

SUMMARY OF RESEARCH REPORT 2

SANITATION VALUE-CHAINS IN LOW DENSITY SETTINGS IN VIETNAM



JULY 2015

This summary presents key findings of research into the sanitation value-chain in two provinces in northern Vietnam to understand the viability of market-based solutions in low density settings.

This study examines the sanitation hardware supply in two rural, remote districts in Vietnam - Muong Ang District (in Dien Bien Province) and Mai Chau District (in Hoa Binh Province). The research involved a value chain analysis and examined strategies to improve the supply of affordable sanitation products. This study was undertaken by Institute for Sustainable Futures, University of Technology Sydney with SNV Netherlands Development Organisation.

The question addressed by this research emerged from practitioners in development agencies currently attempting to support development of supply chains for sanitation products in rural areas. They were concerned about how the low population density and difficult geographical challenges would affect the effectiveness of market-based approaches to improving access to products and services. This led to an interest to investigate the actual costs along supply chains and gain a better understanding of costs and logistics involved in such remote, rural locations.

STUDY PURPOSE AND METHODS

The research objectives were: (i) To map and correlate latrine costs against poverty levels, toilet coverage and other socio-demographic dimensions in remote, rural areas; (ii) To analyse the viability of market-based solutions for sanitation products in low-density areas, including the impact of distance and transport cost; and (iii) To identify strategies that could support availability of affordable, acceptable products for the poor in remote, rural areas, with a key focus on the enabling environment for pro-poor business development.

This research methodology was based on a value-chain analysis, working backwards

from the costs of component materials to build toilets at households in Muong Ang and Mai Chau Districts. For externally sourced materials such as cement and toilet pans, we followed the links up the supply-chain to local materials shops, district and provincial shops and distributors to producers and manufacturers. The study also considered the prices and availability of locally sourced materials. For the purposes of the research, three government (Ministry of Health) approved toilet types were investigated. These were ventilated improved pit (VIP) latrines, double-vault latrines and septic tank latrines (see Figure 1).

FIGURE 1 TOILET MODELS L-R: VIP LATRINE, DOUBLE VAULT LATRINE AND SEPTIC TANK LATRINE



POVERTY, TOILET COVERAGE AND COSTS TO BUILD A TOILET

In Muong Ang and Mai Chau, there was a strong correlation between poverty, low hygienic toilet coverage and high costs of toilets (see Figure 2 for Muong Ang data). In the remote communes, poverty and hygienic latrine coverage were lowest while costs of toilets were the highest.

MAJOR COST COMPONENTS IN BUILDING A TOILET

The major material components to build toilets included cement, bricks, iron, sand, roof tiles (used for superstructure) and a toilet pan (only required for septic tank latrines). Apart from the toilet pan, these materials were common construction materials and were readily accessible in the district towns and in many commune centres. The toilet pan comprised a relatively small percentage of total materials cost in both districts.

In both districts, the material that comprised the highest proportional cost was bricks. Whether made from cement (as in Mai Chau) or clay (as in Muong Ang), bricks made up an average of 50% of the cost in Mai Chau and 46% in Muong Ang for VIP latrines. Figures for Muong Ang are presented in Table 1, while Figure 3 provides an example of material costs for VIP latrines in Mai Chau locations, showing brick dominates costs in all locations.

Consistent labour rates across both districts were used, estimated based on data collected. For VIP latrines, in most locations in Muong Ang district, material costs were less than costs for labour (material costs are approx. 80 – 90% of labour costs). For double vault latrines, labour cost less than materials: materials were 10% higher than labour for the former and double the cost of labour for the latter.

