

RURAL SANITATION RAPID MARKET SCAN REPORT



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BACKGROUND

An estimated 17 million rural Vietnamese people lack access to proper sanitation facilities, nearly 6 million of which have no toilet at all, with no alternative to open defecation. While Vietnam has made remarkable progress towards increasing access to improved sanitation in recent years, improvements have been largely concentrated in urban areas, where only 32% of the population resides. In rural Vietnam, only 67% of the households have a hygienic toilet, due in part to broken or inefficient supply chains to reach these communities with adequate sanitation products and services.¹

The existence of strong markets to provide sanitation products and their associated services is vital for the increase in improved sanitation practices among rural communities.² Research in Vietnam demonstrates a tangible link between household demand for improved sanitation and the market's ability to provide quality, affordable and equitable sanitation coverage.^{3,4,5} In order to reach the Government of Vietnam's objective of universal access to improved sanitation by 2030, over 300,000 toilets must be built every year over the next fifteen years. Meeting this goal poses a significant challenge and requires a strong sanitation market to achieve these numbers.

In 2014, Population Services International Vietnam (PSI/V) conducted a rapid market scan to identify market barriers and potential opportunities to improve rural sanitation access in Dien Bien and Vinh Long, two provinces with the worst sanitation indicators in all of Vietnam.⁶ Dien Bien is located in the mountainous northern region of the country where an estimated 74% of rural households do not have hygienic latrines; Vinh Long is located in the southern Mekong Delta region where approximately 65% of rural households do not have hygienic latrines.⁷

Leveraging PSI Vietnam's understanding of rural markets and consumers, the rapid sanitation market scan was designed to identify practical insights from rural households and community influencers, as well as rural supply chain actors linked to sanitation product and service provision. This report describes the market scan findings and offers concrete recommendations to inform future programs.

¹ Joint Monitoring Program WHO/UNICEF. Progress on drinking water and sanitation. Update 2014

² Private and social enterprise engagement in water and sanitation for the poor. Incentives shaping enterprise engagement in Vietnam.

³ Ministry of Construction and Ministry of Agriculture and Rural Development. National rural clean water supply and sanitation strategy up to year 2020. Hanoi 2010.

⁴ Rheinländer T, Samuelsen H, Dalsgaard A, Konradsen F: Hygiene and sanitation among ethnic minorities in Northern Vietnam: does government promotion match community priorities? *Social Science Medicine* 2010, 71(5):994-1001

⁵ SNV (2012) Sustainable Sanitation and Hygiene for All (SSH4A).

⁶ VIHEMA, 2014 of RWSS NTP-3, 2014

⁷ General Statistics Office (GSO), Ministry of Health (MOH), Provincial Statistical Office (PSO), and Preventive Medicine Centre (PMC) 2009 data

MARKET SCAN AREA CONTEXT

Vinh Long and Dien Bien provinces have among the lowest sanitation coverage in the country, though for differing reasons. Mountainous Dien Bien province is characterized by a poverty rate that is more than twice the national average, and contains a high concentration of marginalized ethnic minority groups. Dien Bien also has a relatively low population density—12 times lower than Vinh Long province—with limited infrastructure due to its geographic location in the mountains. Vinh Long province, alternatively, is located within the dynamic and rapidly developing Mekong Delta region. Frequent flooding and a high water table in this region present unique challenges to sanitation product design and transport.



Province and Country Demographics

Indicator	Dien Bien	Vinh Long	Vietnam
Total population	521,300, 85% rural	1,023,400, 79% rural	89,693,000, 67% rural
Population density	55 people/km ²	694 people/km ²	270 people/km ²
Households below poverty line	44.9%	18.7%	20.7%
Ethnic distribution	Kinh (18%), Thai (38%), Hmong (35%), Others (9%)	Kinh (99.8%), Others (0.2%)	Kinh (86%), Others (14%)
Rural sanitation access	26%	35%	67%

Data sources: General Statistics Office (GSO), Ministry of Health (MOH), Provincial Statistical Office (PSO), and Preventive Medicine Centre (PMC) 2009 data; Vietnam Household Living Standards Survey (VLSS 2012), Vietnam Population and Housing Census (Census 2009), and Health Statistics Yearbook (HSYb 2009).

KEY FINDINGS

While many factors affecting low sanitation coverage differ by province, there are common themes as well. Market-based interventions designed to improve coverage **should be tailored to a specific local context for optimal results**. Using the ‘Four Ps of Marketing Mix’ - Product, Placement, Price and Promotion - as categories, the key findings are summarized below, which are derived from the content of the various interviews described later in this report.

Product P: Rural consumers in both provinces aspire to own a toilet with a septic tank, despite their differentiated geographic and socio-economic conditions. In Dien Bien province, dry-pit latrines—such as a double-vault composting latrine or VIP latrine—are likely the most context-appropriate technology, while pour-flush and septic tank latrines seem to be most suitable for Vinh Long.

Placement P: Relatively, commercial sanitation product and service suppliers are more accessible in Vinh Long. Dien Bien’s mountainous terrain is difficult to navigate, leading to significant supply chain gaps. By contrast, the sanitation market in Vinh Long includes numerous entrepreneurs selling sanitation products. However, quality and accessibility factors remain potential barriers for consumers in Vinh Long as well as Dien Bien, and must be addressed.

Price P: There is significant variation in the cost of building a latrine, even within each province. Many households do not feel they can afford a latrine. In Dien Bien, transportation represents a significant portion of the final cost. Improvements in access to credit, flexible payment terms, and targeted subsidies for the poorest households are necessary.

