Emerging Markets Consulting

Water and Sanitation in Kampong Speu, Cambodia

Supply Chain Analysis and Strategy Development

Final Report

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Prepared for

LIEN AID and WORLD TOILET ORGANIZATION

EMC Emerging Markets Consulting

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Executive Summary

Background and Methodology

The Water, Sanitation and Hygiene Marketing (WASH) Project is a joint initiative by Lien Aid and the World Toilet Organization (WTO). As part of the WASH Project, Lien Aid and WTO contracted Emerging Markets Consulting (EMC) to undertake an analysis of the water and sanitation supply chains in four districts of Kampong Speu province and to develop strategies to strengthen these supply chains. This report presents the results of this work.

To gather data, both field work and desk research were conducted by EMC. Field work consisted of both one-on-one interviews and focus group discussions. Supply chain actors consulted included:

- masons, concrete ring producers, building material retailers and wholesalers (sanitation); and
- wholesalers and retailers of pumps and filters, a filter manufacturer, rain water storage producers, well drillers, and other suppliers (drinking water).

Other stakeholders such as NGOs, provincial officials, and commune chiefs were also interviewed.

Key Observations

For sanitation, the essential problem is that too few people have latrines. The main cause of problems for the supply chain is a lack of scale. Most sanitation supply chain problems appear to stem from this. The latrine market is simply too small. Hence many actors supply other products and/or services besides latrines. There is not enough business from latrines alone for most of them to specialize. For some actors, the infrequent nature of latrine sales and the absence of specialization means that they lack some skills and knowledge with regards to latrines. Major observations of the sanitation supply chain indicate that:

- The supply chain not too fragmented but information flows are limited;
- A number of actors are entrepreneurial;
- Latrine business has been growing;
- Latrine sales can be seasonal;
- Credit is available, but cash flow management is a problem;
- Masons have an advisory role; and
- The high price of latrines is a key issue.

In water, the problem to be addressed is that too few have access to the various water products and services. These products exist in Cambodia, but are not being acquired by most consumers. The majority still boil water (if they do anything). Partly this weak demand for products is a product of affordability, but it is also because of poor information flows and an incomplete supply chain that does not effectively reach the end consumer (water filters are cheaper than boiling over one year). Like sanitation, the problems stem from the small market size and lack of scale, but there are also some differences. For the water supply chain, major findings are that:

- Water filter distribution costs are high but not excessive, but there are limitations in the ‘last mile’;
- Fewer filters are available in the target area than previously;
- There is no supply of additives (powders and tablets);
- Retailers are willing to stock new products; and
- Demand is irregular and seasonal.

Some of the key differences observed between the sanitation and water supply chains are:

- The water supply chain is less complete than sanitation;
- Water product suppliers are less likely to obtain credit from suppliers; and
- There is weaker product knowledge/awareness of water products and services than latrines.

Guiding principles and criteria for strategies

The WASH Project requires strategies to improve access to water and sanitation products and services that are market-based, sustainable and with measurable results. Strategies should be as 'hands-off' as possible. The Project aims to improve the profitability of the private sector actors in the supply chain, through business improvements, supply chain efficiencies, and/or improved integration. In addition, EMC believes the Project should observe these principles:

- Facilitation rather than delivery;
- Services rather than products;
- Private sector focus rather than NGO/Government;
- Demand-driven rather than supply-driven approach (ie. strategies respond to the demands of supply chain actors rather than being supplied from on high); and
- Treat supply chain participants as customers not program beneficiaries.

Sanitation strategies

For more people to have latrines, we believe that demand-side interventions are most important. However, past evidence from CLTS programs shows that supply does not respond adequately to demand-only strategies. Hence, while demand-side initiatives are paramount it remains important to augment demand-side strategies with supply chain strengthening. EMC has identified a number of interventions that should ensure the supply chain does respond adequately when demand-side interventions raise household demand for latrines.

In summary, we believe the WASH Project should engage with all segments of the latrine supply chain. This engagement should be through facilitation of the improvement in skills, dissemination of R&D, and improved linkages and flow of information. Consistent with the guiding principles, wherever possible members of the supply chain themselves should drive and deliver the services and activities that achieves this (with encouragement and facilitation – or even nudging - from the WASH Project team). In some cases, such as formal generic training, established private sector training providers should be used.

Specific recommended activities for sanitation are:

Activity 1 – Interest Group Meetings

Hosting interest group meetings will help to identify the entrepreneurial businesses within the supply chain. Initially all the local actors identified as having potential can be invited to an interest group meeting. All levels of the supply chain should be targeted for this, from building material suppliers to masons. The WASH Project's demand-side initiatives should explained, so that participants know that they may benefit from an increase in demand. At the meeting, businesses should be encouraged to identify key constraints and issues, with discussion of possible solutions facilitated by the WASH Project. The resulting interventions and activities from these meetings might include training, exposure visits and so on, as discussed below. When subsequent Project activities are offered because they result from businesses' discussion at interest group meetings, they have more credibility and acceptability.

Activity 2 – Latrine Design Workshops

Many actors have narrow knowledge of latrines, generally restricted to the 'ideal latrine' which is extremely expensive. Yet masons also play an important role in advising consumers. Hence,

training masons in new, cheaper latrine designs should be a very effective way to increase affordability and hence the size of the latrine market.

Activity 3 – Exposure Visits

Hosting a trip of local businesses to a different province to meet with latrine supply chain actors there is a useful way to increase knowledge and foster links with other businesses. Attendees could witness new and improved production techniques, different ways to manage a business, and meet with successful entrepreneurs to see how they plan and have invested in their business. Participants might also learn more about market linkages and may obtain ideas on solving technical and business issues. One of the main benefits of this activity is to bring suppliers together and get them talking to one another.

Activity 4 – Training I – Products and technical skills

We envisage a number of activities to improve the skills and knowledge of actors within the supply chain. Again, wherever possible this training should be in response to businesses' own requests or comments about desired assistance (made during Activity 1). Also, it should be delivered by actors within the supply chain, such as utilising the skills and experience of large national building material suppliers. These upstream suppliers are sophisticated businesses. They should have the incentive and the resources to participate in a program that will result in more demand for their products. Some local businesses reported already receiving technical assistance from upstream cement and brick suppliers.

Activity 5 – Training II – Practical financial management

One of the main constraints for many businesses in the supply chain is management of creditors and debtors (and hence cash flow). A local bank or MFI, particular one already lending to the sector, should be encouraged to attend a meeting of businesses to explain some basics of small business finance. The MFI could also promote its own products. The incentive for the MFI to participate is the potential for new clients. This should also be linked to financial management training that forms part of Activity 6.

Activity 6 – Training III – Business management

In conjunction with the technical training discussed above, many of the businesses would benefit greatly from more structured business management training. Basic business training helps ensure that services/products are sold profitably, that business expansion is done efficiently and services are provided with a customer-focused orientation. Also importantly, small businesses must be provided with the skills (and support) to access customers and engage in the selling process. Existing private sector suppliers of training in Cambodia already offer courses tailored for unsophisticated SMEs.

A key question for the Project is who will pay for this training. Ideally, the participants would pay for it all themselves. The WASH Project may consider a partial subsidy. Requiring participants to fund at least some of the cost themselves will ensure only those most likely to benefit from the training will attend.

Activity 7 – Business Forum or a Working Group

The Project could facilitate a forum of businesses and certain local government officials to discuss issues and developments. If identified by actors as a constraint, the Project could usefully assist in creating a dialog between the businesses and local government to raise issues of concern. Improved dialog with government may assist removing impediments to business growth and profitability.