FIGURE 2 POVERTY RATES AND TOILET COSTS FOR MUONG ANG COMMUNES

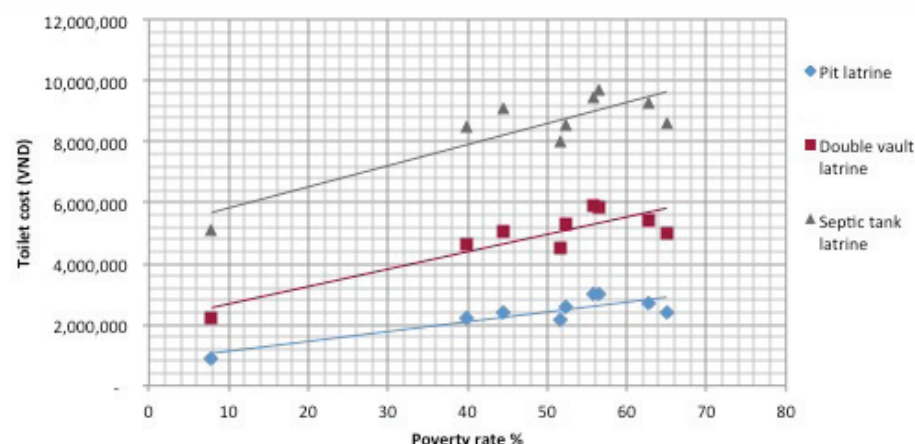
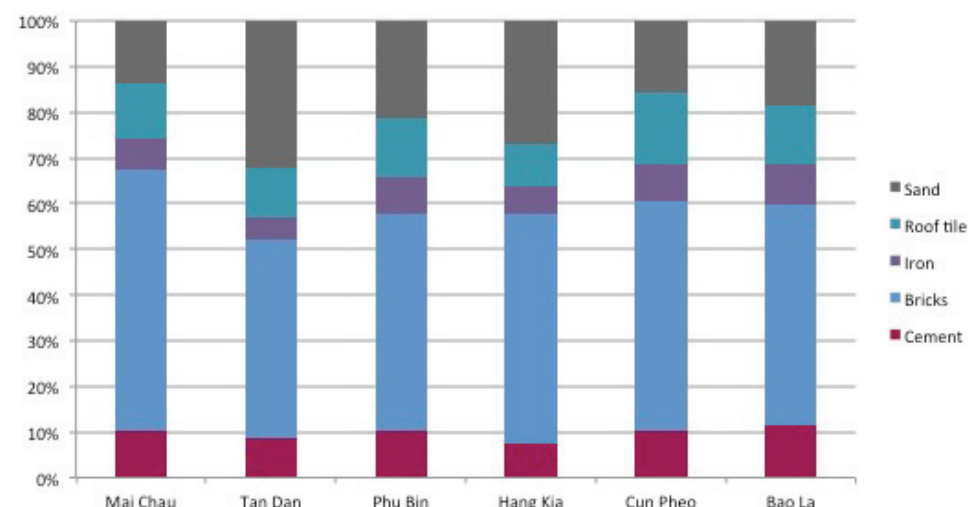


TABLE 1 PROPORTION OF COSTS ATTRIBUTED TO MAIN MATERIALS IN MUONG ANG FOR THREE TOILET TYPES

| | CEMENT | BRICKS | IRON | ROOF TILE | TOILET PAN |
|----------------------|--------|--------|------|-----------|------------|
| VIP latrine | 15% | 46% | 19% | 20% | n/a |
| Double vault latrine | 12% | 61% | 19% | 8% | n/a |
| Septic tank latrine | 5% | 71% | 17% | 3% | 3% |

FIGURE 3 PROPORTION OF COSTS ATTRIBUTED TO MAIN MATERIALS OF VIP LATRINES IN COMMUNES IN MAI CHAU



AVERAGE COSTS IN EACH DISTRICT

The costs of toilets for households in this research far exceeded the government's estimates. On average, the total cost for the three toilet types is provided in Table 2. Note that the data collection locations in Mai Chau consisted of more remote and difficult to reach locations (leading to higher costs from transport), thus the two districts should not be compared as equals. Also included are the estimates of latrine costs from the Ministry of Health, which includes labour, and is supposedly indicative of the budget estimate for household latrines. These costs are far below the actual costs found in Muong Ang and Mai Chau, particularly for remote locations. For example, for VIP latrines, our research shows that in remote locations, they are 168% of MoH costs. For Mai Chau, costs of double vault latrines in remote locations are almost 3.5 times the estimates from MoH.

