safe water network

# Ghana Market Assessment:

## Market-Based Provision of Water at the Community Level

**Executive Summary**

**MARCH 2013**

Developed with support from the Conrad N. Hilton FOUNDATION

**This Executive Summary provides an overview of the full assessment, which will soon be available for download at www.safewaternetwork.org following input from participants at the Beyond the Pipe Forum on March 20, 2013 in Accra, Ghana.**

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The study was carried out by members of Safe Water Network's team in Ghana: Joseph Ampadu-Boakye (Program Manager), Charles Yeboah (Health & Hygiene Manager, M&E Support) and Francis Tetteh-Zomayi (Program Officer). Additional Safe Water Network staff, including Amanda Gimble (SVP Strategic Initiatives), Hew Crooks (SVP Operations), Bob Stea (VP Technical Assistance), and Ryan Hebert (Program Associate) offered analysis that was incorporated.

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In addition to the Conrad N. Hilton Foundation, we would like to thank the PepsiCo Foundation, the Newman's Own Foundation and Kosmos Energy. Without their important ongoing support of our work in Ghana, this report would not have been possible.

# ABOUT SAFE WATER NETWORK-GHANA

Safe Water Network is a nonprofit organization with a mission to be an active catalyst and sector leader in the development of market-based solutions that provide water access to underserved populations.

We set out in 2008 to prove that locally-owned water systems could provide safe, affordable water to the poor in Ghana. Our initial involvement was to fund the installation of five sites implemented by WaterHealth Ghana, a subsidiary of WaterHealth International. In 2010 we assumed primary management of these sites to further refine operating models and improve viability. In the first quarter of 2013 we are launching new water systems using different technologies in the Volta, Eastern, and Western Regions. With the help of our partners from the public and private sector, we are now advancing promising models that can be scaled and sustained over time to achieve lasting health and livelihood benefits to the communities we serve.

# EXECUTIVE SUMMARY

## Assessing the Potential for Market-Based Approaches

Safe Water Network, with funding from the Conrad N. Hilton Foundation, completed this Market Assessment to evaluate the potential for decentralized market-based approaches to provide sustainable safe water to the poor. "Market-based approaches" include both commercial solutions in which capital is recovered and hybrid solutions in which operating costs are covered and cash reserves are built up for operation and maintenance repairs through affordable user tariffs. The water service can be provided and managed by a local community or the private sector (i.e. entrepreneurs, private companies, etc.). In both cases, the goal of these approaches is to establish the local ownership, capacities, financial resources, and support systems needed to ensure the long-term sustainability of water systems (see **Exhibit 1** to this summary).

The focus of this Assessment is on the poor in rural communities and small towns not supplied or connected by municipal systems. The Assessment built on the Conrad N. Hilton Foundation's considerable and long-term investment and commitment to water access in Ghana and leveraged Safe Water Network's four years of field experience derived from its market-based water initiatives, which provide access to safe water for over 200,000 people, including 36,000 in Ghana.

Consumer buys water at Safe Water Station, Dzemeni, Volta Region

The following were incorporated into this Assessment:

i Desktop analyses (literature review, policy review, in-field data);

ii Field-based research (in-field case studies, interviews with technology providers, entrepreneurs, households, financial institutions, and site visits);

iii Active engagement of water sector stakeholders at the national, regional and district levels, including a mid-term workshop (March 2012) to review interim findings, and a final review with advisors and stakeholders[1] to provide input on draft report and recommendations (October 2012);

iv Financial modeling to determine the potential for communities of various sizes to support market-based approaches; and

v Insights from the evaluation and development of a Modular Slow-Sand Filtration demonstration project in two pilot communities – Aveme in the Volta Region and Akateng in the Eastern Region – where implementation of the water systems is nearing completion.

## Six Requirements for Sustainable Water Services

This Assessment identifies key barriers and proposed solutions to providing sustainable water service using a market-based approach targeting the poor (see summary on challenges to sustainability in Exhibit 1 of the full report). The key barriers and solutions have been structured across the following thematic areas: (1) consumer engagement (2) water system technologies (3) local capacity (4) policy environment (5) economics and (6) financing.