Activity 8 – WASH Market Centre

Some on-going, one-on-one provision of supporting information is often required. Hence, the Project's in-house staff, in addition to facilitating the activities discussed above, could be a repository for relevant support information and materials to assist local businesses and enhance

information flows in the supply chain. We envisage the Project's office, located in the centre of Kampong Speu, would become the *WASH Market Centre*.

Broadly, the Centre would be both a repository and also a disseminator of relevant market information for all businesses and stakeholders. This would help overcome key problems of knowledge and information flows identified in both the sanitation and water supply chains.

A range of information could be provided, such as:

- Repackaged demand-side promotional materials such that they are targeted at retailers and distributors.
- All producers' marketing material. This could also be produced into a single product. That is, a booklet with all information, contact details, product specifications, recommended prices/margins, photos, the pros and cons of each product, and so. This could then be distributed to retailers throughout the Project's target area.
- Results of the WASH Project's demand survey. Market demand mapping will help retailers and wholesalers understand potential demand in their area.

The centre could run a range of activities, including hosting exhibitions or trade fairs, with product demonstrations. We see the WASH Market Centre as an important strategy not just for sanitation, but also for the water supply chain.

Water Strategies

Recommended strategies for water are very similar to for sanitation, and leverages them where possible. Certain economies exist in the provision of some activities (such as formal training).

Activity 1 – Interest Group Meeting

As with sanitation, hosting an initial interest group meeting helps to identify the entrepreneurial businesses within the supply chain. We think it particularly important to communicate the message of the demand-side work to wholesalers of filters in Phnom Penh. They currently sell little to Kampong Speu and think that demand there is very low. They also have shown they can influence the product stocked by local retailers.

Activity 2 – Product Information Workshop

Knowledge of water products and services is particularly weak among many supply chain actors. Retailers would benefit from increased knowledge of the costs and benefits of different filters and other products. Also, a large number of actors could benefit from the dissemination of knowledge about rainwater harvesting systems. Many of the relevant actors are also in the latrine supply chain: building material suppliers and concrete producers. Even masons could learn more about rainwater harvesting since they may be able to get work installing these systems and they already have a close relationship with the end consumer.

Activity 3 – Exposure Visit

It might be particularly useful to take retailers from Kampong Speu to a ceramic water filter factory. We also think that retailers should be taken to Phnom Penh to meet filter wholesalers and distributors. Meeting a group of retailers who are selling filters will help them to over the risk hurdle of supplying to Kampong Speu. It will also help introduce retailers to new products, and educate them about the benefits of costs of different types of products.

Activity 4 – Training I – Products and technical skills

The WASH Project should facilitate training sessions in Kampong Speu by manufacturers and national distributors of water products. Organisations hosting these sessions could include Hydrologic, PSI and RDI, but also large distributors various FMCG (including water products) such as Dynamic Pharma and Diethelm.

Masons could be trained in rainwater harvesting systems and concrete producers could learn about ferro-cement jars and water storage products (these are cheaper and withstand shock better than concrete or brick water storage).

Activity 5 – Training II – Practical financial management

Participation in financial training from a MFI would be particularly useful for the water supply chain businesses, given the current lower prevalence of credit compared to sanitation.

Activity 6 – Training III – Business management

Like actors in the sanitation supply chain, water businesses are usually family-run and informal. Skills in business and financial management are weak. They would benefit greatly from this training.

Given the economies of formal training (fixed total price regardless of number of participants), including water supply chain participants in Sanitation Activity 6 (generic business management training) will help defray the cost per participant.

Activity 7 – Business Forum or a Working Group

The Business Forum activity discussion in Section 6 should also include the water supply chain. Many of the issues will be similar.

Activity 8 – WASH Market Centre

Removing information gaps, combined with demand-side social marketing, will help to improve the efficiency and size of the market for water products and services, helping distributers to serve customers more cheaply, including reducing unit transport costs which can also be a constraint. Wholesalers may learn about a wider range of products that will enable bundling of the distribution of products to retailers, potentially reducing unit transport costs. By providing information on all available products, retailers will be able to offer a wider, and more informed, choice to consumers.

We see the WASH Market Centre as being the key supplier of this information in Kampong Speu.

We believe that these strategies will most efficiently strengthen the supply chains and increase access to water and sanitation products and services in the target area. By avoiding direct provision and subsidy, and by making use of the expertise, skills and experience of businesses within the private sector itself, distortions are minimised, credibility is enhanced and lasting change can be achieved.

1. Introduction

The WASH (Water, Sanitation and Hygiene Marketing) Project is a joint initiative by Lien Aid and the World Toilet Organization (WTO). The objectives of the WASH Project are to:

- Motivate and sustain changes in sanitation, water and hygiene behaviours;
- Create consumer demand by addressing barriers to consumption and increasing knowledge of water and sanitation products & services; and
- Improve supply by increasing access to safe, sustainable, affordable water and sanitation products & services.

As part of the WASH Project, Lien Aid and WTO contracted EMC to undertake an analysis of the water and sanitation supply chains in Kampong Speu and to develop strategies to strengthen these supply chains. The objectives are to:

- Gather information about the existing supply chain for WSH products and services available in Kampong Speu Province in order to:
- Develop specific strategies to strengthen the network of private importers, manufacturers, distributors, retailers, and masons and improve the profitability of these local enterprises.

This supply chain analysis and strategy development has three primary components:

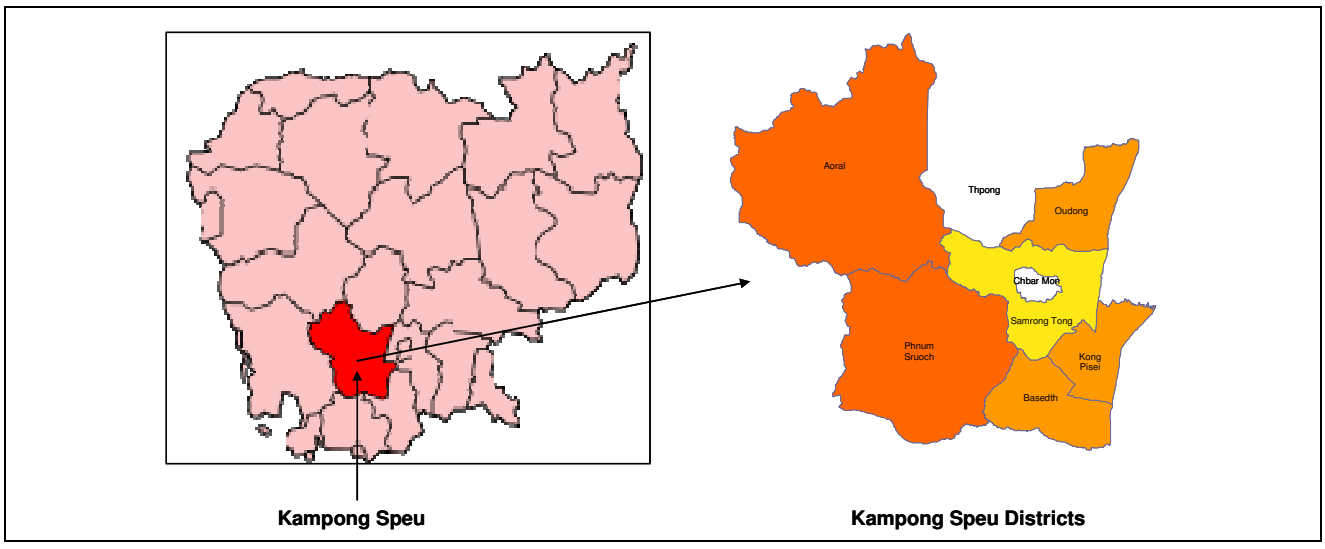
- Survey of existing water and sanitation supply chain actors in Kampong Speu;
- Analysis of data to better understand the nature of water and latrine supply chain enterprises and networks; and
- Development of strategies to strengthen and improve supply chain enterprises and networks.

