SAFE WATER DISTRIBUTION IN INDIA

Improving Financial Viability Through Cost-Effective Delivery Services

Safe Water Stations need to reach minimum sales volumes to become financially viable. We’ve field-tested a range of approaches to enable third-party distribution networks, with the goal of demonstrating a model that’s profitable for local distributors and standardized for replication.

Lead Author: Ryan Hebert  Contributing Authors: Ravi Sewak, Hew Crooks, Sumanta Mitra, Shanker Batra

PROGRAM SUMMARY

• Objective: Improve the financial viability of Safe Water Stations in India through bulk water sales to institutions, distribution through retail stores, and home delivery services.

• Intervention: Field-testing alternative models to enable consumers to pay a premium for delivery services—including part- and full-time approaches, different vehicle types and channels, and various models for equipment ownership and water pricing.

KEY INSIGHTS

• Local distributors have both the interest and the capacity to carry out safe water distribution as an extension of their businesses.

• Profitable distribution is challenging: water is heavy, roads are often poor, and low margins make it critical to keep costs as low as possible.

• Distribution is most successful using part-time assets, and in communities where populations are sufficiently large to offset costs.

• Success requires identifying suitable distributors, engaging bulk purchasers, and ensuring consumer willingness to pay for the value-add of distribution.

Background: Safe Water Kiosks

To become sustainable, any water system must first achieve financial viability. The community-level Safe Water Stations we establish operate at low margins in order to maintain affordable pricing (₹4, or $0.07, per 20L container). As a result, each must sell ~90 containers per day (20% of system capacity) to cover ongoing operating expenses, and a total of ~200 (45% of system capacity) if it is to build reserves for maintenance and capital replacement. To help reach these thresholds, and to ensure health benefits, our target is for 75% of households in each community to become Safe Water Station customers.

Testing Delivery Services to Drive Sales

As part of our work to reach these goals, we developed distribution models (pricing, channels, logistics, vehicle selection, etc.), and provided training to local private distributors. These distributors collect water from Stations and deliver it throughout the village and in nearby hamlets, serving homes, retail stores, and institutional buyers capable of purchasing 10 or more containers at a time (such as schools). To date, we have implemented distribution in 23 villages, in the states of Andhra Pradesh (Warangal and Karimnagar districts) and Uttar Pradesh (Gautam Buddha Nagar and Mathura districts). At the end of 2012, we made distribution a more significant focus and intensified our efforts, as described below.

1 Our related work to develop viable distribution in Ghana will be described in a future Field Insights.

2 As of this writing, $1 = ₹60 (August 2013)

3 A household of five people would need to purchase slightly less than two containers per day to provide each person with the 7L minimum recommended by UNHCR.

Safe Water Network develops innovative solutions that provide safe water to communities in need. Our goal is to achieve sustainable service delivery and locally-independent operations through the application of local ownership and market principles.

In Field Insights, we provide a focused analysis of how we’ve approached a particular challenge and what insights have been gained.

For more information, contact info@safewaternetwork.org.
Beyond improving the viability of water systems, distribution contributes to local livelihoods by providing revenue streams to private distributors and retailers. It also enables us to provide safe water access to many more people, including the old and infirm (who may be unable to carry water over any significant distance), and greater convenience for others.¹

### Challenges to Cost-Effective Distribution

Though distribution has the potential to improve system economics, it is also challenging on a number of fronts. Water is heavy to transport, and our low margins make it essential to identify efficiencies wherever possible—particularly given the need to divide revenues between an operator, a distributor, and in some cases a retailer. Our field-testing focused on addressing the following challenges:

1. **Vehicle Selection**
   - **Challenge:** We found that distributors were often unrealistic in their revenue and margin expectations, and purchased expensive new vehicles for which cost recovery was unlikely. Vehicles must be carefully chosen based on a balance between cargo capacity, reliability on bad roads, and cost.
   - **Solution:** We tested a range of vehicles to determine which represented the most effective balance. Vehicles tested (see Figure 1) included three- and four-wheeled trucks, motorized rickshaws, jugasds (motorized trolleys), and ox carts.

2. **Logistics**
   - **Challenge:** In peri-urban areas or other locations with relatively smooth roads, three-wheeled trucks are limited in weight-carrying capacity and tend to require more maintenance. Though distribution has the potential to improve system economics, it is also challenging on a number of fronts. Water is heavy to transport, and our low margins make it essential to identify efficiencies wherever possible—particularly given the need to divide revenues between an operator, a distributor, and in some cases a retailer. Our field-testing focused on addressing the following challenges:

3. **Quality Assurance**
   - **Challenge:** With more activities happening outside the controlled Safe Water Station environment, distribution creates complications in ensuring that treated water is not recontaminated before it reaches the final consumer. Handling during transport and storage, the rate of inventory turnover in retail shops, and the transfer of water between vessels all have the potential to compromise water quality. Quality assurance can be particularly challenging in areas where residents insist on owning their own containers rather than exchanging an empty for a full one (often because of sensitivities regarding caste).
   - **Solution:** We manage this risk through the consistent use of residual chlorine (at 0 to 0.3 ppm in treated water, with 0.5 ppm used weekly to clean distribution tanks). Where resellers maintain their own inventory of containers, we also closely monitor their cleaning practices, ensuring that strict standards are met.

