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PRICE CHANGE AND STATION PERFORMANCE IN GHANA

The Impact of Price Increases on Station Performance and Inclusiveness in Ghana

Station volumes are on the road to recovery 15 months after a price increase in April 2016. Convenience and socio-economic status are key contributors to consumer resilience in price changes.

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KEY INSIGHTS

- Average monthly sales volumes decreased by 12% in the 15 months after the price increase, compared with the 15 months preceding the price increase. Recovery to prior volume levels was on track in months 10-15, though more data is required for evidence of when recovery is achieved.
- Households with low socio-economic status (SES) were most affected, decreasing consumption by 26%, while high-SES households increased consumption by 26%.
- Household connection (HHC) volumes increased by 3%, compared with a 27% reduction in onsite purchases, suggesting that the increased convenience of HHCs contributes to pricing resilience.
- The price increase bolstered Station financial viability, with a 4% increase in average monthly revenue and a 14% increase in gross margins, despite the short-term negative impact on sales volumes and lower-SES consumer participation.

In April 2016, Safe Water Network increased prices at 29 of its 35 H_2OME! Water Stations in Ghana to adjust for high inflation and increasing variable costs.

Safe Water Network analyzed sales and consumer data before and after the price increase to understand the impact on financial viability and inclusiveness. The analyses show a 12% reduction in consumer purchases overall in the 15 months following the increase, driven largely by decreased participation of low-SES groups. However, evidence suggests that average monthly sales volumes are recovering to pre-price-increase levels.

Background

Water utilities face the difficult challenge of balancing affordable water service provision and covering the costs of operation and maintenance (O&M) and sustainability reserves through water sales revenue. According to the World Bank,[1] approximately 70% of the world's water utilities do not fully cover costs with revenue; in low-income countries, 97% of utilities set tariffs too low to cover even basic O&M, resulting in heavy reliance on subsidies.

Safe Water Network provides affordable, safe water through small water enterprises, branded as H_2OME! Water Stations in Ghana. To improve Station financial viability in response to changes in the local operating environment, Safe Water Network raised water prices by 33-50%, based on Station technology type (Table 1) —a driver of variations in O&M expenses—after engaging with communities, district assemblies, and water boards. The new prices also considered the availability of currency denominations and affordability targets[2] for those earning approximately USD 1.90 per day (which is the target demographic).[3] Prices were not increased in six of the 35 Stations due to various factors (market conditions, weak performance, etc.). Both Station groups (those with and without a price increase) comprised a similar mix of water treatment technology, age, geography, and price-point distribution.

Table 1. Station Pricing Analyzed by Technology Type

		Price per 20L (in USD)*		
Technology	# Stations (# with price increase)	OLD	NEW	% Price Increase
Limited Mechanization System	26 (23)	$0.015	$0.023	33[4]
Modular Slow Sand Filtration	5 (3)	$0.023	$0.034	50
Multi-Staged Filtration with Ultra Violet	4 (3)	$0.034	$0.046	33
TOTAL	35 (29)	(N/A)		

* 1 USD = 4.39 GHS

[1] The World Bank. "Water, Electricity, and the Poor: Who Benefits from Utility Subsidies?" 2005.
[2] The United Nations Development Programme's guidance on affordability states that households should not spend more than 3% of their household income on water for domestic uses.
[3] The World Bank. "FAQs: Global Poverty Line Update." 30 Sept. 2015, http://www.worldbank.org/en/topic/poverty/brief/global-poverty-line-faq.
[4] From $0.023 for 30L to $0.023 for 20L—a 33% difference.

At the previous price point, Station financial viability was highly susceptible to increases in electricity costs (which saw a 23.2% average annual increase from 2010 to 2015)[5] and high inflation rates (which experienced a 16% average annual increase from 2010 to 2015).[6] However, Safe Water Network recognized that a price increase to counteract higher O&M costs could potentially reduce consumption and also impact Station financial performance. The impact of the price increase was analyzed so that its effects on financial sustainability and consumer inclusiveness could be understood.