Promotion P: Interviews with rural consumers in both provinces reveal a need to increase consumer motivation to invest in sanitation. To date, sanitation interventions have underutilized behavior change communication approaches. Where utilized, messaging has focused on health, which does not typically resonate with poor rural households. The market scan revealed a diverse range of perceived benefits associated with improved latrines which can inform effective, targeted messaging.



Meet Ms. Van, a 21-year-old mother of two, aged 3 years and 13 months, living in Vinh Long. She lives on less than 1 million VND each month (~50 USD), earned through her husband’s seasonal work in the rice fields and from selling oranges she grows in her garden. Pictured is her family’s hanging latrine.

CUSTOMER ANALYSIS

The socio-economic conditions between customers in Dien Bien and Vinh Long differ significantly, which impact rural household practices, needs and motivations related to sanitation.

Perceptions and Values

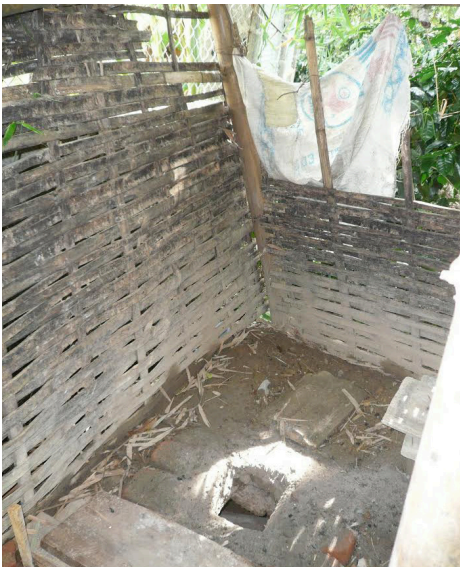
Unhygienic sanitation practices vary by province, but are similarly socially acceptable in both cases. Hanging latrines, typically a squatting platform positioned over a fishpond, are the most common type of latrine used in the Mekong Delta. In Dien Bien, rural households are likely to defecate in an unhygienic pit latrine or in an open area. Even families with proper sanitation arrangements within their homes may practice open defecation while working in rice paddies or when they are otherwise away from their homes. These practices are acceptable within the community and may be rooted in tradition.

“The King is the happiest, but one who defecates openly is the second happiest [because of exposure to fresh air/wind and lack of smell].”
Male Head of a Rural Household, Dien Bien province.

In both provinces, rural households have generally positive attitudes related to unhygienic sanitation practices. Hanging latrines and other open defecation practices are perceived as having several advantages including ‘comfort’, lack of smell, and low maintenance and cleaning requirements. In addition, the hanging latrines are perceived as a ‘natural’ and low-cost way of feeding fish. This market scan also revealed a common Hmong ethnic group belief that burying feces in a hole is not acceptable and that feces should be exposed to air.

However, the research illustrated that toilet ownership is viewed as a sign of higher social status and therefore provides incentive for families to invest in hygienic latrines to distinguish themselves from, or keep up with, community expectations.

Overall, there is limited awareness of the benefits associated with hygienic sanitation. Interviews with rural households in both provinces during the market scan revealed limited understanding of the characteristics that define improved sanitation. In the majority of remote villages of rural Dien Bien, families interviewed have never used a latrine before. The interviews found that in areas where local masons are available, rural households rely significantly, if not exclusively, on the advice from neighborhood masons on how to construct septic tanks.



An example of the unhygienic latrines commonly found in Dien Bien province

“Last year I was so ashamed (xấu hổ), when my nephews from Saigon visited me, and we did not have a proper latrine for them to use” – A female hygienic latrine owner in Binh Tan, Vinh Long province



An example of the simple, integrated shower and bathing area with a hanging latrine over water commonly found in Vinh Long province

Interviews with rural families who invested in hygienic sanitation revealed perceived logistical and convenience benefits as key drivers behind their decisions. For example, integrating the toilet into a household bathroom with a shower and hot water is described as motivation for families to invest in sanitation as part of a larger household improvement project.

“I intend to build a latrine located inside the house for more convenience when I upgrade my house.” – A male rural household head in Binh Tan, Vinh Long province

The decision to build a toilet is typically influenced by multiple members of a household in addition to community influencers, such as neighbors (Vinh Long) and authorities (Dien Bien). Interviews conducted for this market scan suggest that women are consulted, but the male head of the household's support is the primary decision maker.

For many rural households, investing in a toilet is described as a 'dead investment', meaning it will not generate further financial and/or social value for the family. Rural households described other competing priorities for scarce resources including children's education and the investment in luxury items that offer more visible signs of their family's status, e.g. a high-end motorbike, fancy television or a smart phone, as justification for not investing in a toilet.

In Vinh Long, there is strong individual and community support to sustain fishpond latrines based on their contributions to fish farming, and based on the perception that they are an ecologically sound sanitation solution. Although banned by the Ministry of Health (MOH) due to high environmental and health risks, households interviewed for the market scan did not seem concerned about enforcement or consequences of the ban.

Affordability; Willingness and Ability to Pay for Proper Sanitation

Latrine pricing varies by province and by latrine model. Based on data collected during the market

scan, the average consumer cost of a hygienic latrine in Dien Bien province ranges between ~70-166 USD. In Vinh Long province, the typical cost of a hygienic latrine is between ~150-250 USD. The variance in price stems largely from the need to elevate the latrine to accommodate the high water table and seasonal flooding. The low-cost pit latrines used in Dien Bien are not feasible in Mekong given the high risk of flooding.