Geographic scope

The WASH Project is restricted to four districts close to National Road #4 in Kampong Speu province. It comprises all of the districts of Chbar Mon and Samraong Tong, and parts of Kong Pisei and Phnom Sruoch (see Figure 1).

Kampong Speu is ranked as one of the poorest provinces in Cambodia (sometimes ranked the poorest). Most people earn their livelihood from agriculture, although there has been some business development, with, for example, a number of garment factories now operating in the province.

Figure 1: Kampong Speu and its districts



The target area covers 530 villages and around 55,800 households (there are a total of 746 villages and 78,130 households in these four districts). According to available data, around one-fifth of households in the target area have access to a latrine, but this varies considerably across the districts. Nearly 60% of households drink safe water (Table 1), the vast majority by boiling, although these households may not *always* drink safe water.

Table 1: Summary of the target area

District Name	Communes	Villages	CLTS villages	Households	Latrines	HH drinking safe water
Chbar Mon	5	56	2	8,385	4,250	5,962
Samraong Tong	15	295	90	27,207	6,573	17,188
Kong Pisei	5	87	1	7,535	1,187	2,285
Phnom Sruoch	6	92	12	12,673	1,958	6,919
Total	**31**	**530**	**105**	**55,800**	**11,868**	**32,354**

Source: WASH Project.

Generally, latrine and safe water access is lower the further from Phnom Penh and the lower the population density. This relationship with population density is consistent with most economic and social indicators throughout Cambodia.

Product scope

The focus of the study was limited to:

- Sanitation: household latrines;
- Water: pumps, filters, additives, rain water storage.

This Report is in eight parts. Following this introduction, Section 2 explains the research methodology. The next two sections present a description and analysis of the sanitation and water supply chains in the target region. Guiding principles for strategies are presented in Section 5. Strategies for supply chain strengthening in each of sanitation and water are then discussed in Sections 6 and 7. Cost estimates for the recommended strategies are provided in Section 8.

2. Research Methodology

To gather data, field work and desk research were conducted by EMC. Field work consisted of both one-on-one interviews and focus group discussions. Supply chain actors consulted included:

- For sanitation: masons, concrete ring producers, building material retailers and wholesalers;
- For drinking water: wholesalers and retailers of pumps and filters, a filter manufacturer, rain water storage producers, well drillers, and other suppliers.

Other stakeholders such as NGOs, provincial officials, and commune chiefs were also interviewed. In addition, we tried to interview local quarries but they were unresponsive.

Table 2: One-on-one Interviews

Supply chain actors/stakeholders	Chbar Mon	Samraong Tong	Phnom Sruoch	Kong Pisei	Phnom Penh	Total
Masons	4	2	2	2		10
Large building material supplier	3					3
Medium/small building material suppliers*	8	4	13	10		35
Concrete producers (no material supply)	1	2		6		9
Latrine waste removal agent	1					1
Jar-only producers	1	2	3			6
Well drillers/water tank constructors	3					3
Filter manufacturer					1	1
Filter retailers	3					3
Filter wholesalers					5	5
Pharmacies	3					3
Provincial officials	4					4
NGOs	3		1		4	8
Other local entrepreneurs	2					2
Microfinance institutions	3					3
Total	**39**	**9**	**19**	**18**	**10**	**96**

* Many suppliers of building materials are also concrete producers.

In addition to the interviews listed above, we met briefly with a number of other businesses. For example, with retailers or market stall owners in the districts who did not stock water and sanitation products. A list of all interviewees is included in Appendix 3.

A total of seven focus group discussions were conducted. One focus group of six concrete producers took place in Kong Pisei. Six focus groups with a total of 33 masons were conducted; two in each of Chbar Mon and Samraong Tong, and one in each of Phnom Sruoch and Kong Pisei.

Table 3: Focus Group Discussions

	Chbar Mon	Samraong Tong	Phnom Sruoch	Kong Pisei	Total
Number of FGD	2	2*	1	2	7
Total Participants	8	14	5	12	39

* Both the Samraong Tong focus groups were held in CLTS villages.

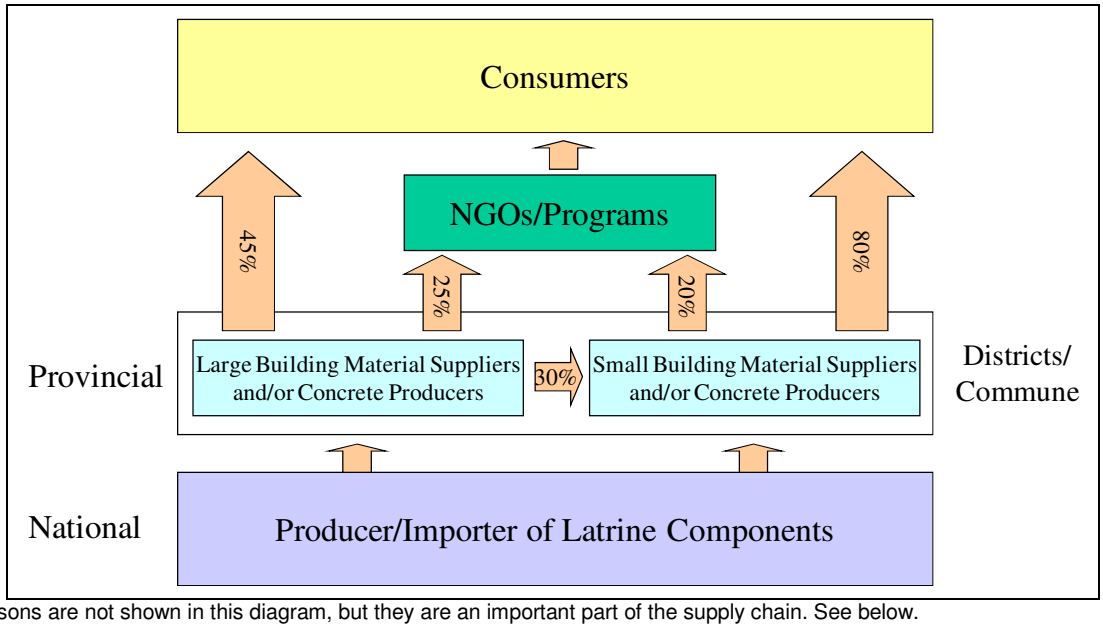
The interviews and focus groups discussed, among other things, the activities of the supply chain actors; their knowledge of latrines and water products; the costs, margins and volumes of their products (including some non-WATSAN products); the performance of their businesses over time; challenges they faced; their willingness to participate in new product designs or techniques; issues regarding credit; and relationships with suppliers. Findings, data and analysis from this research is presented in the next two sections.

3. Sanitation Supply Chain

This section describes the results of field research interviews and focus group discussions with wholesalers, retailers, concrete producers and masons. The results provide an overview of the latrine supply chain in Kampong Speu with emphasis on the four target districts.

Because latrines are not an off-the-shelf product, there are a number of material inputs and a number of different actors involved in their production, distribution and supply. Figure 2 below summarises the latrine supply chain in Kampong Speu province.

Figure 2: Latrine supply chain, Kampong Speu



Note: Masons are not shown in this diagram, but they are an important part of the supply chain. See below.
Source: EMC.

3.1 Input Producers and National Suppliers

Latrines are made from a large number of components. Depending on latrine design these can include concrete, bricks, sand, gravel, PVC piping, zinc sheeting, ceramic pans, and tiles. Many of these components are imported, typically from Thailand or Vietnam but also China. Cement, bricks, sand and gravel are also produced locally.

