Overcoming Barriers to Women's Participation in Water Supply through Innovative Technology

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ABSTRACT

Research from the global development sector repeatedly shows that convenient access to safe water improves women's quality of life. Similarly, digital technology is increasingly highlighted as an essential component for increasing women's educational, economic, and civic opportunities—yet a gender divide exists. As digital technology becomes more prevalent in managing effective and reliable safe water services, the water sector has the opportunity to both create new channels for women to engage with technology and use technology to make safe water supply more responsive to women's needs. In this article, we will explore how technology is deployed within the small water enterprise (SWE) value chain to produce benefits for women beyond immediate safe water access. Using Safe Water Network's experience in India, where it launched a program with Honeywell Hometown Solutions to center women as safe water suppliers, as well as Saha Global's program in Ghana, we will highlight how technology advances women's roles as active participants in the local economy through their responsibilities as SWE managers and operators.

1 INTRODUCTION

The role that water plays in the lives of women, especially in emerging markets across the Global South, is well-documented: research from the global development sector consistently shows that the lack of convenient access to safe water negatively affects women at all stages of life (Das, 2017). In particular, the Ripple Effect study identified both direct and indirect impacts of water programs across eight "pathways": health, income, nutrition, safety and security, education, leadership and skills, time savings, and shifting roles and norms (Ipsos, 2018).

Innovations that improve water access are rightly celebrated for reducing the burden of water collection on women. Women must often travel far distances with heavy containers to secure sufficient water for their household's daily needs (Geere and Cortobius, 2017) and are the primary caregivers for family members stricken with waterborne illnesses.

However, when the international development sector shares reports about women and water, the focus is often only on women as water collectors and users vis-a-vis their traditional domestic role within the family. This narrative places women on the receiving end of the water value chain—but what about women's roles in the production and supply of safe water? We at Safe Water Network believe that women can play critical roles through the entire value chain. To enable women's participation, innovations, specifically digital technology, should be leveraged.

PwC (Pricewaterhouse Coopers) predicts artificial intelligence (AI) combined with tools and talent will create $15.7 trillion of global value by 2030, but the social sector has only started to benefit from data production and usage. For the water sector, data and technology have the potential to revolutionize the customer experience, reaching the most remote villages through satellite imagery and geospatial mapping, eliminating water leakages (and hence non-revenue water), driving efficiencies, lowering costs, and spurring positive social impact while improving and expanding the existing knowledge base to inform public policy and investments. Digital technology can democratize access to data and actionable information, and in turn, safe drinking water.

This article will explore how different digital tools are deployed within the small water enterprise (SWE) value chain to produce benefits for women beyond immediate safe water access.

Safe Water Services through SWEs

SWEs are a growing sub-sector of water service providers within the global safe water space. While their implementing models range quite considerably, SWEs are uniformly characterized by their market-based approach, including:

- Providing reliable access to base-of-the-pyramid communities not sufficiently served by utilities or other conventional solutions
- Focusing on financial viability, working to cover both operating costs through revenue from sales.
- Prioritizing operational sustainability by identifying and addressing barriers to operational excellence.
- Implementing a consumer-oriented approach to service delivery, placing the consumer in the primary position of driving sustainable service delivery.

In emerging markets around the world, SWEs partner with local governments, social entrepreneurs, and community members, leveraging these relationships to create income-generating and leadership opportunities for women. For example, in India, 95 of Safe Water Network's 330 SWEs are managed by women. In addition to female social entrepreneurs, Safe Water Network works directly with district leadership to select and train local women-led Self Help Groups (SHGs), which then manage water treatment and sales for their communities. Other implementers employ women to conduct critical consumer education and safe water awareness activities, using their unique informal social networks to build trust and buy-in.

Technology as an Enabler

Like access to water, digital technology is increasingly highlighted as an important tool for increasing women's educational, economic, and civic opportunities (Gill et al., 2010). At the same time, digital technology has also become more prevalent in managing effective and reliable safe water services (Pule et al., 2017), and is even more critical in today's post-COVID world. Along with the broader water sector, SWEs are incorporating more digital systems and tools into day-to-day operations, spurred by the positive impact on financial and operational performance, consumer engagement, management, and service delivery.

Women in SWE communities tend to have less access to employment and livelihood opportunities outside of the house, especially in more technical industries. However, SWEs have successfully identified technology usage that reduces barriers to entry and enables women to actively participate in delivering safe water to their communities.