Estimated Average Consumer Prices for Sanitation Materials: Vinh Long and Dien Bien Province

Item	Average cost in Dien Bien	Average cost in Vinh Long
Bricks	320,000- 450,000 VND	300,000-400,000 VND
Cement	350,000-400,000 VND	310,000- 450,000 VND
Sand	250,000-300,000 VND	150,000- 200,000 VND
Gravel	100,000-120,000 VND	100,000-120,000 VND
Steel bars	250,000-350,000 VND	200,000-300,000VND
Sanitary ware (squat pan)	170,000 VND	170,000 VND
Mason	1,500,000 VND	2,200,000 VND
Superstructure	250,000 VND	350,000 VND
TOTAL	3,190,000-3,540,000VND (~150-166 USD)	3,780,000-4,190,000VND (~178-197 USD)

Note: these estimates do not include transportation costs and are based on interviews with a relatively small sample of consumers and traders in rural districts of both provinces.

Consumer perceptions regarding sanitation affordability are influenced by many factors including household income, seasonal variations in cash availability (e.g. following harvest) and expenses (e.g. annual Tet lunar new year festivities), and access to credit.

Interviews conducted with rural households identified a range of perceptions regarding willingness to pay for improved sanitation. Some of the households were willing to invest in smart phones but not in improved sanitation, while others were investing more than 16% of their annual household income in sophisticated sanitation facilities. Interviewees explained that they would prefer to invest additional money to have a pour-flush toilet, a septic tank, or a hot shower and would delay latrine construction until they were able to save enough money.

Access to credit remains limited as a result of the relatively small scale of existing sanitation credit sources (available through the Vietnam Bank for Agriculture and Rural Development, the Vietnam Social Policies, the People’s Credit Fund and the Women’s Union). The Dien Bien Women’s Union revolving credit fund currently benefits fewer than 200 households every year. Other barriers to credit access include perceptions of the application process as complicated and time consuming, and the creditor’s preference that sanitation credit recipients do not have other outstanding loans. Rural households interviewed for the rapid market scan indicated a reluctance to take out a sanitation loan because they felt that they would not be able pay monthly interest payments consistently.

Vietnam Bank for Social Policies (VBSP) offers the lowest interest rate at 0.65% per month, however this rate is only available to select households who meet VBSP criteria (very poor households). For other segments of the population, the interest is approximately 0.9% per month. Respondents described the VBSP’s complicated procedures, lack of transparent loan processing, and the need to have a guarantee in order to receive a loan, such as ownership of a house, cow or motorbike as additional barriers to getting a loan for building a latrine.

While the Women’s Union Revolving Fund does not require a guarantee, the maximum loan amount is between 2 - 5 million VND (~95-235 USD) and, these loans are primarily designed to support investments in farming or livestock.



Meet Hien, a Khmer woman living in rural Vinh Long and mother of two daughters aged 2 & 6 years old. Hien’s family lives on approximately 1 million VND per month (~50 USD), generated by her husband’s work in the rice fields and the sale of manure and meat from their two cows. Hien’s family uses a self-made hanging latrine.

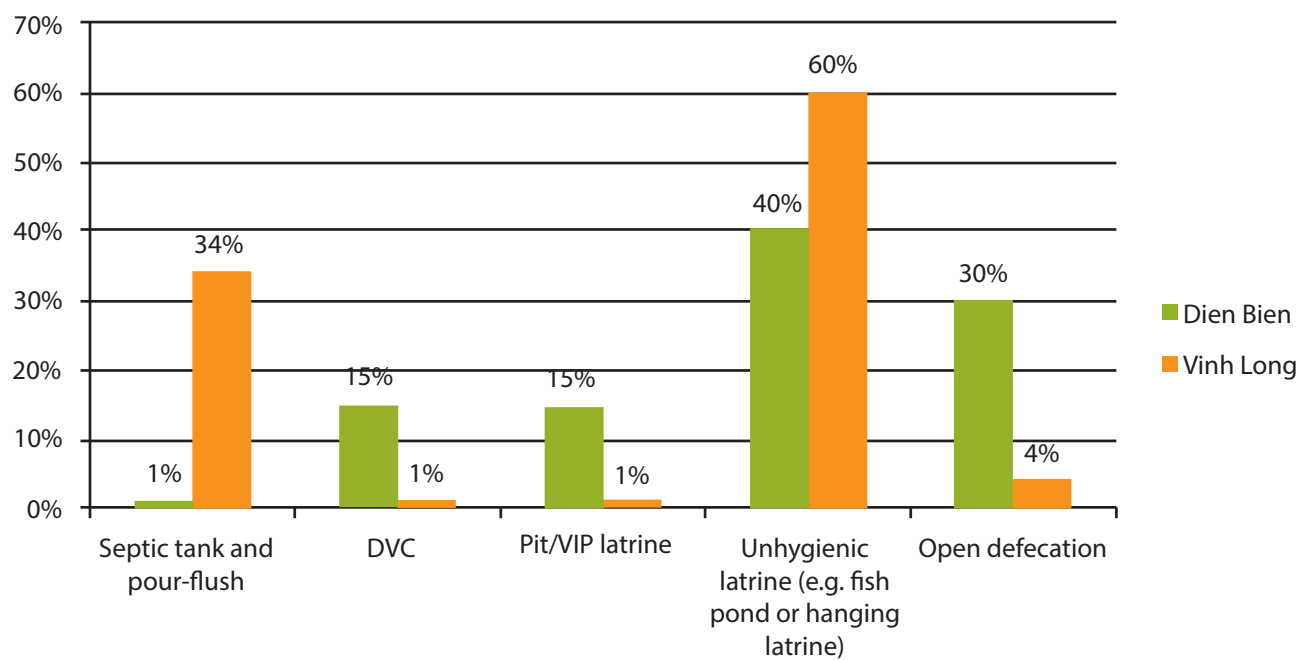
TRADER ANALYSIS: Sanitation Masons, Entrepreneurs and Waste Collectors

This section describes findings based on interviews with actors at various levels of the supply chain in the two provinces where the rapid sanitation market scan was conducted, including masons, sanitation product sellers or ‘entrepreneurs’, and waste collectors.