These products are supplied nationally by large importers/wholesalers. These companies include Chip Mong Group, Peng Huot Co., Heng Asia, BPC Co., K Cement, and many more. These companies are based in Phnom Penh, but have networks of warehouses and trucking fleets. They arrange delivery to their customers in Kampong Speu. Some imported products, such as cement, are delivered to Kampong Speu direct from Sihanoukville.

These companies have sales staff and do undertake marketing. They advertise extensively. Some also run annual “workshops” in Phnom Penh, where major customers are invited to learn about new products, promotions or distribution schemes.

There are a number of quarries within the target area, supplying stone and gravel, and also dredging companies supplying sand. There are at least two sand suppliers in Samraong Tong and one gravel supplier in Kong Pisei. There are quarries in Phnom Sruoch. Bricks are also manufactured in Kampong Speu, although one retailer reported sourcing bricks from a producer in Kandal.

3.2 Wholesalers and Large Retailers

General characteristics

Wholesalers and large retailers buy in bulk construction materials including latrine inputs and accessories (such as ceramic pans, gravel, cement, bricks, PVC tubing, galvanised steel sheet, tiles, etc.) from the national distributors described above. Many of the building material suppliers in Kampong Speu reported sourcing from BPC Co., while some others said they use Chip Mong Group.

These products are then sold to both smaller or commune-based retailers as well as to end consumers. As illustrated in Figure 2, about 45% of sales by large wholesalers are directly to end consumers. The rest are to NGO programs and smaller retailers. One wholesaler in Chbar Mon reported having permanent relationships with three retailers and viewed these as her "distributors".

These large building material suppliers are usually also concrete producers, manufacturing different types of concrete products including concrete rings and slabs for latrines.

There are four wholesalers/large retailers of this type in Kampong Speu, all in the provincial capital.

Description of the enterprises

Wholesalers and large retailers are medium-size businesses operating with proper legal status. They register with either the Department of Commerce or the Department of Industry, Mines and Energy, or both. They file tax submissions with the Provincial Department of Taxation.

They keep sales or accounting records. This is usually done manually. The enterprises are family-owned businesses with family and relatives in charge of major operational functions (for example, the wife as general affairs manager, a daughter as accountant/record keeper, etc.).

The businesses stock many different kinds of products. There are about 600 to 700 different kinds of stock. We estimate around 20 to 30 of the products stocked are latrine-related supplies, including: ceramic pans (different types of pans), tiles, cement, gravel, galvanised steel sheets, PVC tubes, and bricks.

We roughly estimate that these businesses each have total assets of over $100,000, with the largest around $500,000. This includes trucks, cranes, and stock.

The businesses do not have a distribution channel of their own and all sales are done on site. They do provide delivery with their own trucks. Usually customers go to them, even for sales to end consumers. They employ from 10 to 30 staff to work in different areas of their businesses but usually relatives are control key areas such as sales and cash collection. Hired labour work in concrete ring production, loading/unloading of goods, drivers, etc.

Wholesalers and large retailers do not do any marketing or promotion. Any promotion is done by upstream suppliers.

Business performance

During 2007 and 2008, overall business grew strongly, particularly related to the property and construction boom. Inputs for latrines were no exception to this. However, with the economic slow-down in 2009, business is now much quieter.

In terms of latrines, during the boom they each sold up to 80-100 pans per month. Now they estimate sales of around 35 to 55 pans per month, although there is large variance from month to month. Of these pan sales, around 5 to 15 per month are sold with concrete slabs.

The typical gross margin varies from item to item, largely dependent on the value of the goods and volume of sales. Not surprisingly, a more valuable and fast moving product will sell at a lower margin while a lower value and slow moving stock will be sold at higher margin. We estimate gross margins range from 2% up to 30%. Larger margins are charged to end consumers compared with

sales to retailers. The typical margin for most latrine inputs stands at around 5% to 15%. Table 4 describes typical gross margins for major items.

Table 4: Building material wholesaler margins

Description	Typical Gross Margin	Volumes and comment
Ceramic pan/bowl (a number of different types including T1[1], T2 and T3). No T4 was found during the field work.	10 – 15 % (sales to end consumers) 5 – 10% (sales to retailers)	The sales volume has been slow down in recent months starting this year. It is hard to estimate because of large variance from month to month. The rough estimate is at 30 to 40 pans per month. During the property price boom (2007/2008), the sales was very good at more than double of the current sales.
Ceramic pans with concrete slabs (T1 + slab)	8% (sales to consumers) 5% (sales to retailers)	More sales to consumers and the volumes are lower than the pans without slabs. Current sales estimate 5 to 15 units per month.
Tiles (floor and wall tiles)	5% to 10% (both to consumers and retailers)	Volumes are much higher than pans because they are not only used in latrines but housing and other construction.
PVC Tubes	8% to 10% (both to consumers and retailers)	A number of different types but the ones used in latrine construction, volumes are similar to the pans where two specific types of PVC tube are used.
Gravel (fine and coarse)	40% (both consumers and retailers)	High volume but significant wastage and loss. Also, transportation cost is very high.
Sand (fine and coarse)	15% to 20% (both consumers and retailers)	Similar to gravel.
Bricks (solid/hollow brick and ventilation block)	5% to 8% (bricks) 20% to 30% (ventilation block)	Brick volumes are very high - except for ventilation blocks. Not all latrines requires ventilation block and only a few are required if they are used.
Galvanised or zinc roofing sheets	5% to 10%	Very high volumes given use beyond latrine construction.
Cement (many different types of brands)	2% (both consumers and retailers)	Mostly sell to retailers than to end consumers. High volume, and normally customers order in large quantity.

3.3 Medium and Small Retailers

General characteristics

Medium and small retailers are similar to the large retailers discussed above. Generally they are located in district and commune markets. A few are in more remote villages. They get supplies from a few main sources – direct distributors and wholesalers or large retailers in the

[1] As per IDE's 'Supply Chain Assessment for Sanitary Latrines in Rural and Peri-Urban Areas of Cambodia'.

provincial/district markets. They source sand and gravel from local sand dredgers and quarry companies, usually the ones closest to them. They sell mostly to end consumers (with around 20% of sales to NGO programs), who come to them.

There are at least 20 small and medium retailers of building materials in each of the target districts of Kampong Speu province.

Like large retailers, in many cases they are also concrete producers and they produce different types of concrete products including concrete rings and slabs for latrine construction based on the needs of their consumers. Concrete production is discussed below.

Description of the business enterprises

Medium and small retailers are small or micro sized businesses, with or without proper legal registration. Some of them register with the Department of Industry, Mine and Energy while some do not. Those who register pay an annual operating patent but they don't file tax submissions.

They do not keep sales or accounting records, with exception of very basic recording of debtors (if at all). The enterprises are family-owned businesses with family and relatives being employed full time or part time.

Compared to the larger retailers, they do not usually hold much stock. They stock up to about 50 different kinds of products and we roughly estimate that around 5 to 15 of the products stocked are latrine-related, such as ceramic pans (they usually stock one or two types only), tiles (though not all retailers have tiles in stock), cement, gravel, galvanised steel sheets, PVC tubes, and bricks. We estimate the value of their stock is typically around $2,000 to $5,000. In addition they will own a small truck, and some other assets.

They don't have any distribution channel and all sales are done on site. Usually customers go to them and negotiate price.

They don't do any marketing and promotion. Retailers stated they don't believe they should do marketing and some don't know what exactly is meant by marketing. Their only concept of marketing is television and radio advertising.

