Social Impact Study on Piped-Connection Services for Safely Managed Water

Safe Water Network Ghana conducted a pre-post study in Bomfa Achiase with 60 piped-connection customers. The study was designed to gain insights into the impact of safely managed water on our customers’ daily lives.

The Joint Monitoring Programme of WHO/UNICEF defines safely managed water as “accessible on premises, available when needed, and free from contamination.” Safely managed water reduces both the need to store water and the number of trips to collect water. In addition, convenience promotes consumption, which leads to greater social benefits. In an analysis of the purchasing patterns of over 1,000 customers at 58 Safe Water Network Ghana H2OME! stations, piped-connection customers consumed up to four times the amount of water as standpipe customers. On average, piped-connection customers increased their usage from 12% to 60% of the minimum WHO recommendation of 50-100 liters per day.

In light of these benefits, Safe Water Network Ghana prioritized the expansion of our on-premise piped-connection service, which delivers water to households, schools, clinics, and commercial businesses. In 2020, we launched a project to build one new station and retrofit three existing stations, each of which accommodates 500+ piped connections. Optimized Piped Connection (OPC) stations are designed with a distribution network that extends throughout the community to make the cost of the connections to the home equitable. We set up a dedicated sales team to accelerate the uptake of connections. We also built a sales tracking mobile app that uses geographic information system (GIS) asset mapping to provide the sales team with automated and accurate pricing for connections.

The retrofits provided the ideal environment to monitor and evaluate changes experienced by customers before and after receiving piped connections. We selected Bomfa Achiase, a community of 3,700 people in the Ashanti region, to conduct a pre-post study of 60 consumers surveyed on consumption patterns and perceptions. Questions covered: (a) frequency (number of visits to water sources); (b) usage; (c) impact on daily activities, (d) subjective well-being; (e) perception of benefits; and (f) customer satisfaction.

A pre-post study is a quasi-experimental design used to evaluate perceptions and attitudes relative to an intervention. While this approach shows correlation, our results cannot demonstrate causation. Instead, we can show directionality and examine changes in perceptions and attitudes, which are crucial to driving demand for safe water and piped connections.

Key Findings

- Customers with piped connections greatly reduce the number of visits to groundwater and community standpipe sources. The number of trips for sachet water and rainwater are less affected.
- Piped-connection customers save an average of 309 minutes/week with reduced trips to groundwater and community standpipe sources.
- Respondents reported increases to their subjective well-being on topics related to finances, health, quality time, and life as a woman.
- Perception of benefits also increased for piped-connection customers.
- Customer satisfaction was high among those who received the piped-connection service.

1 https://washdata.org/monitoring/drinking-water
2 A new station was built in Nobewam and retrofits were completed in Bomfa Achiase, Bonwire, and Adanwomase
3 Customers pay for last mile of piping at an average of $85 per connection. Previously, customers who lived farther from the station would pay a larger cost than those who live closer.
METHODOLOGY

A pre-post study is a correlation design that surveys participants before and after an intervention takes place. Sixty (60) participants were surveyed on 21 questions two months before and after they received a piped-connection to their home.

Participants were all female, above the age of 18, who identified as the head woman of the household. The majority of those surveyed (58%) were over 46, while 32% were between the ages of 36-45 and 10% were between the ages of 26-35. Household income ranged between $1.00 and $2.50 per day with an average household size of 3.6. Participants were selected randomly from a roster of those who expressed interest in a piped connection.

CUSTOMERS SAVE TIME BY USING A PIPED-CONNECTION

We asked participants which water sources they use, the number of visits per week, and the travel time to reach the selected sources. When comparing response from the pre- and post- periods, we found that participants switched from the community standpipe to the H2OME! piped-connection source as shown in Figure 1. While many still visited other sources, Figure 2 shows the number of visits per source declined. This shift was most notable for groundwater, which realized a 71% decline in visits compared to sachet water and rainwater visits, which declined 7% and 5%, respectively. Figure 2 shows a reduction in visits to all non-piped-connection water sources, indicating that even if customers were still using other sources, they were using them less often.