Masons are involved in some but not all construction of improved household sanitation. In some cases, toilets are self-constructed entirely by home-owners or with some assistance from relatives or neighbors who have previously invested in hygienic sanitation or have an understanding of masonry. In Dien Bien, where most toilets are dry-latrines of various models, households are likely to build their latrines without the assistance of a formally trained mason, whereas in Vinh Long, septic tank latrines are typically built with the assistance of a mason.

The following table summarizes the main different types of toilets used in each province. While in Dien Bien most basic latrines are in the form of temporary pit latrines, in Vinh Long most basic latrines are hanging latrines connected either to a fishpond or to a stream.

Sanitary Facilities by Province



Source: Department of Health data from Dien Bien and Vinh Long

Masonry market context

There are relatively few formally trained masons in Dien Bien. Those who do work as masons are likely to work only part-time as a supplement to their primary source of income (predominantly farming). In Vinh Long, the masonry market context is more developed and includes individual mason consultants as well as construction companies with ‘master masons’. Overall, the number and range of masonry skills is more developed in Vinh Long in comparison to Dien Bien province.

However, in both provinces, masons interviewed described sanitation as a relatively minor portion of their overall business. Particularly for the skilled masons, those interviewed described a preference for larger, single home renovation or building projects.

Capacity to comply with sanitation quality standards is limited, given the fact that even skilled masons reported limited knowledge on how to build a proper toilet. Formal training in sanitation is non-existent; masons indicated limited awareness of standards, designs, and technologies.

“Normally, our clients trust us more than sellers as our knowledge and experiences” – Mason, Binh Tan, Vinh Long province



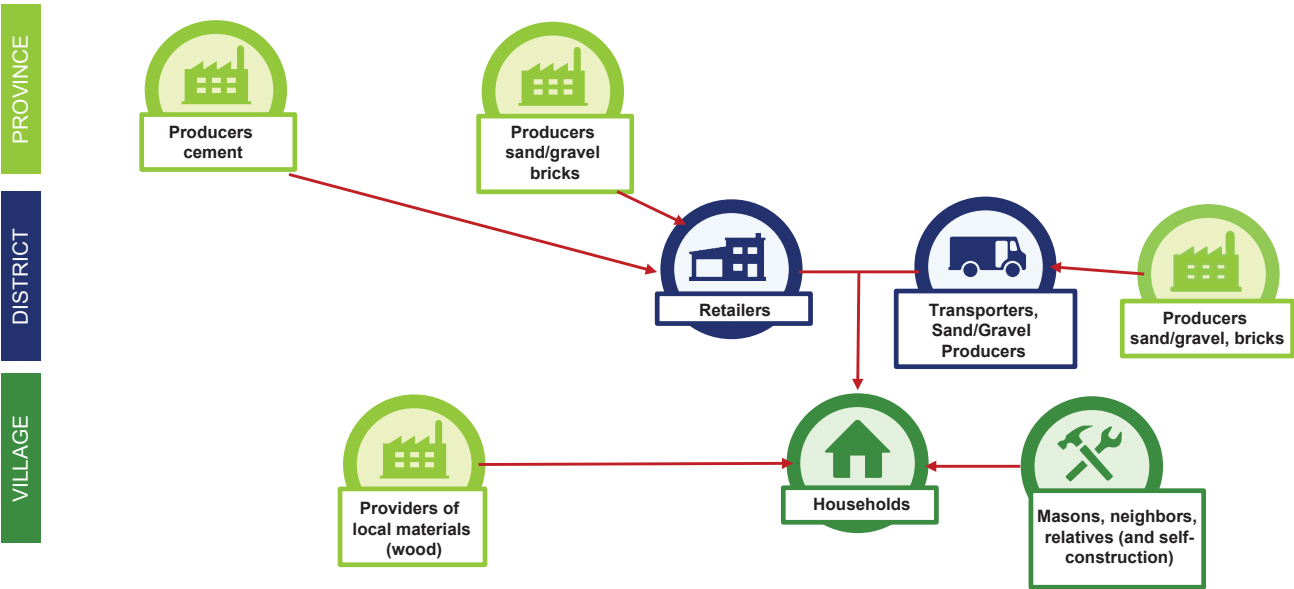
Mr. Khoi is a 43 year-old mason who lives in Binh Tan district. He is currently using a hanging latrine, although he knows how to build a hygienic latrine. He has two children and his investment priorities are his children’s education and to build a new house.

SANITATION RETAILERS

This section analyzes the potential providers of the necessary input materials required to build an improved latrine including: sand, cement, brick, gravel, steel, PVC pipes, and ceramic pans. Retailers are defined as businesses (either formal or informal) that sell materials to individual households or to masons hired by those households, whereas wholesalers are companies that provide materials to retailers, either as producers of the materials or as aggregators of large quantities of materials to be distributed to retailers in bulk.