Typical margins and volume

As with larger retailers, margins depend on the volumes and value of the product. Price also varies depending on the relationship with the customer Operating in smaller centres, these retailers are more like to know their customer.

Margins tend to be higher than for the larger retailers. We estimate that margins vary from 5% up to 20%. However, the typical margin for most latrine accessories stands at around 5% to 15%.

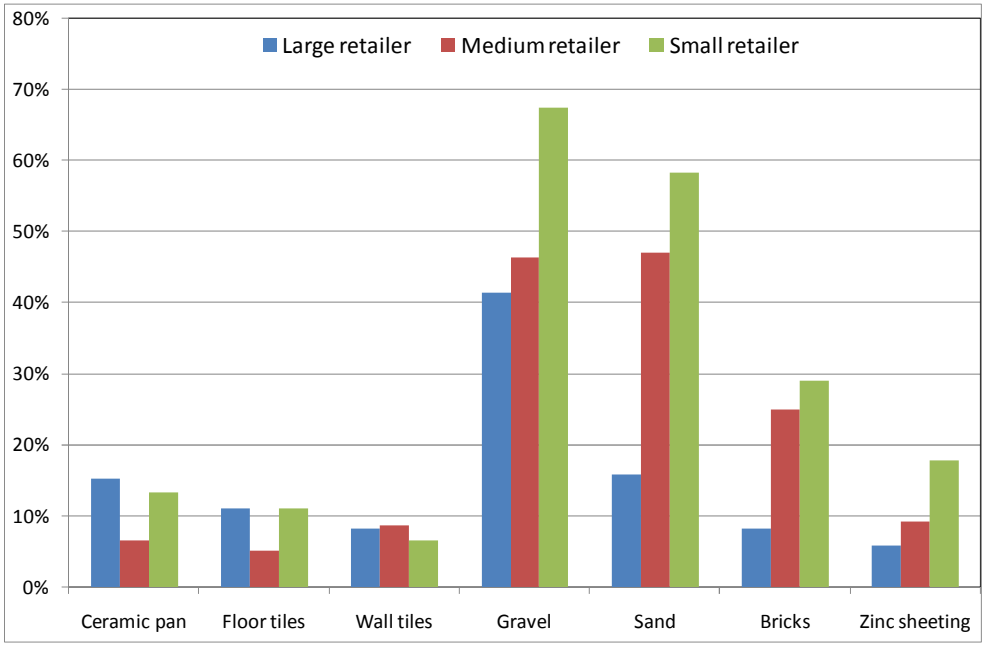
They each sell around 10 latrine pans per month (some with concrete slabs, some pan-only), although one small retailer in Phnom Sruoch reported selling components for 2 to 3 latrines per month and none in some months. In the more rural areas, it is apparently more common for pans to be sold with slab. Chinese pans are cheaper than Thai, both sold at similar margins. Chinese pans retail for $8 (in Chbar Mon and district centres) to $10 (communes), while Thai pans sell for $10 to $14.

Figure 3 below compares typical gross margins for different products, by size of retailer. Large retailers are in the provincial capital, medium size retailers are in district towns, and small retailers are in commune centres.

Margins are very high for gravel and sand because significant amount is lost is transportation and storage, and also because of difficulties with storage and transportation (given they are not a packaged or stackable product). Large retailers in the provincial capital benefit from significantly higher volumes, and hence can charge lower margins. Also, given that there are 4 of them in the

town, some competition might exist, limited margins. Finally, around half of their sales are bulk purchases from smaller retailers and NGO programs.

Figure 3: Gross margins for building material suppliers



Source: EMC.

Curiously, margins for latrine pans and tiles are not lower at larger retailers. Medium and small retailers reported paying more per unit for ceramic latrine pans than do large retailers, but do not charge their customers a correspondingly higher mark-up. Medium retailers may be unable to mark-up products sufficiently do to competition from the large retailers. Smaller retailers, located in communes, face less immediate competition than medium-sized retailers, also helping margins.

3.4 Concrete Producers

General characteristics

Concrete producers are typical rural enterprises that produce moulded concrete products such as concrete rings for latrine construction or water storage, as well as concrete posts for house construction. About 30% of the concrete producers we consulted were previously skilled masons. They were able to raise sufficient capital to become concrete producers.

We estimate minimum start-up capital for a concrete producer at around $8,000 (this is for a truck, moulds, and working capital). Although it is possible to enter on a smaller scale – around $1,000 in capital, mostly for moulds – concrete producers said this would be very difficult. They explained that capital is required to cover customer credit, since customers pay slower than that demanded by suppliers (if suppliers will give credit at all to new producers). Only with a very close relationship to a building material supplier could a concrete producer start-up for $1,000. Many larger concrete producers have assets of around $30,000 or more, comprised of a truck with crane, cement mixer, moulds, stock, materials and other equipment.

As mentioned above, in many cases concrete producers also sell construction materials. Those concrete produces who do not sell construction materials usually have a close relationship (often personal, such as a relative) with a building material retailer.

Concrete producers are generally located in district and commune markets and in few cases in remote villages. We estimate there are 10 to 20 concrete producers in each of the Kampong Speu target districts.

They obtain supplies from a few main sources – direct distributors and wholesalers or large retailers from provincial or district markets. They source sand and gravel from local sand dredgers and quarry companies, usually those close to them.

The majority of their sales are directly to end consumers in the communes and villages, while some sales are through NGO-funded programmes.

Description of the business enterprises

Concrete producers are small or micro size businesses usually registered with the Department of Industry, Mine and Energy. However, we believe not all enterprises registered their business operations. Those who register pay an annual operating patent but they don't file tax submissions.

Concrete producers don't keep sales or accounting records. The enterprises are family-owned businesses with family and relatives being employed full time or part time. They tend to be reasonably entrepreneurial. We encountered some involved in multiple business activities, including water supply, catering services (for weddings and other ceremonies), and livestock raising (as well as those selling construction materials).

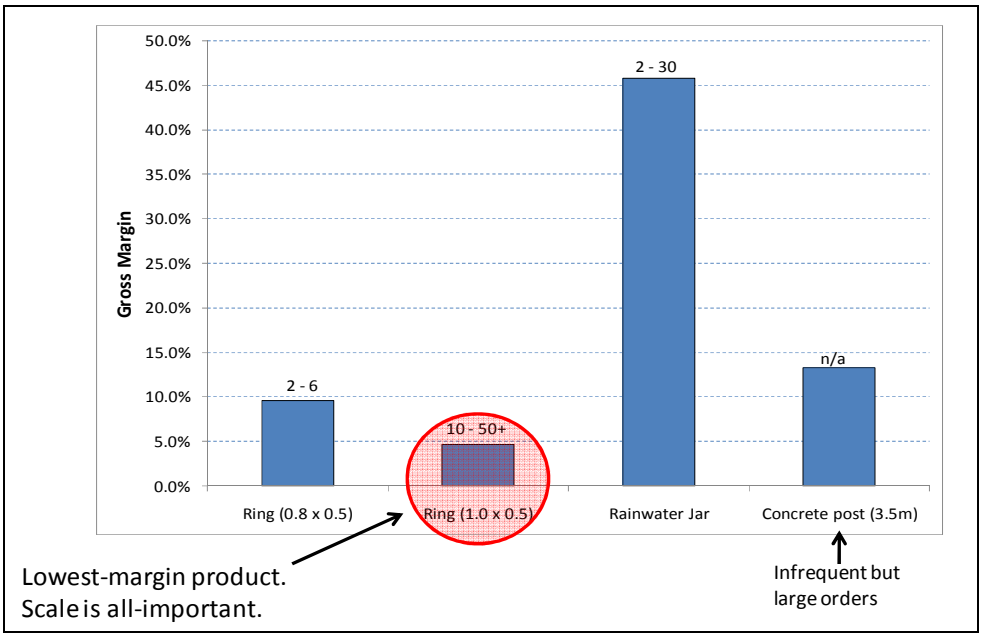
Depending on their size, they hold certain stock of finished products: concrete rings (50–100 rings), concrete posts (20–50 posts), concrete slabs (10–20 slabs), drainage rings (20–50 rings), and some producers stock water jars (5–10). They also hold quantities of input materials including cement, gravel, and sand. Hence, having access to sufficient land to store finished products and materials is a requirement for concrete producers.