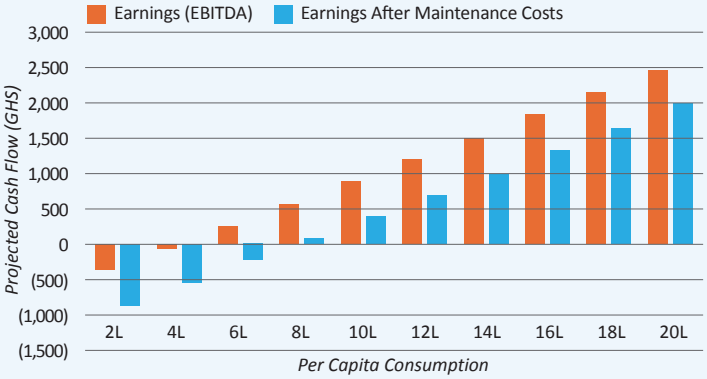
1. A list of advisors consulted is included as Exhibit 3 of the full report.

# 1. CONSUMER ENGAGEMENT

In most rural communities in Ghana, people are accustomed to easily available, free and often unsafe water from surface water and other sources. The Ghanaian government and NGOs operating in country have historically provided water facilities, and sometimes maintenance and repair, for free. There is therefore a weak culture of paying water tariffs in most rural communities in Ghana, which makes it difficult for commercial water systems to raise the revenue needed to meet operating and capital maintenance expenses. Our field research indicates that, where consumers are asked to pay for the treated water they receive, consumption levels average just 2-3 liters per capita per day (lpcd) – far lower than the World Health Organization (WHO) recommended consumption of at least 7 lpcd for drinking and cooking. Even where consumers have a high willingness to pay for safe water in principle, this willingness is strongly influenced by convenience. Our GPS mapping exercise at five Safe Water Stations managed by Safe Water Network showed high adoption among households near the site, but a significant drop-off beyond 100 meters.

Prince Adoboe, Safe Water Station Manager in Dzemeni, Volta Region, works with peer educators.

**Figure 1: Cash Flow vs. Per Capita Consumption**




Economic modeling of system revenues shows the critical importance of per capita consumption (assumptions: LMS-based water system serving a community of 1,000 people at 70% household penetration)

***Key Recommendation***

**Ensure convenient access, implement effective outreach, and incentivize health educators to drive safe water use.**

A three pronged strategy can be employed to address these barriers:

i Improving convenience of access by establishing delivery services and additional points of sale can significantly increase the adoption rate and per-capita consumption of safe water. In Safe Water Network's sites in Ghana, these approaches contributed to an immediate and significant increase in safe water consumption. A study in four regions in Ghana concluded that the spacing of standpipes (typically 300-500m apart, but sometimes up to 1km apart), coupled with limited hours of operation and long queues, represented a significant deterrent to the use of water systems.[2]

ii Implementing effective and comprehensive messaging and outreach programs can also lead to increases in consumption levels. Safe Water Network implemented an outreach program at our Ghana sites beginning in 2010, which included establishing local health and hygiene teams to conduct outreach and education encouraging the use of safe water. This program, together with other system improvements, led to a 200% increase in safe water consumption over the ensuing two years.

iii Providing incentives can motivate health and hygiene volunteers to increase public awareness of the benefits of safe water and increase the consumption of treated water. Our case study of a water system in Odomasua[3] demonstrates that incentives for Water and Sanitation Management Teams helped raise consumption levels to some 13 lpcd. Safe Water Network has implemented a similar approach at our sites, where health and hygiene teams are provided incentives including t-shirts, certificates and education allowances.

2. EIB-AFD Ghana Rural Water Supply and Sanitation Program. Feasibility Study Volume 1. Study undertaken by Mott Mac Donald, Tremolet Consulting and others. May 2012
3. Odomasua is a rural community in the Afram Plains in the Eastern region of Ghana with a population of about 800 people.