Supply Chain for Double Vault Latrines

Recommended for Muong Cha district, Dien Bien Province

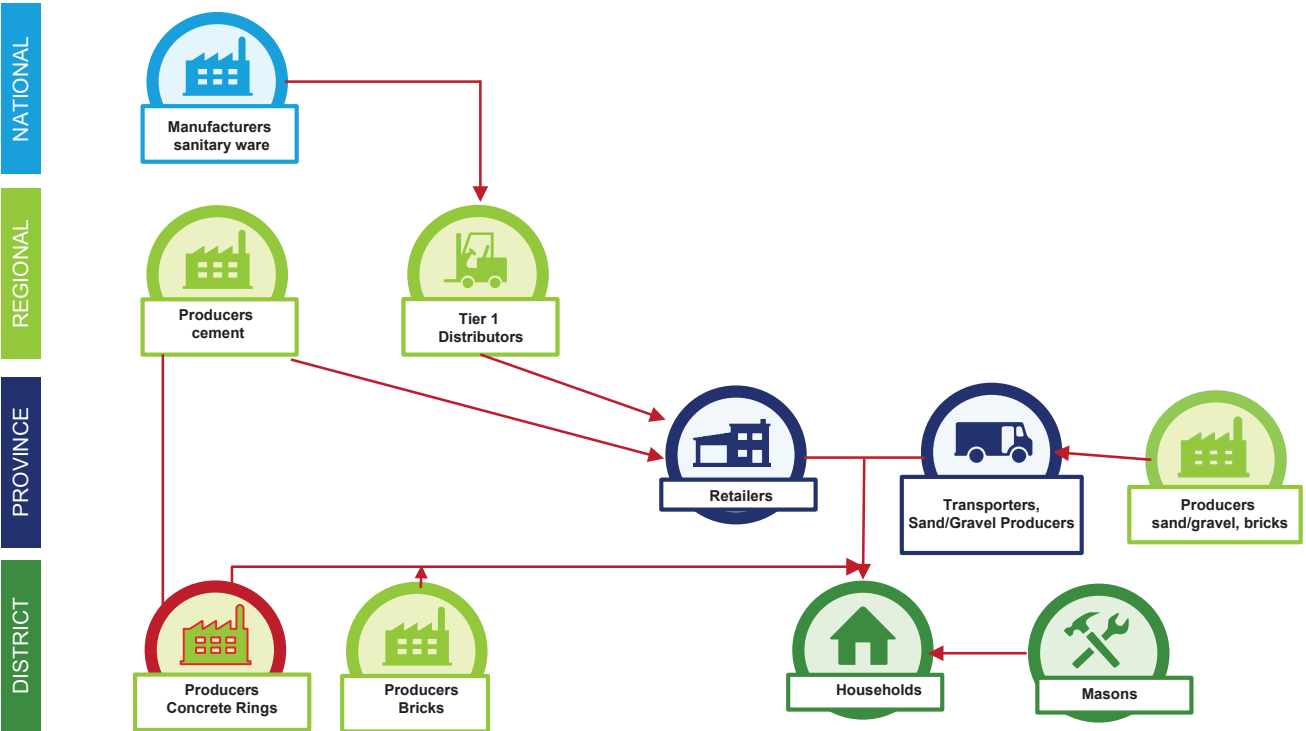


“I tried to provide good consultation to customers and hope that it will help them and create more reputation for my shop as well” – Female sanitation retailer, Muong Cha district, Dien Bien province

Market scan findings suggest that sanitation retailers and wholesalers consider their advisory role—regarding sanitation products and services—as critical to their reputation and business viability overall. Retailers and wholesalers typically rely on word of mouth to generate sales. Similar to the masons, sanitation represents a very small fraction of total sales and revenue for suppliers, which helps explain the relatively low interest in marketing specific sanitation products and services. In Vinh Long province, retailers explained that materials for latrine construction are typically sold along with other household improvement materials.

Supply Chain for Pour Flush Latrines (with concrete rings)

Recommended for Vinh Long



Meet Mr. Quyen, a sanitation materials entrepreneur in East Dien Bien district. His business sells construction materials, including products needed to build hygienic latrines. Quyen’s store generates a monthly gross revenue between 80-100 USD, and has an average margin on sanitation products of 15%. An estimated 20% of his customers are urban families upgrading their houses and toilets and the remaining 80% are rural.