They don't have any distribution channel and all sales are done on site. Usually customers go to them and negotiate price. The price usually includes transportation. As with small retailers, typically they will not do any marketing and promotion.

Typical margins and profitability

The gross margin per unit is usually 10% to 15%, dependent mainly on the cost of transportation and order size. Scale is important in the concrete producing businesses. Concrete rings are lower unit margin, but higher volumes (Figure 4). A number of concrete producers reported that they were reluctant to produce concrete posts. They are heavy and inconvenient, require hard work and are not profitable enough. Some said they had stopped producing posts.

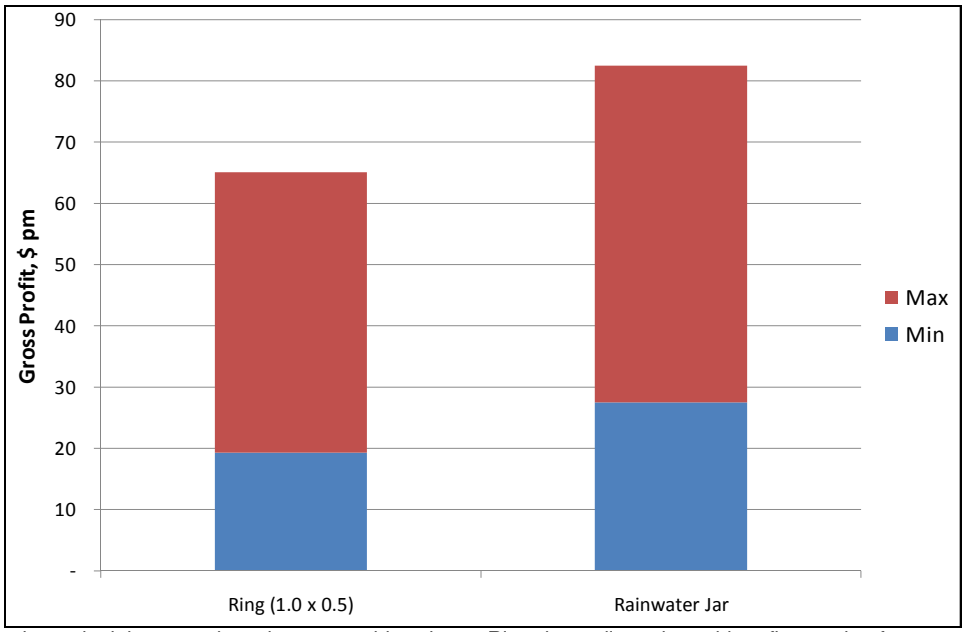
Figure 4: Gross margins for concrete producers, and typical monthly volumes



Source: EMC.

However, this above figure is deceptive. Every three to four concrete rings produced results in sufficient by-product to make one concrete lid, which retails for 15,000 reil (nearly $4). Some producers commented that rings might even be sold at a small unit loss, compensated for by the profit on lids. Figure 5 compares the typical monthly profit on ring sales including these lids with that from sales of rainwater jars ("peang").

Figure 5: Gross monthly profit for concrete producers



Note: Based on estimated minimum and maximum monthly volume. Ring data adjusted to add profit on sale of a concrete lid for every 4 rings.

Source: EMC.

Concrete producers reported that they prefer to make concrete rings than other products. This is a combination of volumes, regularity and being easier to handle and transport than jars and posts. Concrete rings are a small part of total business for the larger businesses (those that are also

material retailers/wholesalers). In more rural areas, concrete rings are a larger portion of total business (60% or more).

3.5 Masons

General characteristics

Masons are construction workers contracted to build latrines (among other things). Put simply, they supply their labour to build whatever the customer requires. Masons can be broadly categorised according to their level of skill and competency: skilled masons, who are more skilful and have years of experience in construction; semi-skilled masons, who are skilful and have several years experience in construction; and unskilled masons or labourers, who have little or no experience in construction in general.

Skilled masons are usually contracted by their customers for a construction contract of a complete latrine. The skilled mason employs or sub-contracts junior masons (semi-skilled or unskilled) to assist them in completing the construction contract. Junior masons are paid by the contracted skilled mason on a daily basis, while the skilled mason is paid the total contract value.

Business relationships

Masons usually do not supply materials to their customers. They are contracted for the construction of latrine and all materials to be provided by the customers.[2] To some extent, masons have business relationship with retailers and concrete producers, since it is their products that the mason works with. But the end consumer deals directly with the retailers (see below).

As discussed above, many concrete producers are former masons. Masons therefore usually know some local concrete producers from previous work.

Skilled masons usually have close relationship with their fellow masons. Once they win a construction contract, they sub-contract their fellow masons, usually junior masons.

Key role

Masons are often consulted by villagers - at no charge - prior to getting the construction contract. Masons are often the first persons a consumer goes to when he or she decides to build a latrine.[3] During the consultation, the mason provides a brief description of the materials required and a rough cost estimate for the construction of a latrine. Their prices are usually based on their experience in previous construction jobs. In some cases estimates do not reflect recent changes in certain material costs. The mason may recommend a supplier that he knows (we know of at least one supplier that offers commission to masons). However, consumers typically shop around more than one supplier.

Narrow latrine experience

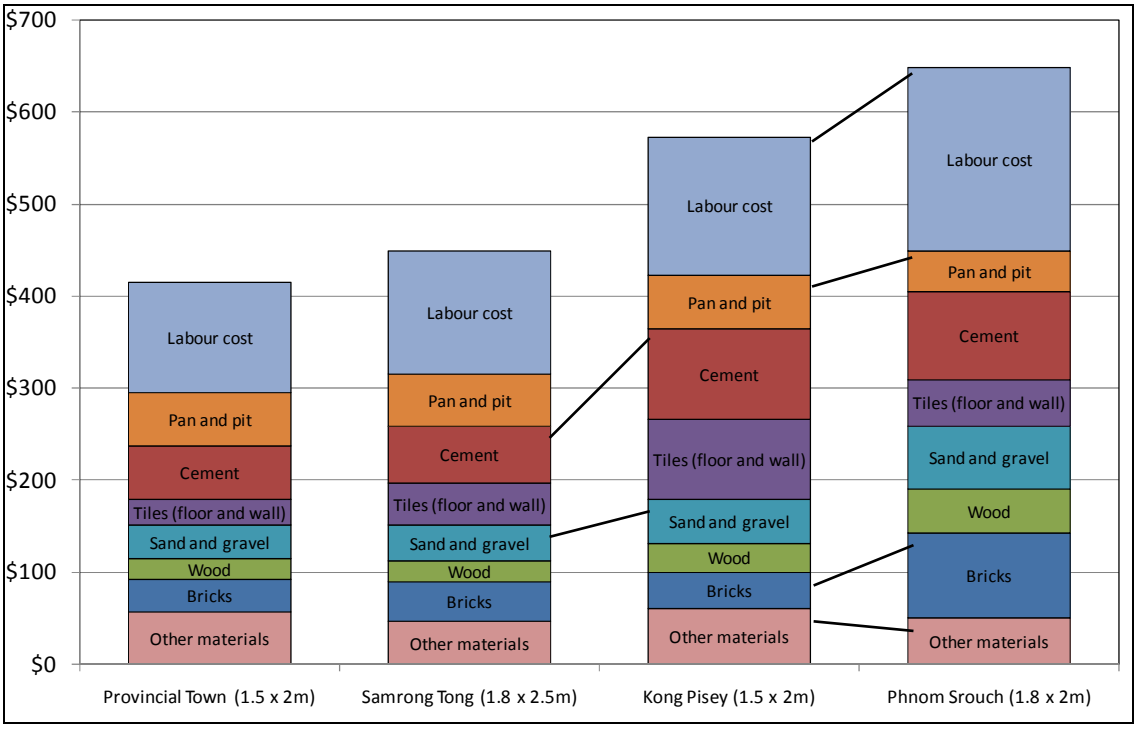
Masons do not usually provide options for their customers. They are only able to promote and provide cost estimates to their customers for latrines similar to those they have previously constructed. Usually this is an “ideal model”, perhaps similar to that pictured below. Some masons have knowledge of more than one latrine type, but generally these are all expensive designs. Masons also have an incentive to promote such a latrine, since it will take more time to construct, resulting in more income for the mason.

