

## Learning from innovation in sanitation business models: prefabricated septic tank distribution in Chittagong

WSUP works on the front line of a challenging sector: not everything goes to plan when trying to innovate. This note details the development and testing of a business model in Chittagong (Bangladesh) that was found to be unviable. It is part of a series of reports emerging from a business-focused on-site sanitation programme funded by the Bill and Melinda Gates Foundation.

### Project objective: activating the on-site sanitation market in Chittagong

WSUP's objective in Chittagong is to activate the on-site sanitation market at city-wide scale: an urgent task in a city of around 6 million people with no sewerage and 100% dependence on on-site sanitation. Early studies of the city's sanitation landscape identified potential opportunities in supporting the public and private sectors in containment, collection and primary disposal. The containment stage of the sanitation chain in particular was seen to present an untapped market, which could potentially be energised by sales of prefabricated septic tanks.

### Why focus on prefabricated septic tanks?

Prefabricated septic tanks have the advantage of being able to produce a standard quality effluent. They also have a number of advantages for low-income customers: upfront costs are lower than for the reinforcement and cement concrete septic tanks built by informal masons; long-term costs are lower, assuming the design allowed for reduced emptying; and the tanks are easier to construct (particularly for homes located near water bodies). There appeared to be a significant market for the tanks in Chittagong: 140,000 low-income households owned land and had an unimproved toilet (pit latrine or direct to drain) that could potentially be upgraded.

### What was the business model and how were the technologies tested?

Three prefabricated septic tank technologies were considered, and corresponding pricing strategies developed to test willingness and ability of Chittagong residents to invest. PRAN-RFL and Aqua Septic tanks (both from Bangladesh) were then deployed in three wards in a year-long technical pilot. This process included the training of door-to-door field agents to market the product and to collect detailed data around willingness-to-pay. WSUP's analysis had found that septic tank distribution channels in particular required strengthening: a business plan was therefore developed for a septic tank distribution business that covered the full sanitation chain (see Figure 1), incorporating a dedicated sales team, consumer access to micro-finance and the option to pay by instalment.



Figure 1: Business model for distribution of prefabricated septic tanks

WSUP's pilot exercise and modelling demonstrated that this business would not be financially sustainable. On the next page, we explain why the business model fell short.

### Reality check 1: low demand and willingness-to-pay

While the available market for prefabricated septic tanks in Chittagong was calculated to be around 140,000 households, actual demand for the product among low-income customers was found to be relatively low. Interested customers were almost overwhelmingly from the richer end of the spectrum and earned more than the average income of the wards which WSUP surveyed. This implied that the tanks were financially out of reach for poorer customers. However, finance was not the only factor informing lack of demand: many respondents didn't feel they needed the product, and reinforcement and cement concrete septic tanks provided a cheaper alternative. It also appeared that in the Chittagong context, significant household investment - such as toilet upgrades - often only followed significant life events such as marriage.

### Reality check 2: business modelling confirms lack of financial viability

Incorporating data from a willingness-to-pay survey, WSUP ran a model based on a hypothetical septic tank distribution business that used both hypothetical business and actual manufacturer pricing. Neither pricing strategy resulted in a breakeven scenario within five years, instead projecting significant losses that would render the proposed business model unsustainable (see Figure 2). Increasing sales would only negligibly decrease the time to break even, due to the high upfront business costs (including purchase of the tanks from the manufacturer, hiring a mason to perform installation, and the commission costs of the sales team). Even if demand were to rise in response to a lower price, the cost of hiring more sales staff to meet this demand would only eat further into margins.

| # Sales Agent needed @ WSUP price | Cost of Sales Agent salary (20,000 tk each) | Margin on Septic Tank sales | # Sales | Margin    | Profit/Loss |
|-----------------------------------|---|-----------------------------|---------|-----------|-------------|
| <b>4</b>                          | <b>80,000 tk</b>                            | <b>9,700 tk</b>             | 1 Sale  | 9,700 tk  | (70,300) tk |
|                                   |   |                             | 2 Sales | 19,400 tk | (60,600) tk |
|                                   |   |                             | 3 Sales | 29,100 tk | (50,900) tk |
|                                   |   |                             | 4 Sales | 38,800 tk | (41,200) tk |
|                                   |   |                             | 5 Sales | 48,500 tk | (31,500) tk |

  

| # Sales Agent needed @ Manufacturer's Retail price | Cost of Sales Agent salary (20,000 tk each) | Margin on Septic Tank sales* | # Sales | Margin    | Profit/Loss |
|--|---|------------------------------|---------|-----------|-------------|
| <b>3</b>   | <b>60,000 tk</b>                            | <b>2,000 tk</b>              | 1 Sale  | 2,000 tk  | (58,000) tk |
|  |   |                              | 2 Sales | 4,000 tk  | (56,000) tk |
|  |   |                              | 3 Sales | 6,000 tk  | (54,000) tk |
|  |   |                              | 4 Sales | 8,000 tk  | (52,000) tk |
|  |   |                              | 5 Sales | 10,000 tk | (50,000) tk |

Figure 2: Projected losses from hypothetical septic tank distribution business

\* 2,000 tk is the margin received from the 2,000L tank. The calculations assumed a best case where all sales are 2,000L.

### What we learnt: target the top of the supply chain

It had become clear that a distribution business based around the sales and servicing of septic tanks for the low-income market would not be sustainable. WSUP had learned an important lesson from the project: an intervention is needed further up the supply chain to reduce cost and incentivise existing manufacturers to strengthen distribution channels. Manufacturers such as PRAN-RFL had a wide range of high-volume plastic products, whose more regular sales could support the provision of low-volume products like septic tanks. While there was therefore value to be added in WSUP targeting the top of the supply chain - for example, by working with manufacturers such as PRAN-RFL to unlock the low-income market - WSUP would be entering a crowded space, with other actors in Chittagong already providing this support. Nonetheless, the technical pilot of the two prefabricated septic tanks is ongoing and is expected to yield useful information that could inform the manufacturers' designs.

### Next steps: shifting focus to a proven model for FSM services

With these realities in mind, WSUP has realigned the project to focus on supporting pit and septic tank emptying businesses rather than on-site containment. Drawing on experience in establishing a profitable sanitation public private partnership (PPP) in Dhaka (SWEEP), there is a clear case for iterating and replicating the model in Chittagong. This will involve strengthening the Chittagong City Corporation's (CCC) capacity to provide safe, sustainable and affordable FSM services, analysing existing service providers, identifying key support areas and developing a support and implementation plan for CCC to establish its own PPP.

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