

INCLUSIVE INNOVATIONS

Delivering Water Beyond the Pipes to Customers at the Bottom-of-the-Pyramid

Hybrid model provides access to clean water for urban households without access to individual piped connections

HIGHLIGHTS

- Community-based model provides poor urban dwellers with access to clean, safe, and cheaper water through off-grid system with distribution points.
- Pooling users reduces transaction costs for utilities and creates accountability.
- Community involvement and voice ensures better maintenance of infrastructure and less water loss/theft.



Summary

Under an innovative hybrid model, community-based organizations (CBOs) purchase water from utilities, which they resell to end-users who would not otherwise be able to access piped water. The model provides clean water that is less expensive than bottle or bagged water. The model can save the lives and improve the well-being of millions of poor people in urban areas.

Development Challenge

More than one billion people live in urban slums (Bloom 2016), where millions lack access to safe water and sanitation. The implications for development are vast. According to the US Centers for Disease Control, diarrhea (caused largely by waterborne pathogens) kills more than 2,000 children a day—more than AIDS, malaria, and measles combined. Lack of clean water and sanitation also affects people's livelihoods, security, and quality of life.

Building urban water systems could solve the problem, but the infrastructure needed is costly and often fails to affect people at the bottom of the pyramid, who are too poor to afford connections or live in areas (such as informal settlements) the system does not reach. Smaller-scale off-grid solutions therefore hold promise.

Business Model

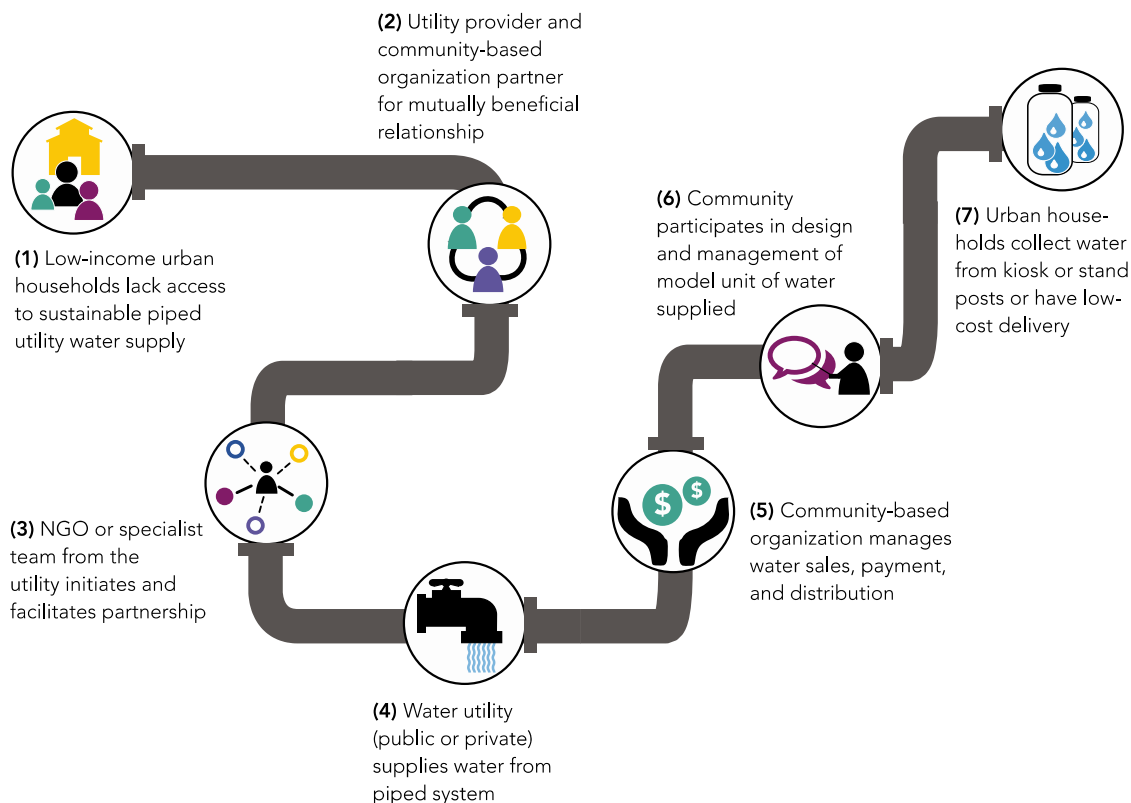
Off-grid systems represent a low-cost, sustainable solution that is based on establishing a mutually beneficial relationship between a utility and the community.