# 2. WATER SYSTEM TECHNOLOGIES

In Ghana, sector investment in new water systems has generally gone into providing ground water technologies including boreholes, hand-dug wells and small town piped schemes. The country now has roughly 24,000 boreholes and 4,500 hand-dug wells with hand pumps. These systems involve a low capital investment, but require the user to expend significant time and energy pumping water – a burden that lowers willingness to pay. Further, where small-town piped systems are provided, they are often designed and constructed based on projections for consumption that are far higher than what occurs, resulting in overbuilding and unnecessarily high per-liter capital and operating costs. While most water systems in Ghana are designed to provide the World Health Organization-recommended consumption of at least 20 lpcd (for all uses), actual treated water consumption levels are low (some 2-3 lpcd), particularly in rural areas, as noted above.

Although Ghana is endowed with surface water resources including lakes, rivers and streams, these water resources are under-utilized because groundwater is often considered safer. The 2,500 water facilities in the Volta Region, despite the region's proximity to the Volta Lake, rely primarily on groundwater resources. The roughly 11% of households in Ghana that do rely on surface water for drinking often use it without treatment, resulting in a high incidence of water-related diseases include schistosomiasis, typhoid fever, diarrhea and Buruli ulcer. In Ghana, about 15 million infections of schistosomiasis are recorded annually.[4]

***Key Recommendation***

Limited Mechanization Systems, Modular Slow-Sand Filtration, and Membrane Filtration show significant potential to serve the poor.

The majority of rural communities are also without electricity, which is another barrier to providing appropriate technology for the poor as it restricts the options for pumping, conveyance, and treatment of water. In addition, electricity used for water supply attracts commercial tariffs, which can be very high on a per-liter basis.

4. http://www.medicineonthemove.org/index.php/insci/what-is-schistosomiasis


Children collecting contaminated water from Lake Volta

To address these technology challenges and provide convenient, affordable access, this Assessment identifies three key treatment technologies with significant potential to provide sustainable safe water access to rural communities in Ghana:

i Limited Mechanization Systems (LMS) can leverage the existing 24,000 boreholes in Ghana[5] and provide more convenient access than hand-pump systems, at a relatively low level of incremental investment (~$24,000 for 1,000 population) and operating cost. LMS could potentially serve some 3 million people in Ghana[6]. The approach is most promising in seven of the ten regions in Ghana, which collectively house some 16,400 existing boreholes. In the remaining three regions– Northern, Upper East, and Upper West–falling groundwater levels makes it challenging to apply LMS[7].

ii Modular Slow Sand Filtration (MSSF) can address microbial contamination in surface water. Our pilot projects in Aveme and Akateng seek to demonstrate the potential for MSSF technology to be further deployed in Ghana. This technology can provide a reliable, appropriate and sustainable solution at a cost of roughly $40,000 for a 1,000 population. It is relatively easy to operate, and the modular aspect provides the flexibility to expand with demand, avoiding overspending on unneeded capacity. MSSF is most promising in communities along the Volta Lake and other perennial water sources with low turbidity.

iii In communities where MSSF and LMS are inadequate to address local water source challenges, Membrane Filtration (MF) can be deployed. MF is particularly appropriate for communities with surface water resources that have a highly variable physical/chemical contamination including turbidity, iron, manganese and color bodies. Due to higher capital requirements ($50,000 - $100,000) and operating costs, the approach is best-suited to larger communities (populations over 3,000) to reduce costs per capita.

Together, MSSF and MF could serve some 1.2 million people in Ghana[8].