COSTS IN DIFFERENT LOCATIONS

Variation in costs across different locations were due to:

- transportation costs
- supply chain costs influencing the price of materials
- accessibility of locally available products, e.g. sand, bricks, cement
- competition between shops, which kept prices similar

Low materials and transport costs were found at the district capitals in both locations, which is unsurprising given issues of competition between the multiple shops and negligible transportation costs. An exception was found in Mai Chau district where some of the commune level shops (e.g. Cun Pheo and Bao La) sold materials cheaper than in the district town. One brand of cement and bricks of low quality was sold in these commune

shops, with the shop owners believing this was what their customers wanted. In Muong Ang district, the highest costs were found in Ngòi Cay, Xuan Lao and Tõ Nõ - all locations that were difficult to access and incurred high transport costs. Costs of double vault latrines for locations across each district are found in Figure 4, where areas further from main roads (dark black lines) are higher than those close to roads.

TRANSPORT COSTS

Households in remote villages faced barriers in transporting materials to their homes due to poor quality roads that were often inaccessible by truck and were steep, slippery and muddy (see Figure 5). Motor bike transport and access on foot were common means to transport materials to these remote locations. Costing the transportation of sanitation materials usually involved a combination of

methods including formal truck transporters (to points where road access permitted), motor bike, boat and on foot using local labourers. Such transport was either self-arranged, where households took opportunistic approaches in doing so (i.e. coming home by motor bike with a load of materials after going to the village for other purposes) or through truck transporters, who acted as a middle-man in purchasing then transporting materials to as close as possible to the household.

Given the prominence of transportation by motor bike, it was important to understand the logistical requirements and scale involved in transporting materials for the three latrine types. Table 4 provides these details, including the weight of material required for each toilet type, and the number of trips required to transport materials using the local capacity of a motor bike (according to local data). Table 4

TABLE 2 AVERAGE COST OF LATRINE TYPES IN MUONG ANG AND MAI CHAU DISTRICTS*, WITH MOH ESTIMATES INCLUDED

| | VIP LATRINE VND (USD) | DOUBLE VAULT LATRINE VND (USD) | SEPTIC TANK LATRINE VND (USD) |
|----------------|-----------------------|--------------------------------|---|
| Muong Ang | 2,402,328 (\$111) | 4,967,283 (\$230) | 8,738,439 (\$405) |
| Mai Chau | 2,924,233 (\$135) | 6,035,155 (\$278) | 11,315,156 (\$521) |
| MoH estimate** | 1,790,858 (\$82) | 2,737,929 (\$126) | 7,352,275 (\$337) -red brick 3,615,015 (\$166) -concrete rings |

* Cost includes materials, labour and transport

** See Decision No 14/QĐ-MT dated 23 January 2014 by VIHEMA/MOH

FIGURE 4 DOUBLE VAULT LATRINE COSTS IN MUONG ANG (LEFT) AND MAI CHAU (RIGHT)