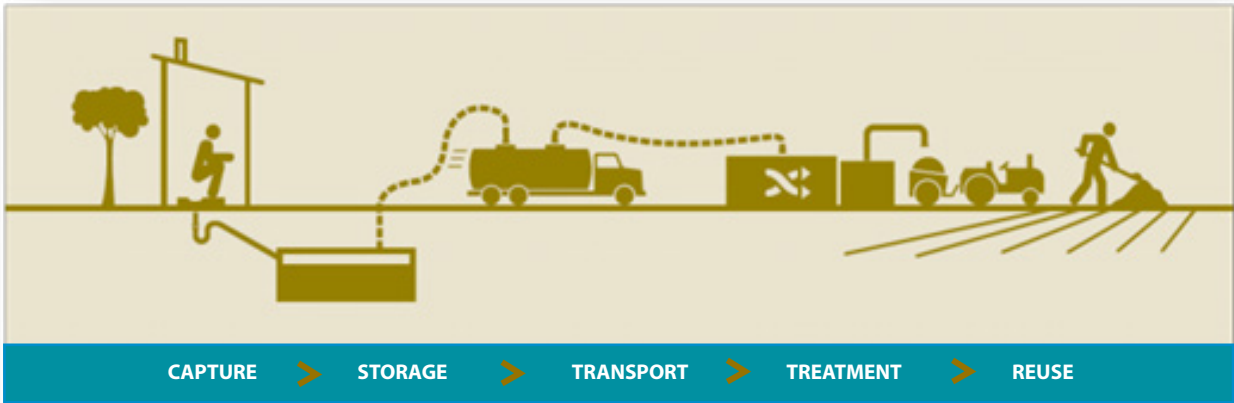


TRANSPORTATION SERVICE PROVIDERS

Transportation represents a significant percentage of the final cost of a toilet, particularly for the most remote rural families and during rainy seasons when roads may be impassable for trucks. Retailers in Dien Bien claimed to charge 10% of the final materials cost for transport within a 20km radius, and an additional 5% for greater distances. Recent studies suggest that transportation costs can represent more than 50% of the total cost of the latrine.⁸ In cases where sanitation material purchased is not large enough to fill a truck, transport costs can increase significantly. If roads are not accessible by truck because they are too narrow or flooded, other means of transportation—motorbike, buffalo or boat—are required, which can further increase the cost and time. Transport costs are generally lower in Vinh Long, due to the more developed road and commercial infrastructure, and more well developed linkages between masons and sanitation retailers. Vinh Long retailers reported charging an additional 5% to transport products from the district capital to a nearby rural area.

FECAL SLUDGE MANAGEMENT SERVICE PROVIDERS

Provision of post-installation waste collection and treatment services is one of the most neglected parts of the sanitation value chain in rural Vietnam. Fecal sludge management services include those services related to the safe removal of sludge/compost, transportation, treatment and reuse.



Source: Gates Foundation

⁸ A. Gero, et al. Relying on markets to address human rights: sanitation supply chain analysis in low-density settings. Submitted to the 37th WEDC International Conference in Hanoi, Vietnam, 2014.

In Dien Bien where most latrines are dry, unlined pit-latrines, the demand for fecal sludge management services such as pit emptying is low and concentrated in urban towns such as Dien Bien city where septic tanks and lined pits are more prevalent. Only a single sludge emptying pump-truck service was identified in Dien Bien city. One of the septic tank owners living in a district town in Dien Bien province paid 1.5 million VND (~71USD) for dislodging a 1-2 cubic meter sized tank.

In Vinh Long there is only one formal company dedicated to waste removal, but only 5-10% of their clients are currently rural, and only a small portion of their overall business is dedicated to waste removal. Their service is extended only to areas where a truck or other vehicle can reach. The cost of emptying a septic tank is 500,000 VND/truck if the distance is below 20 km from the provincial capital, adding 5,000 VND for each additional kilometer. Some districts, such as Binh Tan area, are serviced by companies located in Can Tho province at a similar cost.

There is increasing concern about the management of feces as well as the associated fecal sludge management services. Research on the safety of Double Vault Composting (DVC) latrines recommend that there is need for a minimum of 6-12 months for a pit to be left untouched in order to eliminate all pathogens before being used as a fertilizer. In Dien Bien this is a major concern as households reported that they empty the pit when they need fertilizer, or on average every 3-6 months. Safe treatment and disposal of sludge collected from septic tanks is not common. In many cases, even in urban areas, companies that empty the tanks discharge the untreated sludge into the environment such as water streams.

RECOMMENDATIONS

Based on the findings from this market scan, the following priority considerations emerge for future rural sanitation marketing interventions.

PRODUCT

Some of the existing sanitation technologies across Vietnam require adaptation to the local context in each province.

In Dien Bien, the socio-economic conditions of the majority of the population necessitate the availability of low-cost solutions. VIP or DVC latrines are existing technologies that seem to be best suited for the Dien Bien context, though they are not what households currently aspire to own. One recommendation is to promote latrines as upgradable over time; for example, households can build a VIP latrine which can then be upgraded to a DVC latrine by installing an additional vault once more capital is available. The use of local materials for the superstructure, such as wood and bamboo, should be explored. Reducing the use of non-locally sourced materials, and thus the related transportation costs, could significantly reduce the cost of the infrastructure.

In Vinh Long, the main challenge is to identify an appropriate and affordable technology for use in flood-prone areas and in areas with a high water table. Due to the high cost to transport bricks, the feasibility to use locally produced concrete rings should be explored and promoted in Vietnam.

Concerns about access to water also have to be considered, and informed choice should be promoted among households. In many cases masons tend to push for costly solutions such as pour-flush latrines, even if the household lacks proper access to water.

Upgrading existing structures and building in phases

An important aspect of household sanitation practices to consider is the sanitation ladder, on which a household incrementally improves its latrine technology. In many cases households do not have enough money to construct their ideal latrine all at once, therefore having the opportunity to upgrade a latrine in installments is an attractive option.

Ideally, building in phases should entail a proper plan with the household owner, in which the priority is given to the underground components, namely the pit or septic tank in a first phase, and only later in a second phase is a permanent superstructure is built. Temporary options such as shelters assembled from widely available natural materials cost little or nothing to the households to put up right away.

Toilet upgrades could be to replace leach pits with a septic tank. In this case the existing pit can be still used and just requires a connection to a second chamber. Considering this option could allow households to build a pour-flush latrine with a single concrete ring chamber and then in a second phase set up a second concrete ring tank to create a proper septic tank.

