cartagena Water Concession is often cited as one of Latin America's most successful urban water PPPs. In 1995, the city entered into a mixed-ownership partnership with a private operator, while retaining public ownership of water assets. The concession mobilised substantial private investment to rehabilitate and expand water and sewerage infrastructure, improve operational efficiency, and strengthen utility management. Within a decade, access to safe drinking water increased to nearly universal levels, sewerage coverage expanded significantly, service continuity improved, and non-revenue water declined. A transparent regulatory framework, strong municipal commitment, targeted public subsidies for low-income households, and clearly defined contractual obligations were central to the partnership's success. It helped combine commercial efficiency with social objectives to achieve sustainable improvements in urban water services. Marin 2009, ppiaf.org

8. Bucharest water PPP: The Bucharest Water Concession, awarded in 2000 to Apa Nova București (a subsidiary of Veolia), is considered one of Europe's most successful water PPPs. The long-term concession enabled significant private investment in the rehabilitation and modernisation of the city's water supply and sewerage systems. Over the following two decades, service reliability improved markedly, non-revenue water was substantially reduced, water quality met European Union standards, and operational efficiency increased. The concession was supported by a strong regulatory framework with clearly defined performance indicators, periodic tariff reviews, and strong public oversight. While tariff adjustments generated public debate, the partnership successfully balanced financial viability with service quality improvements. This experience illustrates the importance of

sound contract design, independent regulation, and performance-based incentives in delivering long-term improvements in urban water utilities. Sources: Ehrhardt et. al (2001)

Table 4 Selected Examples of “Relatively Successful” Cases of PPPs for Water sector

Project	Country	Frequently Reported Success Factors
Manila Water Concession	Philippines	Expanded coverage and operational efficiency, though still controversial
Cartagena Water PPP	Colombia	Strong public oversight and phased investments
Senegal Urban Water Reform	Senegal	Performance-based affermage structure
Bucharest Water PPP	Romania	Improved continuity and water quality
Laguna Water Concession	Philippines	Piped coverage rose from 14% to 60% and non-revenue water cut from 48% to 12% in five years
Zhuyuan Youlian Wastewater PPP	China	Delivered 40% below projected cost, with financial risk transferred to the private partner
ONEA Performance Contract	Burkina Faso	Corporatised utility with performance-based contract and donor support

Sources: See sources cited in Box 1 above.

These few cases do show that strong institutional frameworks, performance-based incentives, good contract design and a sustained government commitment have been key to making some of the PPPs in water and sanitation work effectively over the long term. The World Bank’s comparative review of more than 65 water PPPs concludes that outcomes were highly context-dependent, with stronger results where regulation, governance, and contract design were robust. (Marin 2009). However, it does appear that large utility privatisation and PPP models faced several issues and have clearly declined. Compared with other sectors such as electricity, telecom and transport, water and sanitation PPPs account for a relatively very small share of global PPP investment. This is despite the fact that initially water sector PPP investments may have been higher. (World Bank, 2026).

Over the last ten to fifteen years, the trend suggests that, unlike the large concession-type models, there are more selective and hybrid PPP models. There is a shift towards smaller, and often performance-based models. There is also a greater use of public funds as well as later involvement of blended finance. There is regional variation with some continued growth in middle-income countries, while others are moving to performance-based management contracts, non-revenue water reduction contracts, desalination BOTs, wastewater treatment PPPs, bulk water supply PPPs and smaller local operator models. (Delmon, 2015). Today’s PPPs are often shorter-term, less politically visible, financially de-

risked by governments or donors, and focused on specific technical functions rather than entire citywide systems.

A major lesson from some of the earlier failures is that large-scale water PPPs are especially vulnerable in contexts with weak institutions, poverty and political instability. This is one reason why recent literature increasingly focuses on: a) smaller-scale blended finance models, b) community-based partnerships, with performance-based contracts, and c) microfinance-supported water systems and small public-public partnerships (PPPs). These approaches are often considered more adaptable and politically acceptable than full privatisation concessions.