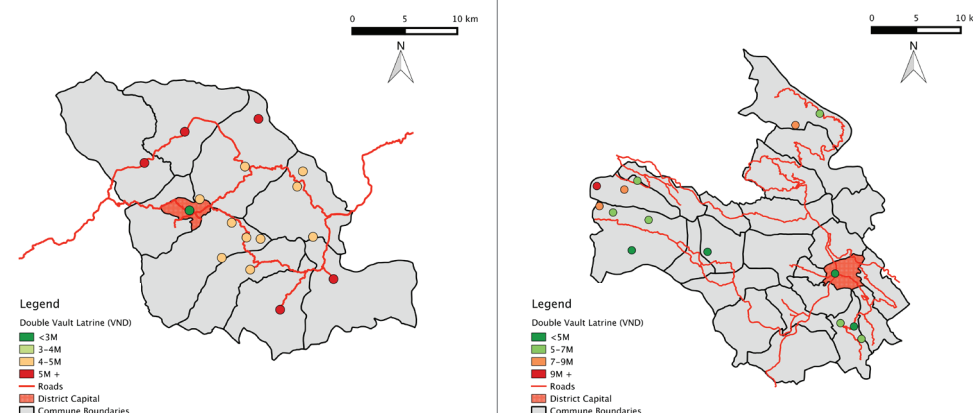


FIGURE 5 DIFFICULT ROAD ACCESS TO VILLAGES IN HANG KIA COMMUNE, MAI CHAU DISTRICT



TABLE 4 NUMBER OF TRIPS REQUIRED FOR TRANSPORTATION BY MOTOR BIKE FOR THREE TOILET TYPES

| MATERIAL | VIP LATRINE | DOUBLE VAULT LATRINE | SEPTIC TANK LATRINE |
|---|-------------|----------------------|---------------------|
| Cement (P=100kg, DVL=200kg, STL=200kg) | 2 | 3 | 3 |
| Bricks (P=600kg, DVL=2000kg, STL=5400kg) | 10 | 33 | 90 |
| Sand (P=1600kg, DVL=3200kg, STL=8000kg) | 27 | 54 | 133 |
| Other (e.g. roof tiles, toilet pan) | 3 | 3 | 3 |
| TOTAL TRIPS | 42 | 93 | 229 |

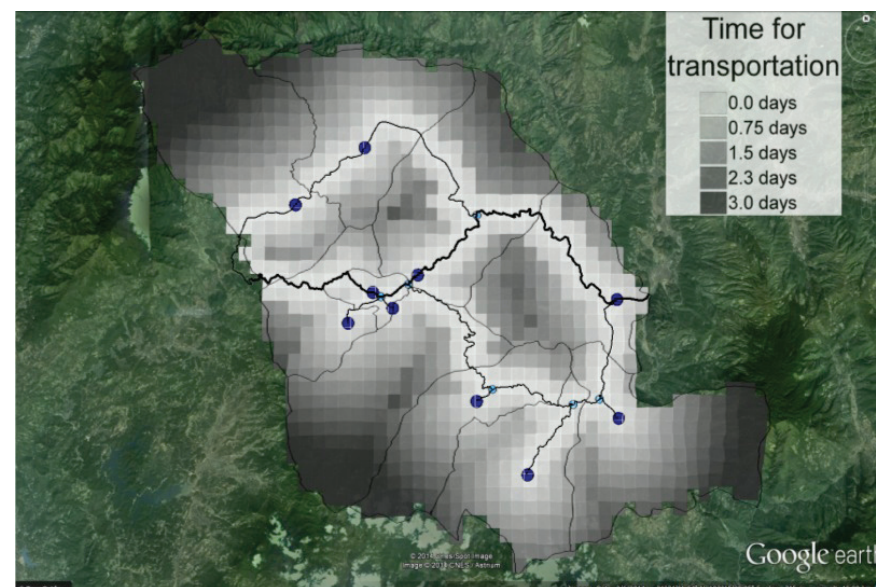
Note: Weights for materials are included for materials where P = VIP latrine, DVL = double vault latrine and STL = septic tank latrine.

shows that even for a VIP latrine, 42 trips by motorbike are required. Even for households living close to the village centre (or from the materials pick-up point), considerable time is needed to dedicate to this task, as well as fuel costs and potential missed labour time. This is a significant barrier to households accessing even the simplest of hygienic latrine options. For transportation of septic tank latrine materials, 229 trips are required which is unrealistic to think a householder would dedicate time towards.

How these trips translate to time in Muong Ang District is illustrated in Figure 6. This time

incorporates the multiple trips required to transport the standard quantities of materials for a VIP latrine from the point of purchase to the household. In this figure, we assume a motor bike can travel not only on the main roads (which are shown as dark thick lines), but also virtually access anywhere else along small tracks away from roads. What can be seen is that for areas further away from the roads in the most remote locations, the time taken is the highest, adding to three full days of time, driving small, manageable quantities of materials from the point of purchase to the household. To dedicate this amount of time to such a task would require a high degree

FIGURE 6 TIME FOR TRANSPORTATION OF MATERIALS BY MOTOR BIKE FOR VIP LATRINES BEYOND COMMUNE CENTRES IN MUONG ANG DISTRICT



of motivation, as well as cost, since most householders work as labourers or farmers and three days transporting materials would equate to three days less wages, plus fuel costs.

SUPPLY CHAINS FOR EXTERNALLY SOURCED MATERIALS

In Muong Ang district, most cement was locally produced in Dien Bien Phu (the provincial capital). Profit margins for cement were typically very low for retailers (up to 7% in Muong Ang town). The more remote commune centres (e.g. Ang To) sold cement for higher prices (up to 40% higher than the wholesale price at the factory) to account for costs associated with transporting the material to their shop. In Mai Chau, profit margins for cement were reportedly even lower than in Muong Ang, with 3% calculated at one Mai Chau retailer. Small discounts were provided for bulk purchases in some shops – dependent on the strength of the relationship between the customer and the retailer. Cement sold for 30,000 VND higher than Mai Chau town in smaller, remote villages (e.g. Tao No).