Limited Mechanization System, Somsei, Eastern Region
(Case study available in Final Report)

Safe Water Network's Modular Slow Sand Filtration System, Aveme, Volta Region

In addition to water treatment options, solar power can reduce operating costs and provide water access to communities without a reliable source of electricity, most of which are poor rural communities. Although the capital outlay is higher than for grid-based supply or diesel generators, the price of solar panels has decreased significantly and continues to drop. On a purely economic basis, solar power is most appropriate for larger communities with significant pumping requirements. On the other hand, smaller communities are least likely to have electricity supply, which makes solar electricity a necessity for a mechanized water system. There is also the potential to generate additional revenue from adjunct businesses, such as cell phone charging. Solar power could help to serve up to 8.5 million people in rural areas[9].

5. According to CWSA, the distribution of boreholes across all regions in Ghana as of 2010 are as follows: Ashanti (6151), Brong Ahafo (2400), Central (1514), Eastern (2306), Greater Accra (227), Northern (4104), Upper East (2120), Upper West (1621), Volta (2275) and Western (1317).
6. 350k people in communities less than 1,000 population; about 480k in communities with population ranging from 1,000-2,000; and 2.1million in communities with population ranging from 2,000 to 50,000. This is based on CWSA data on water coverage in 2010. These communities have at least one borehole. However yield tests would have to be carried out to identify boreholes with potential.
7. Water Resources Commission (2011) Medium Term Strategic Plan for Integrated Water Resources Management in Ghana (2011-2015). Final Report. Draft 1. Volume 1
8. This figure is based on data provided by CWSA on communities without any potable water facility. It has been assumed that these communities are currently not served because of poor ground water potential which makes them unsuitable for provision of boreholes.
9. This figure is based on 2010 population census that estimates rural population to be 12.1m. About 70% of rural communities are without electricity.

# 3. LOCAL CAPACITY

There is currently limited oversight, operation and technical servicing capacity for most communal water systems in Ghana. Although Municipal and District Assemblies have legal ownership of water systems, they have not been able to provide adequate training and supervisory support to manage water systems at the community level. Most Water and Sanitation Management Teams (WSMTs) at the community level are inactive, and rely on the goodwill of individual members to function. This weak local capacity inhibits the ability to repair and maintain water systems and limits the ability to generate adequate cash flow to enable sustainable operations.

The resultant effect is that many water systems are not working as expected. For example, according to a study by the IRC Triple S Project, about 78% of hand-pumps are not working as expected: 29% are broken, while an additional 49% are only partially functional[10].

This Assessment identifies three approaches to address local capacity challenges:

i Building the capacity of Technical Institutes to train local technicians in the repair and maintenance of water systems. These secondary educational institutions provide practice-oriented professional training and can contribute to developing the required local-level technical capability to manage water systems. There are over 30 Technical Institutes in Ghana – at least two in each of Ghana's 10 regions. These institutes currently produce technicians who manage various water systems in Ghana particularly for the Ghana Water Company Limited.

***Key Recommendation***

**Strengthen the capacity of Technical Institutes and provide appropriate incentives to WSMTs, operators, vendors, and EHAs.**

ii Professionalizing the work of WSMTs, operators, and vendors responsible for community water systems by introducing monetary incentives, allowances and commissions. Similar incentives are provided for most piped systems in Ghana, which has resulted in a comparatively higher level of functionality of their management structures.

iii Providing non-monetary incentives, including certificates and citations, to Environmental Health Assistants responsible for providing oversight on community water and sanitation issues, to encourage them to provide supportive supervision to WSMTs. Non-monetary incentives for both individuals and communities (such as certificates and citations at national events) are part of the sector strategy for sanitation promotion, and the approach has shown some success – communities that have been rewarded as part of this strategy have remained open-defecation free.

10. This study was carried out in three districts located in the Northern, Brong Ahafo and Volta regions of Ghana.

Broken municipal borehole in the Volta Region, out of commission for over a year for the want of GHC 20 (US$10)

Emmanuel Tsenu, Safe Water Station operator in Dzemeni, Volta Region

# 4. POLICY ENVIRONMENT

The combination of limited enforcement of tariff legislation and a ban on community contributions to water system capital expenses make it highly challenging to recover costs, especially in rural communities. Some NGOs continue to provide water systems and related services to communities for free – an ultimately unsustainable approach in conflict with official sector policy, which requires that communities take responsibility for the repair of water systems. The availability of these free sources reduces demand for pay-as-you-fetch water systems, an approach with far greater potential for sustainability.