Methodology

The findings in this report were informed by two analyses:

1. Operational Data Analysis

Safe Water Network used monthly operational data from each of the 35 Stations in Ghana that have been in operation for more than one year, grouped into different cohorts (Stations with or without a price increase; Station age; new price point; and location). The data was further categorized by the sales volumes of different water services, including total Station sales, onsite sales,[7] HHC sales,[8] and bulk delivery sales.[9] Cohort trends were compared by assessing sales volumes, revenue, and gross margins between January 2015 and June 2017 (15 months before and after the price increase). Significant findings with programmatic implications are reported in this *Field Insight* report.

2. Consumer Survey Analysis

Safe Water Network collected water purchase data from 332 households in eight representative communities (of the 29 that experienced a price increase). Data was collected over 41 days—11 days before the price increase and 30 days after the price increase.[10] Households were stratified into socio-economic categories[11] and the role of SES on purchase decisions was evaluated.

Limitations

Limitations included compounding factors and externalities that could not be entirely controlled, such as:

- Seasonality and rainfall patterns that may have affected consumer purchase behavior.[12]
- HHC revenue collection methods (allowing delayed payments) that may have affected HHC consumption trends.
- Sales impacts due to the effect of launching new Stations nearby.
- Station downtime from pump- or electricity-related issues that may have affected sales after the price increase (especially in September 2016 and June 2017).[13]
- Limited data available on proportion of consumer SES groups for each point of water purchase, whether HHC, onsite, or bulk delivery.

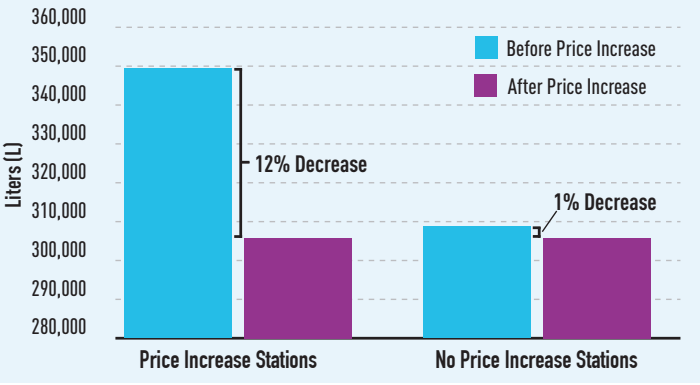
Results and Findings

1. Sales Volumes on Track to Recover to Pre-Price-Increase Volumes After 15 Months

Safe Water Network's analysis suggests that, after an initial decline, Station sales volume recovery was on track to match pre-price-increase volumes 10-15 months after the price increase (January to June 2017), though more data is required for conclusive evidence of recovery.[14]

In total, average monthly sales volumes decreased by 12% in the 15 months after the price increase—from 349,000 liters per month per Station (LMPS) to 306,000 LMPS. By contrast, average monthly sales volumes at the six Stations without a price increase only decreased by 1% (from 309,000 LMPS to 306,000 LMPS) for the same period.[15] (See Figure 1.)

Figure 1. Average Monthly Volumes per Station (L)



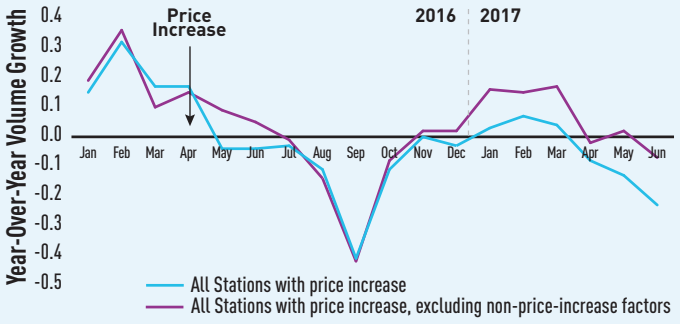
[5] Energy Commission of Ghana. "National Energy Statistics 2005 – 2014." Apr 2015, http://energycom.gov.gh/files/Energy%20Statistics_2015Final_1.pdf.
[6] The World Bank. "DataBank." 2017, https://data.worldbank.org/indicator/NY.GDP.DEFL.KD.ZG?locations=GH.
[7] Sales of water collected at Station access points, including the treatment Station, sub-Stations, remote kiosks, and local standpipes manned by vendors.
[8] In some communities with Stations, some households access water through a household tap with water piped directly from the Station.
[9] Some Stations offer bulk delivery, whereby large amounts of water are delivered to customers in tanks when ordered. This is a very small percentage of sales volumes and was not a significant part of this study.
[10] The goal of the consumer analysis was to understand the initial impact of the price increase on consumers. The timeframe is therefore different from that of the operational data analysis.
[11] Safe Water Network defines SES by household assets owned, housing characteristics, and sanitation practices. SES indicators were selected using the Demographic and Health Survey (DHS) in Ghana.
[12] Total Ghana September 2016 rainfall was 4.5 times higher than September 2015 rainfall (National Oceanic and Atmospheric Administration, 2017).
[13] June 2017's downtime of 9% (716 hours total for 29 Stations with a price increase) was due to power cable thefts at water pumps.
[14] At the time of publication, Stations have recovered in the months after this analysis period.
[15] This decrease was primarily due to two Stations that faced raw water quality challenges and unreliable electricity during this period.