Toilet pans were manufactured in provinces near to Hanoi (e.g. Thani Binh province). In Muong Ang District, one of the most significant costs involved in toilet pan purchase for locations outside the district centre was transport, for example, in Ang To commune, squat pans were sold at five times the price as in Muong Ang town (see Figure 7). In Mai Chau, one commune level shop owner noted the profit margin on squat pans sold was 5 – 7%. Squatting pans were preferred by households in both Muong Ang and Mai Chau, with brand name not important in deciding which to purchase.

LOCALLY SOURCED MATERIALS

In Muong Ang and Mai Chau, there were local cement manufacturers and as such, the price of cement at each of the town centres was similar (135,000 VND/100kg). Bricks were also produced locally in both districts. In Muong Ang, there were local producers of both cement and red (clay) bricks while in Mai Chau, only cement bricks were locally made (there was a red brick factory 65km away). The cost of cement bricks differed considerably between the two districts. In Muong Ang, cement bricks cost appr. imately 1350 VND per brick, while in Mai Chau they cost appr. imately 2400 VND per brick. Bricks comprise the largest proportion of material costs for both districts. The sources and flows of cement, from wholesalers in distant provinces and producers in the district, are illustrated in Figure 8.

Sand was locally available in Muong Ang district, and households were able to easily and cheaply procure enough sand for their household latrine construction such that costs were negligible. In Mai Chau this was not the case. Sand therefore added significantly to the overall costs of materials, also posing logistical challenges in transportation to remote households.

FIGURE 7 COST OF TOILET PANS FROM MUONG ANG TOWN TO MORE REMOTE COMMUNES

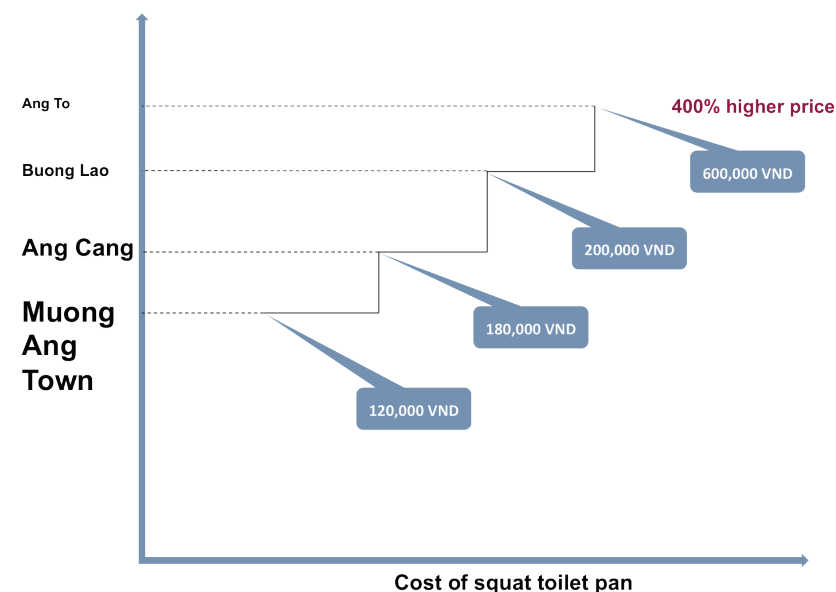
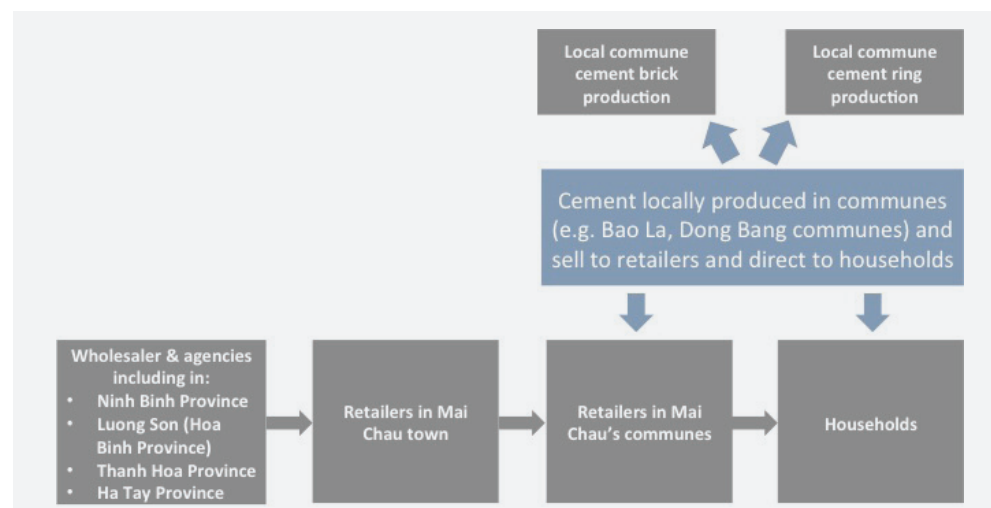