Examples from the Field

Digital technology can play an important role in allowing for the flexibility that women need to both enter the workforce and successfully manage their dual roles. For its program in India, Safe Water Network has developed audio-visual training content that can be delivered on-demand by field officers that provide technical and service support to individual SWEs. Field officers load standardized digital modules onto their mobile tablets and phones and bring trainees together at a convenient location in the community. The mobile devices allow for repeat playback of content, aiding memory recall and helping trainees develop the necessary skills to manage and operate SWEs.

Once onboarded as an SWE manager, women use other technologies to ensure high-quality water processing and safe water service delivery. Remote monitoring systems are integrated into the water treatment system to allow for operational oversight that does not require female SWE operators and managers to be present full-time at the water kiosk. The remote monitoring system uses sensors to capture nearly 20 technical and operational parameters, including voltage, pressure, volumes, quality, and sales. This data can be accessed remotely, ensuring that the women's time on-site is used most efficiently. The real-time remote monitoring approach was beneficial during lockdowns due to the COVID-19 pandemic, ensuring continuity of service delivery with less than 2% downtime.

Incorporating automatic water dispensers (or "water ATMs"), which allow for 24/7 water purchases, removed the need for someone on-site during sales hours to handle water sales transactions. Instead, SWE consumers use prepaid Radio Frequency Identification (RFID) cards, which can be topped up via cash mobile money or other e-payment systems, to purchase water. Over 90% of water sales revenue comes through these RFID cards. SWE managers use this revenue to cover operating costs, making payments to vendors and service providers through digital transactions. Not only do the water ATMs and digital payments mitigate women's already demanding schedules and increase water accessibility for the community, but the subsequent elimination of day-to-day cash management also helps reduce women's (and their families) concerns about security and physical safety.

Figure 1: iJal ("Water ATM") operator reviewing water flow parameters during a water plant visit. These data can also be accessed remotely to minimize on-site requirements, especially during COVID-19

Digital technology also supports community education and awareness around the value of safe water. As community mobilizers, women are especially effective at leveraging their informal social networks within communities to generate demand for safe water. Mobilizers are given incentives based on new consumer registration, RFID recharge, and delivery of specialized messaging and sales campaigns. To increase the effectiveness of their outreach into the community, they use audio-visual materials loaded onto mobile tablets to explain the importance of safe drinking water for health, share best practices on safe water handling and storage, and promote safe hygiene.

Digital technology is facilitating women's roles as water entrepreneurs even in resource-scarce environments where literacy and technology adoption rates are very low. Women are often hesitant to seek out opportunities in community water supply because they assume they do not have the required technical skills. In these communities, digital tools can play an important trouble-shooting role, ensuring that SWEs can access auxiliary services when needed.

Saha Global, an SWE implementer in Ghana, works with women in rural villages to launch micro-enterprises that filter and treat contaminated water using low-tech solutions, supported by regional customer care teams. Saha Global's goal is to expand safe water access. A considerable financial investment would be required to sufficiently build the capacity of its female entrepreneurs to manage and utilize digital technology in their day-to-day operations, increasing the costs of doing business and severely threatening the sustainability of the water service. Instead, Saha Global applies digital and mobile tools where they can be most efficiently deployed. For Saha Global, this means using technology to help the customer care teams optimize their processes to provide the best field support possible to individual entrepreneurs.

For example, customer care teams use mWater's digital data platform to manage and analyze field data, which is provided by each entrepreneur. With this data accessible remotely (even more critical within today's COVID-19 context), team members can make evidence-based decisions around field visit scheduling and supplies, identify technical priorities across geographies, and better target the content of follow-up communications with each entrepreneur.

In this way, Saha Global is using digital technology to support SWEs while keeping the water business low-tech, financially self-sustaining, and the price of water is minimal. This technology usage lowers the barriers to entry for female entrepreneurs, making it easier for women, who may not have strong digital literacy skills, to run their businesses successfully.

The Future of Women in Safe Water Supply

Both Safe Water Network's and Saha Global's experiences have demonstrated that digital technology can enable women to lead successful social enterprises, creating efficiencies and enabling remote monitoring, which helps with safety concerns and is especially critical in the post-COVID environment. While technology can exacerbate the gender divide, we posit that when technology is paired with training, women, and society overall, benefit. Instead of bearing the burden of water collection or being positioned as water consumers, aided by technology, women can be at the forefront of water production and water entrepreneurship. We endeavor to further examine possibilities and work with other SWE implementers to use digital technology to build a more inclusive society.

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