Furthermore, there is lack of clarity on the respective roles and responsibilities of the Community Water and Sanitation Agency (CWSA), Ghana Water Company Limited (GWCL), and other actors including private companies and NGOs. This creates a situation where municipal services compete with private sector initiatives, leading either to duplication and waste of scarce resources, or worse, to a service vacuum in which private providers postpone investment but the promised public funding never materializes.

Two solutions are recommended:

i There is a need for dialogue among the Ghanaian government and its partners, NGOs, and other civil society organizations for improved enforcement of appropriate and affordable tariffs for water systems. The Ghanaian government should ensure that tariffs are charged on all water systems, at a level that enables financial sustainability while remaining sufficiently affordable to allow broad inclusiveness. Evidence from our case studies suggests that where tariffs are affordable and enforced, consumers show a high willingness to pay for improved levels of service. In the case study of Odomasua, a rural community in the Kwahu North Afram Plains district of Ghana, the community was able to effectively apply tariffs to all water systems in the community including a Limited Mechanization System provided by the Afram Plains Development Organization (APDO). Meanwhile, APDO provided a similar water system at Somsei, a rural community located roughly a kilometer from Odomasua, but without enforcement of tariffs. The system has had challenges raising revenue, and to date has not saved up any significant reserve for repair and capital maintenance. This is likely to result in the eventual failure of the system unless significant changes are implemented.

***Key Recommendation***

Improve the enabling environment for private participation by enforcing affordable tariffs and eliminating overlap in the jurisdictions of different government agencies.

ii The Ghanaian government should eliminate overlap in jurisdiction and accountability among sector stakeholders. To promote private sector participation in water services delivery, the Ghanaian government needs to elaborate on the framework for private sector participation in the rural and small-town water sector and clearly identify potential opportunities for private sector investment.

# 5. ECONOMICS

Commercial approaches that recoup capital are likely to succeed in poor communities with larger populations (greater than 5,000). Our analysis identified some 400 communities above this size with less than 50% water coverage – in these communities, fully-commercial approaches could provide safe water access to roughly 3.7 million people[11].

Approaches that rely on capital recovery are generally unrealistic in communities with populations under 5,000 if prices are to remain affordable. At a tariff of GHS 0.05/20L (the prevailing rate in most parts of Ghana), our business case concludes that day-to-day operating costs can be recovered for LMS and MSSF water systems with a threshold population of 700 and above – but even this would be challenging, and would require a higher per capita consumption (about 8 lpcd) than is currently the norm. Installing these water systems in communities with populations less than 700 will require subsidizing operating cost. The potential for building cash reserves increases with higher population or higher levels of per capita water consumption.

Reducing the operating and capital cost of water systems will enhance the prospects for providing sustainable water services to the poor. This can be achieved by adopting the following strategies:

i In addition to deploying the low-cost technology options identified above, establishing systems to serve clusters of nearby communities, with centralized training and technical support, can lead to a reduction in capital and other operating cost as well as streamline management. This is particularly critical in addressing the needs of rural communities where the majority of the poor live. The community water system at Mafi Kumase in the Volta region is an example of a single water system (traditional slow sand filtration) that serves a cluster of some 20 communities and is managed by a Water and Sanitation Management Team. WaterHealth Ghana has expanded rapidly since beginning operations in 2009, and their experience over the coming years will represent an important case study for evaluating the viability of a cluster approach.

ii Hybrid solutions, in which capital recovery is not required, can enable sustainable services in smaller and poorer communities. Our economic modeling projects that an MSSF or LMS-based water system can generate sufficient revenue to cover its operating costs and accumulate a reserve for maintenance and repairs in communities with populations of 1,000 people. This can be further reduced to 700 if the initial capital costs are provided as a grant and if maintenance and repair costs are covered through an ongoing subsidy.