Components of the Model

A CBO that represents all members of the community where the water is to be supplied is established as a legal entity. It contracts with the utility to provide water from the piped network to various distribution points, which it pays for in a single payment. The CBO then resells the water to

end-users, from standposts and kiosks. The kiosks can be owned by the local government, the CBO, or the utility itself. Customers usually bring their own water containers, paying the kiosk attendant for water they take. Alternatively, the utility may simply set up a metered connection close to the community and leave it to the CBO to decide how to deliver water to households.

Figure 1. Components of the hybrid, community-based water distribution model



Cost Factors

Setting up and implementing the model involves three sets of costs:

- The costs of connecting to the piped network are usually subsidized by an NGO or donor. They can be gradually recovered through fees charged to end-users.
- The costs of setting up the CBO and establishing relations among stakeholders (convening and engaging the community and setting up management and governance structures) are often borne by NGOs or development agencies.
- The costs of distributing the water to end-users (largely the wages of the people who sell the water and operate and manage the distribution stations) are usually paid for by end-users.

Revenue Streams

End-users pay fees based on the amount of water they use.

Financial Viability

The model is financially viable for the utility, because it already has the piped network and the costs of connecting to it are usually subsidized by an NGO or donor. The CBO covers its costs by charging more for the water than it pays. For example, the Ghana Water Company Ltd. charges a community management committee USD 0.30 per cubic meter; water vendors who sell the water on behalf of the committee charge USD 0.50 per cubic meter.

Partnerships

Connecting urban neighborhoods to existing water infrastructure requires the coordination of multiple stakeholders. The model can be initiated by a utility or driven by an NGO, donor, or aid agency. Setting up the model often requires permission from the relevant government departments.

Different stakeholders have different roles and responsibilities. The utility is usually responsible for installing and maintaining the connection mechanism (the standpipe, kiosk, or metered connection) and supplying clean water to the community. The CBO ensures that all local interests are served equitably and at the lowest possible cost. It receives support from the utility as needed (for major repairs, for instance) and may access the utility's technical skills and other resources not available within the community.

CBOs distribute water to end-users in a number of ways. Some hire their own staff. Others delegate sales to local micro-entrepreneurs. In some countries, including India and Kenya, water is being distributed by "water ATMs" and other technology-based distribution mechanisms (Udas 2014; Gitau 2015).

The water utility, relevant government regulator, or government department monitors the performance of the CBO.

Implementation: Delivering Value to the Poor

Awareness

Community involvement is key to raising awareness about the provision of potable water and its health benefits. Local governments, educational institutions, and the media often work with CBOs in conducting information and awareness campaigns.

Acceptance

For the model to work, the community has to accept that it is reasonable to pay for safe water and that the price is fair (World Bank 2015). Involvement of the community in the design and management of water distribution ensures high levels of acceptance and a sense of community ownership, which often reduces theft and vandalism of infrastructure.

Accessibility

The model addresses a number of constraints that would otherwise prevent a water utility from making water available to low-income households. These constraints include the following:

- Utilities may not be incentivized to reach low-income customers
- Many poor customers are not able or willing to pay for individual household connections, or the transient nature of the population means that they cannot be billed for water.
- The informal nature of housing may mean that the cost of a household connection is very high or not allowed by the authorities.
- Trust between a utility and a community may be low, because of nontransparent pricing; the perception that prices are unfair; poor maintenance of infrastructure, which leads to high water losses, raising costs; vandalism of infrastructure; and theft of water (Water Aid 2013).

Affordability

Water sold through the hybrid system is more affordable than other sources of clean water, such as bottled or bagged water.

Results and Cost-Effectiveness

Scale and Reach

The model is reaching thousands of people. In Antananarivo, Madagascar, for example, 300 kiosks are providing access to safe water to 400,000 people, including some of the poorest people in the city's slums. The model has been implemented globally in many countries and regions, from Latin America to Africa and South Asia (Table 1)

Improving Outcomes

Improvements in health outcomes have not been systematically measured. The gains are undoubtedly large, however, given the very serious consequences of drinking unclean water.