Emerging trends in PPPs for water supply and sanitation: The overall emerging picture suggests that the water PPP market today looks quite different from the large, concession-dominated model of the 1990s or the wave of contract terminations that followed in the 2000s. A review by the World Bank's Victoria Delmon (2015) points to five broad shifts in how water and sanitation PPPs are now being structured: i) build-operate-transfer and design-build-operate arrangements continue to be used for new-build desalination and wastewater treatment plants, particularly in the Middle East, China, Mexico and Brazil, where private financing can be raised with the help of guarantees and other risk mitigation instruments, without the added complexity of taking over an existing infrastructure, ii) performance-based contracts targeting a specific function, such as reducing non-revenue water or expanding connections, have become common, with payments tied to verified results rather than a bundled concession, iii) several countries across the Middle East, Latin America and Africa have used output-based management contracts that bring in private operating expertise for a defined set of tasks while leaving the public utility formally in charge, iv) small-scale private operators have become increasingly common in rural and peri-urban areas, often through donor-supported programmes that have helped new local and regional players emerge and scale up, and v) in some markets a smaller number of large national private operators have consolidated their position, as in the Philippines, Brazil, Malaysia and parts of Africa. Taken together, these shifts point to a move away from the standard lease/concession/BOT template toward more customized, hybrid contract designs shaped by country-specific institutional capacity and political economy.

More recent discussions, including at the OECD Roundtable on Financing Water (OECD, 2025), suggest that this shift is continuing. PPPs are increasingly being designed around specific functions and results. There is also greater focus on sharing risks between public and private partners. Concessional and commercial finance are increasingly being combined to make projects more viable. There is also greater emphasis on strong and independent regulation. Climate resilience and water security are also being considered while designing PPP contracts, rather than being added later. In India, the Urban Challenge Fund (UCF)

creates an opportunity to apply these principles to urban infrastructure, including water and sanitation, by combining public support with market-based finance.

The Promise of Small-Scale, Scalable Water and Sanitation Projects

Experience of smaller, community-focused water and sanitation projects suggests that scale can be built through replication rather than through a single large transaction. These projects often prioritised appropriate technology, local ownership and direct benefits for low-income groups, making them highly effective and sustainable. Some of the examples also demonstrate the possibility of scaling up based on the initial success of pilot projects.

This is particularly relevant as service deficits are often concentrated in smaller, decentralised systems such as rural schemes, peri-urban networks and community-managed sanitation solutions, as they struggle to attract conventional financing. Blended finance, by strategically combining public, philanthropic and commercial capital, can offer a way to derisk these investments, improve project bankability and catalyse private sector participation. The focus should therefore be on identifying service models that can work at a manageable scale and then be replicated or aggregated over time. Notably, while “big water” infrastructure dominates investment volumes, decentralised small-scale solutions represent a distinct ~\$29 billion opportunity globally, underscoring their importance for scaling inclusive services ([Blended Finance Taskforce](#)).

Table 5 Examples of Small PPPs for Water Supply and Sanitation Services

Project / Initiative - Country	Type (PPP / Blended)	Scale	Instruments	Key Actors	Description	Sources
Kenya OBA Water Projects, Kenya	Blended PPP-like	Small piped systems	Output-based aid + loans + guarantees	World Bank, K-Rep Bank, communities	Subsidies tied to verified outputs to crowd in lending	World Bank – Kenya: Using Private Financing to Improve Water Services
WaterCredit (Multi-country: India, Kenya, Bangladesh, etc.)	Blended finance	Household/micro	Grants + TA + microloans	Water.org, MFIs, local banks	Microfinance loans for household water & sanitation; catalytic grants enable lending markets	Water.org – Water Credit Initiative