***Key Recommendation***

Small, poor communities (700-1,000 population) can be served while covering operating costs if per-capita consumption is strong, if clustering approaches are employed, and if recovery of initial capital is not required.

11. This figure was deduced from CWSA database on water coverage rates for all communities in 2010. These communities had less than 50% water coverage rates.
12. Summary outcome from business cases included in Final Report

**Figure 2 Sustainability Potential at Varying Population Sizes[12]**

# 6. FINANCING

A preliminary qualitative survey completed as part of this Assessment indicates that there is a potential to develop and utilize financing solutions, including microcredit and SME financing, to catalyze provision of safe water for the poor. Finance solutions can be applied to support household access to safe water and to promote water-related business activities. Roughly 50% of rural households surveyed[13] expressed interest in accessing a microcredit facility to improve access to safe water, while some 40% of water-related businesses expressed interest in accessing available credit facilities. Based on income levels, we estimate that only 12% of the households and businesses would qualify for a loan using a debt-service coverage of 3x[14].

There is a lack of a well-structured financial products targeting water provision for the poor and an inadequate funding base of financial institutions. The water sector has not been perceived as commercially viable and is therefore viewed as a high-risk venture for financial sector institutions. The cost of capital is high (interest rates are about 30%) and most financial sector institutions in Ghana are risk-averse. This makes it highly challenging to develop appropriate lending products for capital projects to provide safe water targeting the poor.

There is little precedent for government provision of microfinance to support water supply, however, the experience of the USAID-funded initiative with the local microfinance institution Youth and Social Enterprise Fund (YSEF) and CHF International demonstrates the potential for microfinance to be an effective tool for improving access to safe water for the poor. The initiative provided microcredit to households and water-related enterprises in selected communities in the Greater Accra and Western regions to improve access to safe water and sanitation facilities.

Promising loan products that could potentially enhance access to safe water for the poor in Ghana include the development of: (1) piped water connections and shared water facility credit for households; (2) capital finance loans, and repairs and maintenance credit for communities; and (3) capital financing loans and working capital loans for businesses/entrepreneurs.

***Key Recommendation***

**Water financing, including microcredit for households and SME financing for businesses, could be developed and deployed to catalyze provision of safe water for the poor.**

There is an opportunity for government and other investors to catalyze the development and financing of water solutions through:

i Establishment of a rural water financing fund to lend directly to identified microfinance institutions at subsidized rates. Most MFIs do not have adequate funds to support lending periods as short as 12 months. This fund will provide interested MFIs with the requisite funds for on-lending to rural clients on a longer-term basis.

ii Establishment of a guarantee fund for financial institutions to support water financing. Such a fund could provide a wide range of guarantee products including partial portfolio guarantees for financial institutions already lending towards rural water financing; institutional and portable guarantees to enable microfinance institutions to access long-term funds for on-lending to rural and peri-urban poor; and innovative financing schemes such as micro-leasing for water-related entrepreneurs and businesses.

iii Establishment of a wholesale fund for rural water financing. The main difference between this option and option i is the creation of a pool of funds from different stakeholders that will be registered and managed by a team wholly dedicated to the process.

13. This was based on a survey in two districts each in the Eastern and Ashanti Regions.
14. It is important to remember that given that loan sizes differ you can have more than 12% qualifying for different sizes of loan.

# CONCLUSION & NEXT STEPS

Based on the findings above, our primary conclusion is that community-level market-based solutions (in some cases fully commercial, and in others hybrid), have the potential to provide safe water access to between 4 and 8 million[15] out of the 10 million underserved population in Ghana on a sustainable basis particularly for the poor. Success will depend critically on the ability to engage with consumers to increase per-capita consumption of safe water, widely deploy appropriate low-cost technologies, partner with local institutions to build capacity at the community level, improve the enabling regulatory environment for private participation, and provide appropriate financing where needed.

We recommend further investigation of the following to address knowledge gaps.