Following their success selling water, some CBOs have taken on additional responsibilities, operating community laundries and collecting solid waste, for example. The success of the model has also resulted in greater participation by communities in local government planning processes.

Cost-Effectiveness

In Lilongwe, Malawi, the community paid back half of its arrears to the water board in one year while enhancing its water supply (Water Aid 2013). In one year of operation, 2,000 previously nonpaying customers in Dhaka paid for water, generating an additional USD 52,000 in revenues. In an informal housing area in Dhaka, the utility's revenue collection rate rose to 99 percent (Drabble 2015). The main costs of expanding access to clean water through this model are the upfront costs of stakeholder consultations and facilitation efforts. As more end-users are reached, the per user costs decline.

Taking It to Scale

Challenges

The model targets very specific urban population segments. Its potential development impact is therefore limited. Other models need to complement it to provide universal access to safe drinking water.

Role of Government and Policy

Governments are ideally positioned to facilitate the scaling-up of this model. Increasing access to water in this manner fulfills part of their mandate and reduces water theft and illegal water provision.

So far national governments have been only marginally involved in supporting this solution, however. In some countries, such as Madagascar, local governments partially cover the cost of building water kiosks, the management and operation of which they contract out to a local enterprise or organization. Full-scale government support and adoption of the model as a part of the national plan and strategy has not yet occurred.

Table 1. Selected utilities participating in the hybrid model of water distribution

Company	Country	Description
Aguatuya	Bolivia	Project involved municipality of Cochabamba, city's water municipal service (SEMAPA), Aguatuya, and water users, who were organized into water committees or cooperatives. Agua Tuya constructed secondary water systems on behalf of water committees and coordinated with SEMAPA so that it could plan where to direct its main water pipelines. Partners helped build water committees' capacity to manage and maintain their own water systems.

Dhaka Water Supply and Sewage Authority (DWASA)	Bangladesh	DWASA supplies a tank and water, which community members access through a shared connection managed by the users association, which pays a single bill to DWASA and maintains the hand pump used to draw water from the tank (Drabble 2015).
eThekweni Metropolitan Municipality	South Africa	Multistakeholder approach brings private sector, civil society, academia, donors, and public sector together to extend water and sanitation services to the unserved through standpipes.
Ghana Water Company Ltd. (GWCL)	Ghana	Community water management committee purchases water from GWCL and contracts with individual water vendors to sell it from standpipes that are supplied and owned by GWCL.
JIRAMA	Madagascar	Water users association (WUA) purchases water from JIRAMA. Municipal government builds and owns water kiosks and contracts with the WUA to operate them.
Lilongwe Water Board (LWB)	Malawi	WUAs are established as legal entities that sell water and receive management services from LWB. The WUAs employ water attendants and kiosk inspectors. The kiosk management unit of LWB oversees kiosk operations. LWB plans to eventually establish the unit as an independent and financially self-sustaining entity (Water Aid 2013).
Lusaka Water and Sewerage Company (LWSC)	Zambia	LWSC has full operational and commercial responsibility for all 33 peri-urban areas in Lusaka, 10 of which are overseen by “water trusts,” which include representatives from national and local government, service providers, local businesses, and communities. LWSC delegates responsibility for providing water services to the water trusts, which oversee service delivery to low-income communities. Water trusts manage water kiosks and revenue collection.
Nairobi City Water and sewerage company (NCWSC)	Kenya	NCWSC supplies, installs, and connects water chambers and all secondary-level pipe work leading to them. “Small water enterprises” are responsible for the pipe work from the water chamber to their water selling points. The community has a voice and actively participates in the planning, construction, and operation of their water services facilities. Practical Action facilitated the process.
PALYJA/Suez	Indonesia	PALYJA supplies clean water from the piped network to a metered connection close to the community. A CBO oversees delivery of water to the community and manages billing. Community members invest and maintain their own delivery infrastructure, through community standpipes or direct delivery to homes (Hystra 2011).
Sénégalaise des Eaux (SDE)	Senegal	Under this public-private partnership, in operation in Dakar since 1996, SDE manages the water system under an operations and maintenance contract in which it is paid by volume of water sold, incentivizing coverage. SDE works with NGOs to mobilize low-income communities to establish water communities and new standpipe connections. Operators buy in bulk and charge their customers a subsidized tariff.