FIGURE 8 SOURCES AND FLOWS OF CEMENT IN MAI CHAI



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The majority of supply shops accepted credit as a form of payment for their products and many noted that they were forced to do so as their customers were poor and unable to pay the full cost upfront. The terms of credit were negotiated and dependent on the trust and strength of the relationship.

TRANSPORT BUSINESSES

In both districts there were an increasing number of truck transporter businesses emerging, providing services to both supply shops and households for delivery of materials. While profit margins were reported high (e.g. up to 69% in Muong Ang), the increasing competition was driving prices down. The prices charged by transporters in both locations were also negotiated between the customer (either shop owner or householder) and the transporter business owner, and relied on the strength of the relationship and the transporters knowledge of the delivery destination (e.g. distance, condition of the road).

In Mai Chau district, a key difference to Muong Ang was the presence of transporters who householders called upon for both the purchase and delivery of materials. Some householders preferred this option when they were unfamiliar with the types and quantities of materials available/required for latrine construction, and/or those who saw their distance from supply shops as an obstacle to obtaining materials. The transporter acted as a ‘middle man’ who bargained prices with the shop and with the households.

MATERIALS SUPPLY SHOPS

In both districts, shops were often family run, with some having formal registered status as enterprises and others being more informal. Both approaches were legal and had benefits and drawbacks depending on the perspective of the shop owner. Supply shops in the district towns and some communes were aware of

other nearby competitor shops but none went to any lengths at deliberately marketing their products. All relied on their reputation such that their loyal customers would recommend them to others, and make return trips. The majority of supply shops accepted credit as a form of payment for their products and many noted that they were forced to do so as their customers were poor and unable to pay the full cost upfront. The terms of credit were negotiated and dependent on the trust and strength of the relationship. Shops accepting credit from customers placed a considerable burden on the business owner, since they were usually not permitted to pay their own costs to suppliers in the same way. This restriction of cash flow proved to be a barrier for businesses taking loans and expanding their business (see below). In Mai Chau, this had led to some shop owners being less willing to accept credit from all customers.

ACCESS TO CREDIT FOR ENTERPRISES

Enterprises in both districts accessed loans from banks such as the Vietnam Bank for Agriculture and Rural Development for establishing or expanding their business. One shop owner in Muong Ang did note that the loan – while used for the business – was actually taken out under terms supposedly for agricultural purposes. Enterprises also accessed credit and loans from family members, while others drew upon their own personal savings. As noted above, despite offering credit to their customers, most shop owners were required to pay their own suppliers and agents in cash. Managing their debts was therefore a challenge for some businesses.

GOVERNMENT AND POLICY ENVIRONMENT

Responsibility and authority for sanitation at the national level lay with the Ministry of Health. At the local level, government commitment to improving hygienic latrine coverage varied. In Muong Ang and Mai Chau where SNV had worked at the provincial, district and commune level, there was some degree of commitment; however this was hampered by budgetary allocations to sanitation which relied upon provincial decision makers (see Gero and Willetts, 2014).