WaterEquity Funds Multi-country	Blended finance (fund)	Portfolio of small loans	Junior equity + senior debt + concessional capital	Water Equity, DFIs, investors	Aggregates small WASH loans into investable portfolios	WaterEquity – Water & Sanitation Infrastructure Funding
Wai & Sinar FSM Pilot (India)	Blended / public-community	Small town	Grants + TA	CEPT, BMGF, municipalities	Scheduled desludging + integrated sanitation model (OECD)	OECD – Making Blended Finance Work for SDG 6
Narra Water Model (Philippines)	PPP + blended	Small town utility	Concessional loans + microfinance + TA	Local utility, Water.org, MFIs	Multi-layer blending (utility + household financing)	World Bank- Mobilising finance for WASH: getting the foundation right
Small Town Water PPPs (Kenya, Uganda)	PPP + blended	Town-level	Credit lines + guarantees + TA	Local operators, donors, banks	Private operators supported by donor-backed finance	Marin, P. (2009) – Public-Private Partnerships for Urban Water Utilities, World Bank
FSM Enterprises (India, Bangladesh)	Blended finance	Decentralized sanitation	Grants + impact investment	SMEs, NGOs, impact investors	Faecal sludge management in secondary cities	OECD – Making Blended Finance Work for SDG 6
Udaipur Wastewater Initiative (India)	Blended finance	City / modular	Grants + TA	BMGF, CPR, local govts	Catalysing investment in waste treatment systems (OECD)	OECD – Making Blended Finance Work for SDG 6
PAMSIMAS-type Models (Indonesia)	Public-community PPP	Village-level	Grants + community contributions	Govt, communities, local firms	Co-financed rural water systems	World Bank – PAMSIMAS (Water Supply and Sanitation for Low-Income Communities)
Bangladesh Sanitation Marketing (Bangladesh)	Blended market-based	Household	Microfinance + grants	NGOs, MFIs, SMEs	Private sanitation supply chains enabled by finance	World Bank – In Bangladesh, Sanitation Marketing Helps Make

						<u>Toilets More Available and Affordable</u>
Container-Based Sanitation (e.g., Sanergy) (Kenya, Haiti)	Blended / impact	Urban micro-service	Equity + grants + user fees	Social enterprises, donors	Service-based sanitation in informal settlements	<u>Sanergy</u>
Aqua for All Programs (Multi-country)	Blended finance	Small to medium	Grants + blended funds + results-based finance	Aqua for All, partners	Catalytic funding for WASH enterprises (Aqua for All)	<u>Aqua for All – Innovative and Blended Finance</u>

Sources: as cited in the last column.

Box 4: Selected Examples of Successful Small-Scale Water and Sanitation Projects

Several smaller-scale, community-driven and performance-based interventions have also delivered strong results in the water and sanitation sector. Selected examples are highlighted below.

LifeStraw Project in Kenya: This initiative provided portable water filters, improving access to safe drinking water in rural communities. The simplicity and effectiveness of the technology allowed for widespread adoption and significant health benefits **Source:** [Cerdea Dubó, "Transforming Lives: Success Stories in Water Treatment Projects", LinkedIn](#).

Biosand Filter Initiative in Haiti: Biosand filters are a low-cost, point-of-use water treatment technology that can be built and maintained locally. This initiative has successfully scaled up, providing safe water to numerous households in areas lacking centralized treatment. **Source:** [Cerdea Dubó, "Transforming Lives: Success Stories in Water Treatment Projects", LinkedIn](#).

Solar-Powered Water Purification in India: Various projects in India have leveraged solar energy to power small-scale water purification units, often managed by local communities. These decentralized solutions are particularly effective in remote areas without reliable grid access. **Source:** [Cerdea Dubó, "Transforming Lives: Success Stories in Water Treatment Projects", LinkedIn](#).