4. **Seasonality**
   - **Challenge:** Water demand is highly seasonal, peaking along with temperatures between March and June, as shown in Figure 3 on the previous page. This fluctuation makes it highly challenging for distributors, who must be prepared to meet high demand during the peak season while avoiding the high costs of excess capacity in the low-seasonality months. It also makes it difficult to build and maintain a customer base over time.
   - **Solution:** We ensure that distributors anticipate this seasonality, and we incorporate it into the model in two ways: by reducing distribution frequency during lower seasonality months to reduce costs, and by setting high customer targets during peak months with the goal of ensuring that when demand drops, sales remain sufficient to keep distributors at breakeven or better.

### Economic Results

1. **Economics for Distributors**
   - Figure 4 presents a sample from our economic modeling, showing how profitability can be reached if certain volume thresholds are consistently achieved (including in the low-seasonality months). This threshold depends on the vehicle used, but ranges from 40 to 100 containers, which is a profit driver for a four-wheeled truck using diesel, as presented in Figure 4. We have completed variations of this table for each combination of vehicle and fuel.

   ![Figure 4](image)
   
   **Figure 4:** Summary of Economics for Distributors (four-wheeled truck, diesel fuel)

   **ASSUMPTIONS**
   
<table>
<thead>
<tr>
<th>MAIN COMMUNITY</th>
<th>HAMLET</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Village population</td>
<td>3,000</td>
<td>3,430</td>
</tr>
<tr>
<td>Average family size</td>
<td>6.3</td>
<td>6.3</td>
</tr>
<tr>
<td>Household(s)</td>
<td>700</td>
<td>800</td>
</tr>
<tr>
<td>% HH purchasing/month</td>
<td>90%</td>
<td>20%</td>
</tr>
<tr>
<td>% Customer HH delivery purchasing</td>
<td>20%</td>
<td>100%</td>
</tr>
<tr>
<td>HH buying frequency (20L cans/month)</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Total 20L cans delivered/month</td>
<td>840</td>
<td>1,920</td>
</tr>
<tr>
<td>Total 20L cans delivered/day</td>
<td>28</td>
<td>66</td>
</tr>
<tr>
<td>Sales price - delivered water/20L can</td>
<td>$0.17</td>
<td>$0.17</td>
</tr>
<tr>
<td>Cost of water/20L can</td>
<td>$0.07</td>
<td>$0.07</td>
</tr>
<tr>
<td>Reseller margin</td>
<td>$0.03</td>
<td>$0.02</td>
</tr>
</tbody>
</table>

   **DELIVERY ECONOMIES (monthly)**
   
   **TOTAL REVENUE** | $140 | $320 | $460
   **EXPENSES** | | | |
   | Water | $56 | $128 | $184 |
   | Diesel fuel consumption | $2 | $4 | $6 |
   | Vehicle | $32 | $74 | $106 |
   | Loader | $13 | $30 | $43 |
   | Reseller | $28 | $32 | $60 |
   **TOTAL EXPENSES** | $131 | $269 | $399 |
   **NET INCOME FROM DELIVERY** | $10 | $52 | $61 |

2. **Economics for Retailers**
   - Retail resellers generally seek an incremental income of ₹20 to ₹30 per day. For most retailers (who pay ₹10 to ₹15 to have water delivered, and resell it at ₹20), this requires selling 20 containers per day. As retailers establish a market price for retail water, however, we have

¹ When electricity is unreliable to run a motorized pump, filling a 1,000-L tank can take nearly an hour.

² For example, 1.5-2 hours twice a day, as at the village of Pathipaka.
seen other enterprising individuals begin to fetch water by bicycle directly from the Safe Water Station for resale from their homes or storefronts. Earning the full differential from ₹4 (at the Station) to ₹8, they can reach ₹20 per day by selling just five containers per day, which requires only two or three bicycle trips.

3. Contribution to Overall Performance
In Q2 of 2013, distribution represented 20% of total system volumes across all 23 villages, up from just 11% in Q2 of 2012. In volume terms (see Figure 6), distribution increased 60% year over year in Q1 2013 (from 11 to 18 containers per day on average) and 112% year over year in Q2 2013 (from 14 to 29 containers per day). These increased distribution volumes have not come at the expense of main-site sales, which increased by some 5% year over year over the same period. Distribution has played a significant role in bringing Stations above the ~90 container/day threshold for covering operating expenses. It has also generated benefits to livelihoods in the form of full-time employment for 14 people and part-time incremental income for an additional 74 (including 61 retailers).

Having shown the potential for distribution to improve viability and increase coverage, the challenge is to make it profitable everywhere that it is implemented. Villages that have struggled to achieve profitable distribution are generally (though not in all cases) smaller, making it harder to cover costs. Additional challenges in these villages include difficulties in identifying distributors, engaging bulk purchasers, ensuring willingness to pay for distribution, or simply bad roads, which interrupt established delivery routes.

What’s Next?
We continue to refine our approaches and test new methods in the lower-performing villages. Initiatives include:

- Identifying opportunities for distribution to reach poorer consumers, who may be unable to afford the higher prices currently charged.
- Testing subscription models for bulk purchasers to increase frequency and predictability of routes and volumes.
- Identifying ways to improve the speed of loading and unloading to improve efficiency.
- Expanding distribution footprints to ensure distributors reach minimal volumes in off-peak months.
- Continuing to investigate more-successful and less-successful villages to identify opportunities to replicate successes in new environments.
- Developing a standardized “distribution kit” (similar to our Toolkits) including training materials for both distributors and water system managers.

With these improvements in place, we expect that effective, year-round distribution will be a key element of any community safe water project and an important contributor to economic viability.

Safe Water Network’s distribution program is made possible through support from the:

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