However, January to June 2017 showed a marked improvement (see Figure 2). The average monthly sales volumes for the first six months of 2017 were only 4% below volumes for the same time period before the price increase. Further, the 4% volumes deficit during this period was caused by unseasonably heavy rainfall[16] and significant downtime due to technical issues at seven Stations. The monthly volume comparison for January to June 2017 improved to breakeven (0% deficit) against the same period before the price increase when these factors are excluded.

Although these trends are promising, month-over-month volume growth remains volatile and highly susceptible to external factors.

Safe Water Network's consumer research corroborates the result of a 12% decrease in volumes for Stations with a price increase over a 15-month period. The research suggests that consumers purchased on average 15.6% less water 30 days after the price increase (an average of 53 liters per day of water before the increase and 45 liters per day after the increase).

Figure 2. Monthly Volume Growth Comparison: Before and After Price Increase



2. Low-SES Cohorts Were the Most Impacted by the Price Increase for Onsite Sales

On average, Safe Water Network's consumer study found that low-SES households were most affected by the price increase. Low-SES households decreased their water purchases by 26% for onsite sales, while purchases by high-SES households increased 26%. About 57% of low-SES households reported decreased use or dropped out, compared to 19% in high-SES households (see Table 2).

Table 2. Household SES Status and Purchases Before and After the Price Increase, Based on Consumer Surveys

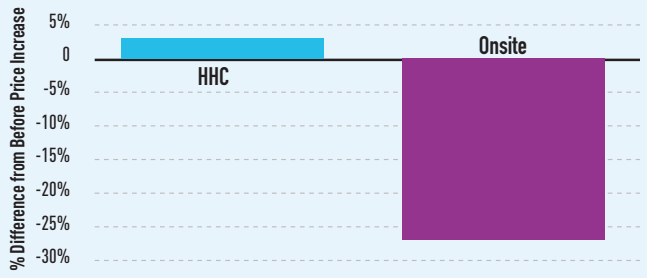
	High SES	Low SES
Household Behavior Use Changes		
Total HH Surveyed (#)	90	65
HH % Increased Use	50%	8%
HH % Decreased Use	19%	57%
HH % No-Change in Use	20%	20%
HH % Drop Out	1%	3%
HH % New User	11%	15%
Average Household Volume Changes		
Average Volume (L) per HH Before Price Increase	49.1	47.5
Average Volume (L) per HH After Price Increase	61.7	35.0
Average Volume Changes	**26%**	**-26%**

The high-SES households' 26% volume increase was influenced by rainfall. Average daily rainfall decreased by 34% during the survey period (30 days after the price increase) at the eight communities included in the consumer analysis. Low rainfall typically drives consumers to increase purchase from the Stations. Socioeconomics impacted responses to the price increase, as the low-SES households may have been unable to increase water purchases with the increased price.

3. Convenience of Household Connections Contributes to Pricing Resilience

HHC sales volumes increased despite the price increase, suggesting that the convenience afforded by HHCs may strengthen pricing resilience. Average monthly sales volumes for HHCs were 3% higher during the 15-month period after the increase than the same period prior to the increase,[17] while onsite sales volumes decreased by 27% (see Figure 3). Prior to the price increase, HHC sales volumes contributed to 6% of total volumes;[18] after the price increase, HHC sales volumes contributed 22%. These findings indicate that HHCs have played a key role in the recovery of volumes to date.