FIGURE 1:
Number of Visitors in Pre- and Post-Period

<table>
<thead>
<tr>
<th>Water Source</th>
<th>Pre-Period</th>
<th>Post-Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community Water Standpipe</td>
<td>33</td>
<td>0</td>
</tr>
<tr>
<td>Groundwater</td>
<td>47</td>
<td>31</td>
</tr>
<tr>
<td>Sachet Water</td>
<td>38</td>
<td>39</td>
</tr>
<tr>
<td>Rainwater</td>
<td>57</td>
<td>55</td>
</tr>
<tr>
<td>Piped Connection</td>
<td>60</td>
<td></td>
</tr>
</tbody>
</table>

FIGURE 2:
Number of Visits in Pre- and Post-Period

<table>
<thead>
<tr>
<th>Water Source</th>
<th>Pre-Period</th>
<th>Post-Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community Water Standpipe</td>
<td>221</td>
<td>0</td>
</tr>
<tr>
<td>Groundwater</td>
<td>230</td>
<td>66</td>
</tr>
<tr>
<td>Sachet Water</td>
<td>91</td>
<td>85</td>
</tr>
<tr>
<td>Rainwater</td>
<td>63</td>
<td>60</td>
</tr>
<tr>
<td>Piped Connection</td>
<td>397</td>
<td></td>
</tr>
</tbody>
</table>

PRE-PERIOD  POST-PERIOD
We mapped the reduction in visits by water source with each participant's reported travel time to the given source. Based on our research, customers who were purchasing from the community standpipe (33) saved a total of 4,985 minutes, which is on average 142 minutes each, or 2 hours and 22 minutes per week.

The 47 participants using groundwater saved a total of 3,240 minutes (69 minutes/week) by reducing water station visits. Combined, these customers average 211 minutes/week of time saved by using a piped connection rather than traveling to the community standpipe or groundwater source. If we include estimated wait times, customers save another 98 minutes. In all, customers save an average of 309 minutes per week through access to a piped connection. The time saved can be re-allocated to opportunities in education, health, and overall productivity.

**ENOC FRIMPONG** is a farm laborer and supports his family of eight (8) including his parents. He recalls several days when he had to cancel his work schedule after spending hours walking in search for water.

> I wanted to make sure my family had water but that meant walking for nearly 3 kilometers and an extra 2 hours at the bore well arguing needlessly in a long queue. The day goes wasted and I lose my wage. I have a connection at home now, and it is exciting to see my parents, wife and children have convenient access. Beyond earning a wage, I was excited about the fact that I was helping make safe water available to people in my community.

**SUBJECTIVE WELL-BEING INCREASED ACROSS ALL INDICATORS**

Measuring subjective well-being provides a window into the relationship between sustainable development and how people experience their lives. Traditionally, financial indicators were used as a measure of the quality of life. However, more recently, organizations like the Organisation for Economic Co-operation and Development*, United Nations*, and The World Bank Group* have acknowledged that subjective well-being is a viable evaluation method for understanding if people's lives are getting better or worse due to a sustainable development intervention.

Safe Water Network Ghana asked questions about quality of family time; the overall health of the family; and life as a woman, wife, and mother. Participants responded using a 5-point scale where 1 was very unhappy, and 5 was completely happy. We also considered satisfaction with finances to cover basic needs*. Respondents used a 5-point scale, with 1 being finances rarely cover basic needs, and 5 being finances often cover more than basic needs.

Our findings showed increases in subjective well-being across all four indicators. When asked about happiness with the quality of family time, most participants (72%) were not happy in the pre-period and selected a score of 3 or lower. The results nearly invert in the post-period when 67% of participants stated they were happy with the quality of family time. The details of the responses can be found in Figure 3.

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4 OECD Guidelines on Measuring Subjective Well-being (OECD, 20 March 2013)
5 Paul Anand, Happiness, Well-Being And Human Development (United Nations Development Programme, 23 August 2017)
6 Living Standards Measurement Study (The World Bank Group)
7 We define basic needs as water, food, shelter, and healthcare.
We saw a similar pattern for happiness with overall family health. In the pre-period, 67% of participants were not happy with this aspect of life. However, Figure 4 shows that 75% expressed happiness with their family's overall health in the post-period.

In the post-period, almost half (47%) of respondents reported a score of 5, stating that they were completely happy with their lives as women, wives, and mothers. These results compare to 28% of respondents who scored a 5 in the pre-period. Figure 5 shows a similar trend as our other subjective well-being questions: 68% of respondents were not happy in the pre-period, and 73% of respondents in the post-period reported being happy with their life as a woman.
Lastly, we asked respondents about finances. Only 3% of participants said their finances sometimes covered more than their basic needs in the pre-period. This finding compares to 62% of respondents in the post-period who said that their finances sometimes or often cover more than their basic needs who selected sometimes or often more.