PRICE

The development of strategies to reduce the costs of materials and transportation are vital to develop the sanitation market in remote settings like Dien Bien province. Bulk purchases or use of local materials—some of which may even be readily available e.g. wood could reduce the total consumer price.

There is large disparity between household, mason, and government perceptions of the cost of an improved latrine. Disseminating accurate breakdowns of the costs for the different options might contribute to facilitating the decision process for households.

Improving access to credit and facilitating more flexible pricing terms is likely to increase consumer investment in sanitation. The research found that many retailers, especially those with close relationships with their clients, represent a significant source of credit. The possibility of expanding and formalizing those financial services should not be underestimated in the design of future interventions, as retailers could be potential partners in a lending/subsidy scheme.

Access to other existing, traditional credit sources could be improved by efforts to streamline the application, qualification and repayment procedures; as well as reconsideration of interest rate affordability for poor, rural families. Communication to increase demand for sanitation should consider incorporating messaging to address the reluctance among some households to use credit for the purchase of a non-income generating consumer product such as a latrine. Finally, sanitation subsidies should be implemented in a highly targeted—benefitting the poorest families—and transparent manner; feedback from rural households suggests there is scope for improvement here.

PROMOTION

Households interviewed revealed a need to increase motivation to invest in sanitation by emphasizing non-health benefits in terms that resonate with a specific group. Key messaging is likely to vary both in content and language by geographic area, and by ethnicity—as specific perceptions and insights regarding perceived benefits are varied. Emotional as well as functional benefits of hygienic sanitation should be promoted. Multiple, targeted communication channels accessible to rural families should be utilized to achieve exposure to reinforcing messaging and to engage household decision makers in interactive discussions designed to go beyond raising awareness to motivate commitment to invest in hygienic sanitation.

Cost-efficient rural communication channels which have been used by PSI and other partners to motivate behavior change among rural communities in Vietnam include: i) billboards near rural markets, schools, and commune entrances; ii) commune loudspeaker spots/serial dramas/songs; iii) interactive market and community based events including family karaoke day; iv) highly illustrated print materials such as posters, hanging banners, and leaflets; v) materials placed at commercial outlets visited regularly by rural families to purchase weekly household supplies; and vi) and face-to-face discussion tools to enable village health workers and other community-based volunteers to engage households in interactive discussions.

Efforts to improve consumer knowledge of pricing, availability, reliability, and quality of certified suppliers are needed. Sanitation entrepreneurs—masons, retailers and waste collectors—are unlikely to have the skills to promote their services and would benefit from external assistance in this area. The most successful promotion campaigns are those that align demand creation activities—in many cases promoted by the government or by NGOs—with marketing promotion of sanitation products and services.

PLACE

The sanitation supply chains vary significantly from one province to another, thus the distribution strategies need to be tailored to each context individually.

Bulk purchases among groups of villagers in Dien Bien could reduce transportation costs, and therefore sanitation costs overall. As a result of promotion and awareness activities, increased demand for products and services may similarly enable masons in Vinh Long to engage in bulk purchasing as well. The presence of input materials and products does not seem to be a large barrier in the areas visited, - even with pans imported from China in Dien Bien province - however the transportation costs are among the main limiting factors.

Even in more developed sanitation markets, such as in Vinh Long province, the supply chain remains disjointed. Efforts should be made to ease the household purchase process and to facilitate linkages between masons, retailers and other sanitation service providers. The creation of a one-stop shop for latrines should be explored, especially in more economically developed areas of Vinh Long, where entrepreneurs are more able to invest in the acquisition of stock.

Ensuring safe disposal of human feces requires more than just building the substructure in which the waste is contained. An integrated vision on fecal sludge management is still missing in Vietnam, therefore there is urgent need to create and promote viable business models and technologies to provide affordable, safe post-construction sanitation services to rural consumers.

ABOUT PSI

PSI's aims to use entrepreneurial approaches to sustainably improve the health of low-income households through increased water, sanitation, and hygiene (WASH) behaviors including household water treatment, use of hygienic latrines and hand washing with soap. PSI has WASH programs in 30 countries, including market-based approaches to sanitation in Benin, Cote d'Ivoire, Ethiopia, Ghana, India, Kenya, Laos, Malawi, Mali, Niger and Senegal and Community Led Total Sanitation (CLTS) programs in Liberia, South Sudan and Papua New Guinea. In Vietnam, PSI's WASH program protects more than 5,200 rural families with safe drinking water and hand washing with soap interventions every year. Globally, PSI has averted almost 30 million cases of diarrhea and distributed enough water treatment products to treat more than 100 billion liters of water as of end 2014.

PSI uses formative research to identify opportunities to strengthen supply and demand to better meet the WASH needs and preferences of program beneficiaries and communities, which includes product design, supply-chain strengthening and targeted behavior change communications strategies to inform consumers and generate demand. PSI's WASH social marketing interventions are informed and assessed using a variety of metrics and measurement tools including rapid market scans, household and market surveys and in-depth qualitative assessments to identify insights among consumers as well as traders at various points in the supply chain. Evidence is used to design interventions consistent with a broader market context and to generate measurable improvements toward access, quality, cost-efficiency and equity goals.

PSI has extensive experience identifying and applying specific insights from consumers and traders to design innovative and effective rural sanitation programs. In the rural state of Bihar in India, in which sanitation coverage is staggeringly low at 12%, through extensive market research and over 9,000 interviews, PSI identified specific barriers, including specific cultural norms supporting open defecation, a lack of affordable latrine options and low awareness of where and how to procure input materials. In Bihar PSI aims to facilitate the construction of 30,000 latrines by 2016, 12,000 of which will be purchased through consumer loans made possible by PSI partnerships with local lenders. This is just one of several examples of PSI's application of entrepreneurial techniques to generate sustainable improvements in rural sanitation at scale.