Figure 3. Change in Average Monthly Volume, Before and After the Price Increase (%)



[16] June 2017's sharp decrease of 21% in year-over-year volume growth was due to high rainfall as compared to the same month in previous years—almost 30% of year-to-date rain fell in June alone, and June 2017's rainfall was the highest absolute monthly amount since the price increase in April 2016 (National Oceanic and Atmospheric Administration, 2017).

[17] There was significant growth in new HHCs throughout Ghana during the period of analysis (a 105% increase, from 205 in April 2016 to 421 in July 2017). This was adjusted for in the Station performance analysis.

[18] Of those Stations offering HHCs (26 Stations).

External factors that could be contributing to HHC sales volume trends include:

- A higher proportion of high-SES households among those with HHCs.
- New HHCs added after the price increase, which may have boosted averages (as these households may have been unaware of previous lower price points).

Results aligned with previous research on convenience as a key driver of consumer water purchases (see 2013 *Field Insight*, "Remote Kiosks: A Cost-Effective Approach to Increasing Safe Water Consumption in Ghana").[19]

4. The Price Increase Improves Station Financial Sustainability

Though the price increase initially resulted in a 12% decline in sales volumes, it ultimately improved financial sustainability: Station revenue increased by 4%.[20] Similarly, gross margins increased by 14 percentage points (from 43% to 57%).[21] This upward trend continued beyond pre-price-increase levels, during the Q4 2017 dry season.

Next Steps

This pricing analysis was the first step toward understanding the impact of pricing on demand for water at Stations. Safe Water Network will leverage these findings to inform its pricing strategy. Next steps include:

- **Confirm Long-Term Recovery:** Safe Water Network will continue tracking Stations' sales volumes and revenue trends beyond the 15-month period analyzed in this report to confirm long-term recovery from the 2016 price increase.
- **Refine Pricing Strategy:** Safe Water Network will improve its comprehensive long-term pricing strategy that standardizes future price increases based on market conditions, including inflation, seasonality, and other factors. This strategy will be consistent with the organization's commitment to affordable pricing and Ghana's pricing laws for water systems.[22]
- **Leverage Consumer Tracking Study:** As part of its consumer tracking study,[23] Safe Water Network is assessing the water consumption levels, purchase decisions, and preferences of new, regular, and discontinued consumers. Results will guide future outreach and marketing around price changes, and be shared with the sector through the first annual *State of the Consumer* report.
- **Strengthen Consumer Marketing Program for Price Increases:** This analysis indicates an opportunity to better prepare Stations and communities for price increases in the future through further engagement. Safe Water Network will work to further strengthen consumer outreach, education, and messaging programs to build consumer loyalty and maintain sales volumes despite price increases.

[19] In the study, consumer penetration decreased from 85% within a 100m radius around a Station's access points to 10% for distances greater than 200m.

[20] There was low HHC revenue collection (and high arrears) from increased volumes during this period, which hindered revenue growth. Without any arrears, this number would have been 10%. Challenges with HHC arrears (due to post-paid supply) are being addressed through prepaid meter installations in partnership with the World Bank's Consultative Group to Assist the Poor (CGAP).

[21] Indicative gross margins after isolating for non-sales-volumes-related factors (e.g. electricity rate hikes and arrears from HHCs).

[22] Community Water and Sanitation Agency. "Regulations." 2011, http://www.cwsa.gov.gh/downloads/2007_CWSA_LEGISLATIVE_INSTRUMENT.pdf.

[23] The consumer tracking study is a semi-annual study of consumer knowledge, attitudes, and behaviors related to safe drinking water. An improved understanding of the consumer facilitates implementation of more effective marketing programs.

CONTACT US

For more information, please visit **www.safewaternetwork.org**, or email the authors at **info@safewaternetwork.org**.

ABOUT SAFE WATER NETWORK

Operating at scale in both India and Ghana, Safe Water Network is demonstrating a cost-effective approach for locally owned and operated small water enterprises to reach millions in need of safe water around the world. Working with other implementers and agencies, we are developing the tools and resources for replication and advancing the case for funding and policy reforms that will enable scale-up. Our team brings together expertise in engineering, operations, finance, health, policy, and social development, and draws upon work experience from world-class multi-nationals, government agencies, and not-for-profits.

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