FIGURE 6:
Changes in Happiness with Finances from Pre- to Post-Intervention Period

The survey closed with a few questions on customer satisfaction. When asked about their experience with Safe Water Network Ghana’s piped-connection service, 55% rated it as excellent, while 93% rated it as good or excellent. In addition, 63% of customers were extremely satisfied with their piped connection, and 98% were at least satisfied. When asked if they would recommend the service to a friend, 100% responded “yes.”
MADAM AKUA SIKA lives in Nobewam in the Ashanti region of Ghana where the entire community uses Safe Water Network Ghana’s piped-connection service. Being physically disabled, Madam Akua usually relied on her neighbor’s children for water collection. With the onset of COVID-19, and consistent with social distancing guidelines issued by the Ghana Government, she was no longer comfortable asking her neighbor’s children to assist her. When our sales team approached her, she was excited and quickly signed up for the piped-connection service. Now, she receives her water in her home and no longer worries about access to water.

“I don’t have to worry to disturb my neighbor’s children anymore. I can now conveniently fetch water any time I want. I feel excited any time I open my tap and there is water.”

PERCEPTION OF BENEFITS OF SAFE WATER INCREASED

Perception of most benefits improved. However, customers had a high perception of benefits from the start. We asked participants how much they agreed with a list of benefit statements as a result of consuming H2OME! water. At least 67% completely agreed with each benefit statement in the pre-period, while at least 88% somewhat agreed. A minimum of 73% completely agreed in the post-period, and at least 88% somewhat agreed.

FIGURE 7 -16: Change in Customer Agreement with Safe Water Benefit Statements Between Pre- and Post-Period
**Children Miss School Less Often**

- Maybe: 4
- Somewhat Agree: 16
- Agree Completely: 40
- Agree: 44

**Households Spend Less On Medical Expenses**

- Maybe: 4
- Somewhat Agree: 8
- Agree Completely: 48
- Agree: 52

**The Number of Visits To A Doctor Are Reduced**

- Maybe: 5
- Somewhat Agree: 11
- Agree Completely: 44
- Agree: 44

**The Quality of Family Life Improves Significantly**

- Maybe: 1
- Somewhat Agree: 6
- Agree Completely: 42
- Agree: 44

**Family Members Get More Time For Other Activities**

- Maybe: 6
- Somewhat Agree: 7
- Agree Completely: 47
- Agree: 48

**Household Savings Increase**

- Maybe: 3
- Somewhat Agree: 3
- Agree Completely: 54
- Agree: 54

**Eliminates All Water-Borne Diseases**

- Maybe: 1
- Somewhat Agree: 6
- Agree Completely: 53
- Agree: 55

**Big Difference To Overall Health Of Family**

- Somewhat Agree: 7
- Completely Agree: 53
- Agree: 56
BUILDING ON OUR FINDINGS

Our research found that piped connections save customers a substantial amount of time, which could then be reallocated for activities related to education, health, and productivity. We also found that customers’ subjective wellbeing and the perception of benefits rose after they had access to safely managed water. These findings indicate that piped connections are having a positive impact on how customers experience their lives.

Safe Water Network is dedicated to investing in our social impact measurement to document quantifiable benefits of our interventions and the subjective wellbeing of our customers. This practice is not only a means to catalyze investment, but also to identify areas of service delivery that we can expand or improve.

Our 2022 program initiatives include specific projects to build on this work and expand services based on customer demand.

- Expansion of piped-connection program to build and retrofit more stations to accommodate 500+ connections
- Ramp-up of piped-connection sales at existing stations to increase number of connections
- Onboard customer service representatives at OPC stations to continue ongoing evaluation of impact and perceptions of piped-connection customers
- Collaborate with other small water enterprise implementers to align metrics and methodology for social impact evaluation
- Explore water usage patterns through follow-up interviews. Our research on usage was inconclusive, but brought up interesting questions about the tradeoffs made by customers
- Collaborate with partners to build demand generation programs to encourage greater use of water for drinking
- Investigate the impact of different pricing strategies on piped-connection consumption

ABOUT SAFE WATER NETWORK

At Safe Water Network, we believe in a collaborative, innovative response to the global water crisis. We envision a world with healthy, thriving communities, each managing its own sustainable supply of safe water. Our mission is to develop and demonstrate affordable, economically viable solutions, share sector knowledge, and build partnerships that reach millions in underserved communities.