References

- Bloom, David E. 2016. "Demographic Upheaval." *Finance & Development* 53 (1). <http://www.imf.org/external/pubs/ft/fandd/2016/03/bloom.htm>.
- Drabble, Sam. 2015. *Setting up an LIC Unit: DWASA's Approach to Serving Low-Income Communities in Dhaka*. Water and Sanitation for the Urban Poor, London. <http://www.wsup.com/resource/setting-up-an-lic-unit-dwasas-approach-to-serving-low-income-communities-in-dhaka/>
- Gitau, Beatrice. 2015. "The Kenyan Government Is Setting up 'Water ATMs.'" *Christian Science Monitor*, July 19. <http://www.businessinsider.com/an-african-government-is-setting-up-water-atms-2015-7>.
- Hystra. 2011. *Access to Safe Water for the Base of the Pyramid*. Paris. <http://hystra.com/safe-water>.
- Sy, Jemima, Robert Warner, and Jane Jamieson. 2014. *Tapping the Markets: Opportunities for Domestic Investments in Water and Sanitation for the Poor*. Washington, DC: World Bank.
- Udas, Sumnima. 2014. "Can These 'Water ATMs' Bring Relief to Thirsty India?" CNN, July 3. <http://www.cnn.com/2014/07/03/business/india-water-atm/index.html>.
- U.S. Centers for Disease Control. n.d. "Global Diarrhea Burden." Washington, DC. <http://www.cdc.gov/healthywater/global/diarrhea-burden.html>.
- Water Aid. 2013. *Managing Communal Water Kiosks in Malawi: Experiences in Water Supply Management in Poor Urban Settlements in Lilongwe*. <http://www.wateraid.org/~media/Publications/managing-communal-water-kiosks-malawi.pdf>

Additional Reading

- Duflo, Esther, Sebastian Galiani, and Mushfiq Mobarak. 2012. *Improving Access to Urban Services for the Poor: Open Issues and a Framework for a Future Research Agenda*. Abdul Latif Jameel Poverty Action Lab, Cambridge, MA. <https://www.povertyactionlab.org/sites/default/files/publications/USIpercent20Reviewpercent20Paper.pdf>.
- Tiberghien, Jacques-Edouard. 2013. *Hybrid Management Models: Blending Community and Private Management*. BPD Water & Sanitation, Water and Sanitation for the Urban Poor, and USAID. http://www.bpdws.org/bpd/mdr_pub/statsHandler_doc.aspx?r=percent2fwebpercent2fdpercent2fDOC_357.pdf.
- Water and Sanitation for the Urban Poor. 2014. *The Urban Water Supply Guide Service Delivery Options for Low-Income Communities*. London.
- . 2015. *Stand-Alone Unit or Mainstreamed Responsibility: How Can Water Utilities Serve Low-Income Communities?* London.

Profile: JIRAMA

Delivering water to low-income customers in Madagascar through a hybrid management model



Challenge

Few people in Madagascar have access to clean piped water. Even in the capital, Antananarivo (known as Tana), only a quarter of households have a private water connection. The majority of the population gets its water from standpipes and water kiosks, according to Water and Sanitation for the Urban Poor (WSUP).

Innovation

JIRAMA, Madagascar's state-owned water utility, delivers water to low-income consumers via kiosks, in partnership with underserved communities. The program has been piloted in Tana, where JIRAMA has an extensive piped network. Under the model, water is distributed through JIRAMA's pipe system to kiosks in low-income neighborhoods, which form water users associations. The municipality awards a management contract to the water users association to manage the sale of water at kiosks and to maintain the kiosks. The municipality, the association, and JIRAMA agree on a social tariff. The association collects payments from people buying water at the kiosk and pays JIRAMA for the water used at the agreed rate. Connection costs, which the municipality and utility pays, are repaid over time from the water revenue.

Customers pay less than USD 0.01 for 20 liters of water. Most water user associations earn a small margin on revenues, which they use to fund water, sanitation, and hygiene projects that benefit the community. These projects include cross-subsidies to the innovative community-based platforms developed under the WSUP program, which provide environmental services, including drainage canal cleaning and solid waste management.

By creating a single point of contact and billing, the model reduces the number of transactions between JIRAMA and customers, enabling it to manage the challenges of serving low-income areas. As an extension of the model, JIRAMA is offering better-off customers individual water connections through an easy payment arrangement.