[2] Supply chain diagrams sometimes show masons being supplied by building material wholesalers. We did not find this, and hence masons are absent from Figure 2.

[3] This was confirmed by others in the supply chain, not just masons.

Each focus group of masons provided cost estimates for a size of latrine that they chose as typical. These sizes varied, from 1.5m x 2.0m to 2.0m x 2.5m. All involved a brick superstructure, with both floor and wall tiles. Masons suggested 4 to 8 concrete rings for the pit, with 1 or 2 concrete covers. As such, the total price of a latrine estimated by the masons is from around $400 to $650 – well beyond the means of the average Cambodian household.[4] Figure 6 illustrates masons estimated total price to build these latrines, and the cost of components.[5]

Figure 6: Masons' estimates of latrine cost, September 2009



Source: EMC.

The higher price for the Kong Pisei latrine in Figure 6 is largely due to using more cement and wall tiles, as well as a higher price for tiles. Despite lower tile costs, the Phnom Sruoch estimate is more expensive again because of a higher price for bricks and a higher labour cost and, to a lesser extent, more sand and gravel, both at higher prices. Since all prices include delivery, the Phnom Sruoch latrine cost indicates a transport premium. Labour costs are 10% to 15% higher per day in Phnom Sruoch. Prices for concrete rings are 5% to 10% higher than other districts, and gravel

[4] Although another mason reported that latrines costs $150 to $500, indicating some awareness of cheaper options.

[5] These costs are based on masons' estimates of material prices at the time. Prices are subject to variation and masons do not always know the most recent prices.

around 20%-30% higher. Price differences for other materials such as tiles are difficult to evaluate because of a lack of homogeneity.[6]

The total latrines costs in Figure 6 were verified by building material suppliers. However, some material suppliers reported selling latrine components for as low as $50-$70.[7] It is likely that this is the cost to someone who is building their own basic latrine (and therefore does not require as much material nor masons' labour).

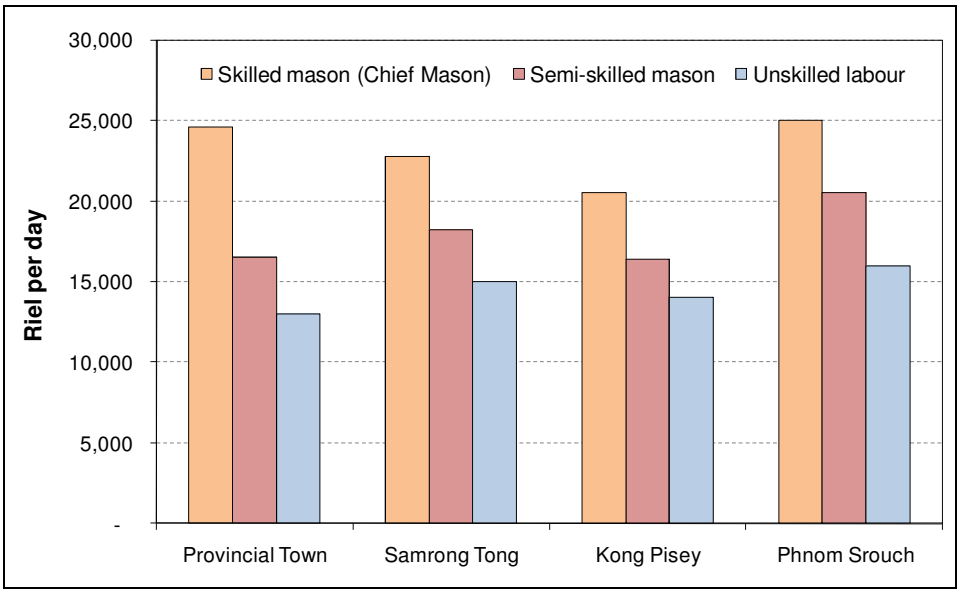
Typical earnings

Skilled masons are usually contracted directly by customers, with a total fixed fee typically $120 to $150 to build the latrine. Some masons, in Phnom Sruoch, said it would cost $200 to build a 1.8m x 2.0m latrine, reflecting the more remote location of the district.

Interviewees estimated that it takes three masons five to seven days to construct a latrine. On some occasions it was suggested that a total of four masons would be required (one skilled, two semi-skilled and one labourer).

Skilled masons charge $5 to $7 per day. Semi-skilled masons earn around $4 to $5 per day while labourers earn around $3.50 per day (Figure 7). In addition, they receive three meals each day (the cost of these meals is included in the fixed contract price). One mason reported that he builds 4 to 5 latrines per month, for a total income of around $100.[8]

Figure 7: Masons' daily income



Note: In addition to income shown here, skilled masons can earn a margin on the total contract.
Source: EMC.

Skilled masons usually, on top of their salary, make 10% to 20% margin on the contract value. That is, after paying themselves and the other masons and paying for three meals each per day (see example in Table 5 below). They also make more profit if the job can be completed faster than expected. However, in some cases they make a loss due to construction constraints such as rain, hard soil condition, or rocks to remove. Finally, some building material suppliers reported that they

[6] The price quoted by masons for bricks in Phnom Sruoch appears to be an abberation. It is nearly double that for other districts – much higher than the price premium in the district on other materials.

[7] It is not certain that this price range includes all necessary components, but given consumers usually buy everything at one location it is likely.

[8] By comparison, a typical garment factory worker earns around $80 per month with overtime.

offer masons commission for introducing customers to their business. The extent and value of this is not known.

From the example in Table 5, it can be seen that if this particular construction job took seven days instead of the estimated six, the skilled mason would incur additional costs of $13 (2 x $4 in wages and 2 x $2.50 in meals), eliminating the margin.

Table 5: Labour cost for 'ideal' latrine construction, a working example

	Units	Unit price	Total
Total contract value			**$140**
Skilled mason salary	1 x 6 days	$6	$36
Semi-skilled mason salary	2 x 6 days	$4	$48
Meals	3 x 6 days	$2.50	$45
Total costs			**$129**
Skilled mason's additional margin			$11

Source: EMC.

3.6 Latrine Waste Disposal

Latrine waste removal is provided in Kampong Speu by a monopoly provider. This exclusive right for latrine waste collection is granted to the business by the Provincial Governor's Office and the local Department of Environment.

To obtain the exclusive license, the provider needed to conform to certain requirements:

- Have an appropriate space to dispose of waste far from the urban centres and villages;
- Invest in a proper disposal pond and ensure no harm to the environment or people; and
- Own a suitable tanker truck with appropriate pump and other equipment.