Support for private enterprise was also present at the national level (however a policy was still lacking), including support for enterprise engagement in sanitation. It remains to be seen how this support will flow to sub-national levels of government where much of the decision making power lies, and hence the reality for businesses depends on the provincial interpretation of national support.

STRATEGIES TO IMPROVE AFFORDABILITY OF TOILETS IN VIETNAM

Based on the key findings, the following strategies could be considered by government and other development agencies to improve affordability and accessibility of rural households to sanitation products and services.

Seek opportunities to reduce costs of locally sourced materials: Further investigation into the costs of locally sourced materials and reasons behind large variations in their cost may reveal strategies to reduce costs. As a minimum, if collective purchasing of materials could be arranged then costs for these materials (and related transport costs) may be able to be reduced.

Access to finance for customers: Approaches that can reduce the outlay for households, including rotating funds.

Organising communities for collective purchasing: Communities could be encouraged and supported to buy materials as collectives to reduce costs. Both community leaders and government staff could promote this approach, and apply incentives (such as time-bound financial support) to support development of momentum and action.

Smart targeted subsidies: Given the need to support the poor, thought must be given to how to address affordability concerns, whilst avoiding undermining private sector actors (e.g. material supply shops) by providing non-targeted subsidies. In many countries the need to develop 'smart' subsidies has been

discussed (and in some cases trialled) to look to overcome this inherent tension. Design of a 'smart subsidy' involves considering issues in the local context in choice of subsidy, and 'designing-in' mitigating strategies for any disadvantages. Some subsidies that involve partnerships or contracts with supply shops and require several steps in their development to ensure equitable participation of supply chain actors and ensure agreements are transparent and upheld. In some other country contexts methods to 'accredit' certain suppliers have been adopted, involving suppliers agreeing to criteria around product quality, amenability to bulk delivery, price guarantees and guarantees to only provide services to eligible households.

Targeting transportation of sanitation materials: The results from this research in Muong Ang and Mai Chau districts illustrate the major increase in the cost of latrines in remote locations is due to transport and distance. As well as the barrier of cost, there is also the practical barrier of arranging the physical transportation of the materials to remote households with highly challenging logistics. Government estimates of toilet costs are far below the costs households in this research are required to pay in reality. Targeted government subsidies for this specific case (i.e. transporting sanitation products to remote locations) could be developed to assist in removing this barrier. Consistent support across Vietnam's provinces, even if targeting the poor, will not

work as the challenges in mountainous, remote locations are not present in the coastal plains. Furthermore, sanitation marketing or market based approaches will not increase access to hygienic sanitation for remote households unless additional support is provided which addresses transport and logistical challenges at the same time.

Target bricks as the most costly component of toilet costs: The high proportional cost of bricks compared to other core material components shows that influencing the cost of latrines may involve investigating alternate materials (e.g. concrete rings – however logistical challenges relating to transport cannot be overlooked here either). These results have implications for the ways to support or subsidise costs for the poorest households, however this would need to be carefully managed due to toilet materials being common construction materials.

Improve community understanding of hygienic sanitation options: In remote villages, households had limited awareness of the types of affordable sanitation options that were available. There were cases of wealthy households building expensive septic tank latrines with adjoining bathrooms, and this was the only example of hygienic sanitation for poorer households. Local government and CSOs, together with Women's Union staff could therefore work to raise the understanding of poor, remote households of the various more affordable types of sanitation that are available.

Research into new innovative products: In addition to investigating alternatives to bricks, other options for core components of toilets could be examined, e.g. durable plastic to replace the concrete slab. Such options have been trialled elsewhere, and CSOs and government could assess the viability for remote locations in Vietnam.

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This summary draws on the following report:
Gero, A., Willetts, J., Murta, J., Doan Trieu Thanh and Mohr, S. (2015) *Sanitation value chains in low density settings in Vietnam*, Enterprise in WASH - Research Report 2, Institute for Sustainable Futures, University of Technology Sydney
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ENTERPRISE IN WASH

'Enterprise in WASH' is a joint research project led by the Institute for Sustainable Futures (ISF) at the University of Technology Sydney, which investigates the role of private and social enterprises in the delivery of water, sanitation and hygiene (WASH) services for the poor. For other Enterprise in WASH publications, see www.enterpriseinwash.info

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