- The transmission of water from source to site can represent a high proportion of total system costs[16]. More research is needed to understand how to reduce the cost of water abstraction and conveyance. There is a dearth of knowledge on appropriate alternatives in Ghana to the use of conventional piping and pumping – such as gravity fed systems – that would transport water from its source to the point of treatment. Exploring the feasibility of other options and their potential psycho-social implications (especially the use of simple solutions such as donkey carts) is needed.

- There is little information on water consumption for domestic and other uses in Ghana. There's a need to better understand willingness to pay and price elasticity, particularly as it applies to the poor. Related to this issue is the need to further disaggregate water consumption across geographical, gender and income classifications. This will enable the sector to deploy appropriate technology and service delivery strategy to meet the needs of consumers. What factors, beyond convenience and education, affect the demand and consumption of safe water, and how do we address these factors to increase demand for safe water?

- Developing and field-testing financial products, including microfinance and donor- or government-backed loan guarantees, could alleviate a major bottleneck in the sector. What are the prospects and barriers for providing funding for lending by MFIs and what is the potential role of stakeholders – Ghana Government, Development Partners, MFIs, District Assemblies, CWSA, GWCL etc.?

- More work is required to develop viable models for technical servicing. Long-term maintenance and repair services can be costly, and to date it has been very challenging for water systems to set aside sufficient revenue to support these services. Safe Water Network is developing a model for a Water Services Entity that would train and mobilize local technicians to support clusters of water systems; however, viability has not yet been demonstrated.

- Safe Water Network has identified a range of criteria for identifying communities with a high potential for market-based water solutions (reviewed in the main report and further detailed in our *Tools for Safe Water Stations*[17]); further refining these criteria into a formal "Readiness Assessment Framework" and broadly surveying Ghanaian communities for their fit would enable approaches to be applied in the areas where they have the greatest chance of succeeding.

Further details on Safe Water Network's Ghana Market Assessment can be found in the complete report soon available on the Safe Water Network website. For more information, contact Joseph Ampadu-Boakye, Program Manager, at jaboakye@safewaternetwork.org.

15. About 3.7 million people can be reached through fully-commercial solutions, while 4.2 million can be reached using the proposed technologies (MSSF, LMS, and UF). It is not currently known how much overlap exists between the two groups.
16. The cost of electricity for pumping and distribution currently accounts for about 22% of operating cost of Safe Water Network's Ghana sites.
17. For more information on our Toolkits, please contact Dave Colner, Communications Associate, at dcolner@safewaternetwork.org

# EXHIBIT 1:

# REQUIREMENTS FOR LOCAL OWNERSHIP AND SUSTAINABILITY

The following is Safe Water Network's list of criteria that must be achieved in order for community-level water systems to be locally sustainable. This list has been informed by our operating experience in Ghana and India as well as by the findings of this Assessment.

| STRATEGIC AREA | CONDITIONS |
|---|---|
| Consumer Engagement | • Community participation<br>• Capable volunteer system<br>• Peer education for demand generation and health & hygiene education (schools and health facilities) |
| Operational | • Capable and well trained operators<br>• Indications of long term operator engagement<br>• Understanding of operations<br>• Maintenance schedules and agreements<br>• Existence and functionality of supporting entities (WSMTs, Water Services Entity) Environmental Health Assistants, District Water and Sanitation Teams etc. |
| Technical | • Ability to handle breakdowns<br>• Routine water quality testing to local standards<br>• Technical support availability |
| Environmental | • Source water management and long-term availability (quantity and quality)<br>• Alternative sources of raw water<br>• Waste stream management |
| Financial | • Achieving operational breakeven<br>• Surplus or management fees (bench marked at 20% of Operations and Maintenance)<br>• Adequate bookkeeping and cash management regimes<br>• External support for deficits (if required) |
| Administrative | • Engaged WSMT<br>• Financial management capability<br>• Adequate human resource pool |
| Monitoring and Evaluation | • Recording, reporting and analysis capability of operators and WSMTs<br>• Process for reporting to local stakeholders<br>• Process for reviews and modifications |