K-Rep Bank Water Financing Model, Kenya: Starting in 2007, the Water and Sanitation Project of the World Bank partnered with K-Rep Bank, a Kenyan microfinance institution, to help rural and peri-urban communities access commercial loans for small piped-water systems, blending output-based grants with microfinance debt. The pilot supported 35 community water projects to access \$3.4 million in loans and mobilize \$1.2 million in community equity, extending piped-water access to over 190,000 people, and was subsequently scaled up as the Maji ni Maisha programme with support from the European

Union **Source:** [GPOBA \(2014\), "Kenya Microfinance for Community-Managed Water Project", Global Partnership for Output-Based Aid, World Bank Group.](#)

Performance Linked Annuity Model (PLAM) for Scheduled Desludging, India: This model engages a private operator to desludge all septic tanks in a city on a fixed schedule, with the local government repaying capital and operating costs through annuity payments linked to performance. The revenues were collected from property/sanitation tax, with an escrow account mechanism to protect the operator against delayed payment. First implemented in Wai and Sinnar in Maharashtra, it was among the first citywide scheduled desludging models in India. **Source:** [Mehta, M., Mehta, D. and Yadav, U. \(2019\), "Citywide Inclusive Sanitation Through Scheduled Desludging Services: Emerging Experience From India", Frontiers in Environmental Science, Vol. 7.](#)

Community Water Reclamation in Windhoek, Namibia: Windhoek boasts one of the world's oldest and most successful direct potable water reuse projects. While larger in scale than a "small project," its success is rooted in community acceptance and robust local management, demonstrating the potential for local solutions to be highly impactful and sustainable in water-scarce regions **Source:** ["Success Stories of Community Water Reclamation", SAJDI.](#)

India's Community-Led Initiatives: Small Indian towns are increasingly becoming hubs for water security innovation through community-led initiatives and decentralized solutions, demonstrating how local engagement can drive sustainable water management **Source:** ["Small towns, big water wins: Community centred innovations", India Water Portal.](#)

Performance-Based Contracting for Non-Revenue Water (NRW) Reduction, Bangkok, Thailand: Bangkok's Metropolitan Waterworks Authority used performance-based contracts to reduce NRW in selected service areas, linking part of contractor payments to actual water savings. Over four years, the contracts helped repair around 150,000 leaks, establish more than 235 district metered areas, replace over 550 km of pipes and save about 165 MLD of water. The experience demonstrates how performance-linked PPP models can incentivise measurable NRW reduction while sharing risks between the utility and private partners. **Source:** Kingdom, B., Liemberger, R. and Marin, P. (2006), "The Challenge of Reducing Non-Revenue Water (NRW) in Developing Countries: How the Private Sector Can Help: A Look at Performance-Based Service Contracting," Water Supply and Sanitation Sector Board Discussion Paper Series, Paper No. 8, World Bank, Washington, DC [link](#).

These examples highlight that successful projects often involve affordable technologies, maintainable by local communities, and directly address the needs of underserved populations. Their success lies in their adaptability, community involvement, and potential for replication and scaling across different regions.

The examples in Table 5 and Box 4 illustrate different ways in which smaller PPP and blended finance models can be structured. While these models may be different, they show

some common features. Most focus on a clearly defined service gap, work at a manageable scale, involve local communities or service providers and use a blended finance approach. The cases also show the importance of matching the financing instrument with the type of service and the ability of users or service providers to pay. They also show how concessional finance can support smaller projects and help build a pipeline that can attract commercial finance over time.

The experience of Kenya provides a useful example of how small projects can be scaled. Under the Maji ni Maisha programme, community-managed water projects received loans from K-Rep Bank, combined with output-based subsidies. Communities contributed part of the investment, while the loan financed the remaining requirement. The subsidy was released after agreed outputs were achieved. This reduced the loan burden and gave both the community and lender greater confidence in project performance. The model subsequently moved beyond the initial pilot. By 2012, around 35 communities had borrowed from K-Rep Bank, raised equity and accessed output-based grants, providing water access to around 190,000 people. This illustrates an important lesson for small-scale WASH financing that scale does not always need to be created through one large project.