ANNEX

The following table summarizes the advantages and disadvantages of the different options existing in Vietnam (based on the technologies approved by VIHEMA).

	Advantages	Disadvantages	Recommended use	Estimated Price
Pit latrine	Low cost HH can build by themselves No water required	Not considered as “hygienic” by MoH Smelly Low acceptance by people Required to build a new pit when full	Recommended to poor and isolated households (especially in Dien Bien) currently practicing OD	40-95 USD
VIP latrine	Low cost HH can build by themselves (or with limited external support) No water required	Smelly Low acceptance by people Requires to build a new pit when full	Recommended to poor and isolated households (especially in Dien Bien) currently practicing OD	50-100 USD
Double Vault Composting (DVC)	Feces can be composted and used as fertilizer Manual emptying every 6 months (average)	Still smelly (as VIP) Relatively low acceptance (especially for people not interested in using compost)	Recommended to poor rural households. Farmers willing to use it as fertilizer and/or do not have problems manipulating compost.	100-190 USD
Pour flush latrine with pit wall unlined	Easy to build Availability of water allows washing hands Can be combined with bathroom and built inside house Durable Convenient No smell	Requires water Not feasible with loose soils, high water tables or nearby water sources. Easy to pollute groundwater Requires emptying with mechanical means (vacuum pump)	The cheapest wet latrine technology, although not appropriate in most of Vinh Long province (high water table and sedimentary materials).	90-190 USD

	Advantages	Disadvantages	Recommended use	Estimated Price
Pour flush latrine with pit wall lined (bricks)	<p>Availability of water allows washing hands</p> <p>Can be combined with bathroom and built inside house</p> <p>Durable</p> <p>Convenient</p> <p>No smell</p>	<p>Requires water</p> <p>Not feasible with high water tables or flooded areas.</p> <p>Could pollute groundwater if not properly build or close to water sources</p> <p>Requires emptying with mechanical means (vacuum pump)</p>	Low-cost wet-latrine technology, although might not appropriate in flooded areas of Vinh Long province.	200-400 USD
Pour flush latrine with pit wall lined (concrete rings)	<p>Availability of water allows washing hands</p> <p>Can be combined with bathroom and built inside house</p> <p>Durable</p> <p>Convenient</p> <p>No smell</p> <p>Cheaper than brick lined pits (if concrete rings locally available)</p>	<p>Requires water</p> <p>Not feasible with high water tables or flooded areas.</p> <p>Requires emptying with mechanical means (vacuum pump)</p> <p>Concrete rinks need to be locally available.</p>	Low-cost wet-latrine technology, although appropriate in flooded areas of Vinh Long province if properly built.	150-300 USD
Septic tank with concrete rings	<p>Availability of water allows washing hands</p> <p>Can be combined with bathroom and built inside house</p> <p>Durable</p> <p>Convenient</p> <p>No smell</p> <p>Cheaper than brick lined tanks (if concrete rings locally available)</p> <p>Best solution for high water tables or flooded areas.</p>	<p>Requires water</p> <p>Requires emptying with mechanical means (vacuum pump)</p> <p>Concrete rinks need to be locally available.</p>	Appropriate in flooded areas of Vinh Long province if properly built. Initial digestion of sludge allows liquid fraction to be less pollutant (possibility to infiltrate)	150-400 USD

	Advantages	Disadvantages	Recommended use	Estimated Price
Septic tank with bricks (including BASTAF)	<p>Availability of water allows washing hands</p> <p>Can be combined with bathroom and built inside house</p> <p>Durable</p> <p>Convenient</p> <p>No smell</p> <p>Best solution for high water tables or flooded areas and no availability of concrete rings. Septic tanks with bricks tend to be more efficient in the digestion process.</p>	<p>Requires water</p> <p>Requires emptying with mechanical means (vacuum pump)</p> <p>More expensive than concrete rings</p>	<p>Appropriate in flooded areas of Vinh Long province if properly built. Initial digestion of sludge allows liquid fraction to be less pollutant (possibility to infiltrate)</p> <p>Best technology for sludge treatment (if properly designed)</p>	200-500 USD
Septic tank with tank made of plastic or composite	<p>Availability of water allows washing hands</p> <p>Can be combined with bathroom and built inside house</p> <p>Convenient</p> <p>No smell</p> <p>The best solution for high water tables or flooded areas.</p>	<p>Requires water</p> <p>Requires emptying with mechanical means (vacuum pump)</p> <p>Requires local availability</p> <p>Light but voluminous (could be difficult to transport)</p> <p>Usually those tanks offer less flexibility (one type does not fits all sizes of HH)</p>	<p>Appropriate in flooded areas of Vinh Long province.</p>	120-250 USD
Biogas digester	<p>Possibility to transform a waste into gas (energy)</p> <p>Possibility to recover part of the investment by saving money (e.g. gas)</p> <p>Combined solution for animal manure and human feces</p>	<p>The technology is recommended only in combination with animal manure (at least 4 pigs or 1 cow to recover the investment).</p> <p>Requires trained masons</p> <p>Higher costs</p>	<p>Appropriate only for households having a minimum of 4 pigs or 1 cow.</p>	450-900 USD

Source: adapted from Jensen et al 2014