Impact

The scheme has grown beyond its original pilot, and as of July 2017, the program serves about 700,000 low-income residents in Tana, about a third of the city's population, providing them with clean drinking water for the first time. Ninety-five percent of water user associations involved in the program in Tana report recovering their operating and maintenance costs. The program projects that 86 percent of kiosks in urban areas will be covering operating and maintenance costs within 10 years and will have paid off connection charges and other capital costs in this time. The success of the model has led water user associations to take on other responsibilities related to water, such as operating community laundries. A platform representing all of the associations has been formed, increasing the voice of low-income citizens in a range of governmental planning processes.

Scaling Up

The catalytic role of organizations such as the Water and Sanitation for the Urban Poor program has been essential to enable the development of a new model and to build the capacity of the Water Use Associations and local stakeholders. More investment is also needed to scale the model further. The lack of funds to cover the costs of kiosk infrastructure and connections is a major constraint. Additional investment is also needed to increase the treated bulk water capacity in JIRAMA's system.

Profile: Ghana Water Company Limited (GWCL)

Delivering water to low-income customers through a hybrid management model



Challenge

Two million annual deaths occur due to unsafe water, sanitation and hygiene and four percent of the global disease burden could be prevented by improving water supply, sanitation, and hygiene.

Underserved residents in Kotei, Ghana access water of unknown quality from hand-dug wells, or purchased from boreholes or on-sellers at around USD 1.65–3 per cubic meter. The official charge for obtaining a household connection in Ghana is around USD 100 but it is estimated that the actual full cost to the utility once investments and financing are taken into account is closer to USD 350 per connection. In Ghana, the GWCL, a state-owned, limited liability company, has national responsibility for urban water supply and operates around 80 systems. Fourteen million people fall within GWCL's mandate; of these, four million are underserved. GWCL must find ways to provide clean, safe water to low-income urban consumers that cannot afford household connections.

Innovation

The model delivers water via community standpipes to low-income consumers in partnership with these underserved communities. The model requires the legal formation of a Community Management Committee (CMC), with representatives from the community and local government. GWCL retains ownership of the piped infrastructure and is responsible for upkeep and maintenance, but awards a management contract to the Committee. The Committee then employs an administrator to manage the sale of water within the area to be served. It liaises with the community within the scheme area, manages complaints, and locates and contracts individual water vendors to sell water from the delivery points (standpipes) in the GWCL system. Finally, the Committee collects money from the water vendors through its administrator and pays GWCL the bulk tariff that has been negotiated.

The Community Management Committee in Kotei negotiated a bulk tariff with GWCL which amounts to USUSD 0.30 per cubic meter. Water vendors are allowed to charge customers USUSD 0.50 per cubic meter. This margin is sufficient to cover operational costs and give water vendors a viable livelihood.

Impact

The pilot scheme in Kotei provides clean water to 5,000 people and the second scheme will provide water to about 32,000 people. In Kumasi, the next roll out, 900,000 people lack safe drinking water and so there is a much greater demand than is currently being met by this scheme or other GWCL provision.

Despite charging less for the water than for an individual domestic connection, a recent sustainability survey of water supply in Kotei indicated that the Community Management Committee is covering its costs and has developed a trusted relationship with local consumers.

Scaling Up

The model reduces the number of transactions that GWCL would have to make with individual customers because they have a single point of contact and billing. This enables them to manage the challenges of servicing low-income customers who can have high default rates and live in settlements in which infrastructure is vulnerable to vandalism and theft.

GWCL is a large, complex organization, making it difficult to be flexible and to develop innovative business models that are different from its core operations providing piped water to households. In

such a context, the role of catalytic organizations such as WSUP has been essential to enable the development of a new model.

Sources

- Musah Issaka Balima, Country Programme Manager, Water and Sanitation for the Urban Poor Ghana, Phone interview with author, May 2015
- Leathes, Bill. 2012. *Delegated management of water and sanitation services in urban areas: experiences from Kumasi, Ghana*. London: Water and Sanitation for the Urban Poor
- Peal, Andy. 2015. *Stand-alone unit or mainstreamed responsibility: how can water utilities serve low-income communities?* London: Water and Sanitation for the Urban Poor
- Water and Sanitation for the Urban Poor. 2014. *The Urban Water Supply Guide Service delivery options for low-income communities*. London: Water and Sanitation for the Urban Poor