Taken together, these experiences suggest that the opportunity is not simply to do more small projects, but to design small projects with replication and scale built into the model from the beginning. The small, blended finance projects which often target decentralised systems, community-level infrastructure, and local service providers, offer an approach well aligned with the ground realities. By combining concessional and commercial capital at modest scales, such initiatives can help build creditworthiness, demonstrate viability, and create pipelines of investable opportunities. Such smaller projects can also serve as building blocks for later aggregation and replication. This makes it possible to achieve scale over time rather than requiring it upfront.

PPPs for water and sanitation sector - Lessons for India

The international experience reviewed above provides ideas and guidance for private participation for water supply and sanitation services. They illustrate that design of the partnership is critical. Large city-wide PPP models can be difficult to sustain where revenue generation is low, regulatory and contract-management capacity is weak, and revenue risks are high. At the same time, more targeted PPPs, performance-based contracts and blended finance models have demonstrated greater potential where the service objectives are clearly defined, risks are appropriately allocated and public and private roles are clearly separated.

These lessons are particularly relevant to India at a time when the financing of urban infrastructure is moving toward market-based resources. The Urban Challenge Fund (UCF)

provides an important opportunity in this regard. These funds could be used to help cities develop bankable, performance-oriented and replicable models for water and sanitation services. The challenge is that many urban water and sanitation projects, particularly in smaller and medium-sized cities, may not initially be bankable to attract commercial finance on their own.

The UCF needs to go beyond financing large projects that appear more bankable and also help smaller cities and smaller projects become bankable. For this, the key lessons emerging from the above review include:

Focus on small PPP projects: For many Indian cities, particularly those where revenue generation is low and contract management capacity is weak, a more appropriate approach may be to identify specific service gaps that can be contracted and monitored independently. Potential areas include non-revenue water reduction, metering, billing and collection improvement, new connections, energy efficiency, wastewater treatment, faecal sludge management and other defined service improvements. Private operators can be paid against clearly specified and independently verified performance indicators. This approach would allow cities to retain overall responsibility for public service delivery while using private expertise and finance for functions where private participation can generate measurable improvements.

There may also be more scope for PPPs in specific infrastructure and service areas, such as in sewerage and wastewater treatment. The Hybrid Annuity Model (HAM) used for treatment plants at Haridwar and Varanasi provides some examples. Under HAM, the government supported part of the capital cost and the private partner receives annuity payments linked to performance during the operating period. This helped to reduce the upfront financing burden on the urban local body while creating a link between payments and performance. The experience can be used with a focus on operations and maintenance and service performance.

Create a pipeline of smaller projects that can be aggregated: A major lesson from the Kenya experience is that scale does not necessarily need to be achieved through a single large transaction. Small projects can first demonstrate technical and financial viability. These can subsequently be replicated or aggregated. This has important implications for taking up WSS projects under the UCF. The Fund could support standardised project models that can be replicated across cities. Aggregation could subsequently reduce transaction costs, create a larger investment pipeline and make these projects more attractive to banks, impact investors and other institutional sources of capital.

Build capacity of cities and consultants: Cities will need adequate capacity to monitor performance and manage the contracts. Strong institutional arrangements, clear responsibilities and regular monitoring will be important to ensure that PPPs deliver better services over the contract period. Many smaller urban local bodies may not have the

technical, financial and legal capacity to develop such projects on their own. The UCF could therefore support standard contracts, simple project development tools and transaction advisory support. This can reduce the transaction costs for cities and help them develop projects that are suitable as per local context.

Overall, the UCF provides an opportunity to move from large, one-off PPP transactions towards a mix of smaller, performance-based and scalable projects. Such an approach can help demonstrate what works, build the capacity of local governments and private operators, and gradually create opportunities for aggregation and scale. Smaller projects can therefore serve as building blocks for wider replication and scaling over time.

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The Center for Water and Sanitation (CWAS) is a part of CEPT Research and Development Foundation (CRDF) at CEPT University. CWAS undertakes action-research, implementation support, capacity building and advocacy in the field of urban water and sanitation. Acting as a thought catalyst and facilitator, CWAS works closely with all levels of governments - national, state and local to support them in delivering water and sanitation services in an efficient, effective and equitable manner.