In addition, an unspecified proportion of fees earned from latrine waste collection are shared with the two licensing offices.

The owner of the business employs two people to run it. One acts as driver and cash collector (he earns about $100 per month) and the other is the plumber ($70 per month).

Fees for waste removal are dependent on location of the customer (travel time) and the depth and size of the latrine. But on average the charges are:

- $30 for a 3-ring latrine located within the provincial town (Chbar Mon) or some part of Samraong Tong
- $40 for a 5-ring latrine located within the provincial town (Chbar Mon) or some part of Samraong Tong
- $100 to $120 for more distant locations such as Phnom Sruoch and Kong Pisei.

The business reports that it empties around 3 to 8 latrines per month.[9] The business advertises extensively through posters on electricity poles throughout the province.

Despite the monopoly license, some competition from neighbouring provinces such as Kandal does exist. When this happens, the business requests help from the local authorities to enforce its exclusive rights.

[9] There are strong incentives to under-report volumes.

3.7 Key Observations

Supply chain not too fragmented but information flows are limited

Some studies of Cambodian sanitation have found the supply chain to be "fragmented".[10] This is usually because household latrines are not a single, off-the-shelf product but rather a range of inputs, provided by different suppliers, and assembled into a latrine at the customer's home. In addition, latrines often account for a minority of actors' total business (more so for upstream suppliers). In more remote parts of Cambodia the supply chain may be fragmented because the market - and hence number of suppliers - is small, distances are large, and transport infrastructure is poor (this applies to supply chains for most products in remote areas of Cambodia).

For the very large building material suppliers, latrines are a small proportion of their total business (5% to 10%), resulting in a lack of focus on sanitation products. Other smaller building material supplier said that latrine components accounted for 20% to 50% of their business.[11] For example, one building material supplier in Chbar Mon stated that they held around $10,000 worth of latrine related stock, representing half of their total stock. Concrete producers report that concrete rings for latrines account for 40% to 60% of their total business. Latrines account for around 10% to 40% of the income of many masons.

Despite latrines not always being actors' major business, in the Project target area we found a reasonably extensive and somewhat integrated supply chain:

- Not including masons, each district has at least around 20 supply chain participants. Access to the supply chain appears not a large problem, even in rural areas. Nearly all villagers know who to consult and where they can buy latrine inputs, even in the more rural parts of the target area.
  - Transportation costs can be a constraint for more remote areas, and skilled masons are not as common in parts of the target area and sometimes have to be brought in. Latrine costs are noticeably higher in Phnom Sruoch.
- All material inputs are typically bought by the consumer at a single location.
- In many cases there are close links between different elements of the supply chain
  - Wholesalers report close relationships with a core of retailers;
  - Many concrete ring producers are former masons;
  - Concrete ring producers are closely related to construction material suppliers, and often are one in the same; and
  - Experienced masons, particularly those in the more urban areas, appear to have a good relationship with building material suppliers.
- Access to materials is usually not a problem. No one complained about access to materials, except in terms of having sufficient funds or credit to acquire them (credit is discussed below).
- There are many quarries in Kampong Speu supplying gravel, sand and stone. Cement and bricks are supplied direct to Kampong Speu wholesalers direct by importers/local factories. Deliveries are made not only along National Road #4, but other roads in the province.

Yet it remains that many actors do not interact with each other. A businessman will know those he deals with regularly and those family members who are in the supply chain. But interaction tends to stop there. During the focus group of concrete producers, after initial trepidation, they were keen to speak at length with one another about their business – because they never had the opportunity to

[10] See, for example, Salter, Dan, October 2008, *Sanitation Demand and Supply in Cambodia: Identifying Constraints to Increasing Sanitation Coverage*. WSP Field Note, World Bank WSP.

[11] The supplier reporting 40% - in Phnom Sruoch – reported that around 60% of latrine sales were to NGO programs such as LWF. Many other suppliers reported that they did not sell to NGOs.

before. They all stated that lack of information was a constraint, including information about changes to materials prices.

Many of the businesses are passive (some because of a lack of desire or drive, others because of a lack of knowledge on how to be more active).

Finally, the monopoly in latrine waste removal in Kampong Speu potentially limits this aspect of the latrine supply chain. It may be that the current size of the latrine market in Kampong Speu is such that two waste removal businesses would be unprofitable (because of fixed costs - namely, a tanker truck). If the market can be successful increased, it may support more than one waste removal business. Presumably, though, the incumbent would prefer to maintain its monopoly, and increase its fleet to meet the increased demand.

In short, we do not think the supply chain is broken or fragmented, but information and knowledge does not always flow freely through it.

A number of actors are entrepreneurial

We met with a number of actors in the Kampong Speu latrine supply chain who are entrepreneurial, open to new ideas (including new techniques and technology, such as thinner concrete rings) and keen to expand their business. This included building material suppliers, concrete producers and masons. Some owners already have other business interests. For example, the concrete producer in Kong Pisei who runs a catering business. Many masons have previously worked in construction in Phnom Penh. Although not currently operating formal businesses, some of them demonstrated a desire to grow their business.

One area where this entrepreneurial spirit appears lacking is in marketing. None of the supply chain actors in Kampong Speu undertake marketing activities and are quite averse to it. They are concerned people will think their business is not doing well if they advertise (even though competition may be strong and margins thin). They also see little return from the effort. However, for many the concept of “marketing” is a narrow one, often restricted to television and radio advertising. Major national suppliers of building material products advertise on television and radio.

The few entrepreneurs from outside the latrine supply chain that we spoke to in Kampong Speu were not that interested in sanitation, stating that they didn’t have the expertise or experience.

Latrine business has been growing

Most interviewees and focus group participants reported increased latrine business over the last three years, and that growth in business from latrines had been faster than other activities. In particular, their business grew strongly in 2007 and 2008 during the construction and property price boom. This slowed somewhat in 2009 with the economic slow-down. Regardless, latrines now represent a larger proportion of masons’ and concrete producers’ business than previously.

They attributed the increased demand for latrines to:

- Media advertising (usually NGO programs) raising sanitation awareness[12];
- Higher incomes (including income from property sales during the boom, or from a daughter working in a garment factory);
- Copying neighbours, or experience of a family member working in a garment factory, etc;
- Most new houses are built with a latrine; and
- Forests have been cleared, resulting in open defecation being less appealing.

[12] Specific NGOs were not specified. Media mentioned was usually radio or television.

Latrine sales can be seasonal

Interestingly, many (though certainly not all) supply chain participants commented that the demand for latrines tends to be higher in wet season. A reason given is because open defecation is less appealing at this time of year. This contradicts expectations that demand would be higher after harvest time (that is, in dry season) when people have more money. Some building material suppliers still experience higher demand in dry season, though this is often for non-latrine construction, or the construction of a latrine when a house is being built. The possibility of buying on credit (see below) means purchasing during wet season is possible.

Masons reported that constructing a latrine is generally easier in wet season, when the earth is softer to dig and when water is plentiful, although major rainfall might lead to delays. It some areas – that is, those without sealed roads – wet season makes transportation more difficult and results in less business.

Credit is available, but cash flow management is a problem

Formal credit from banks and MFIs is available to supply chain actors in Kampong Speu. ACLEDA, PRASAC and Sathapana all stated that they have clients in Kampong Speu who are concrete producers and/or building material suppliers (mostly in Chbar Mon). Typical loans for these businesses are $4,000 to $10,000, over 24 months at a rate of 1.5% to 2.0% per month. Most borrowers pay off the loan early.

In addition to formal credit, trade terms are available from upstream suppliers, usually 15 to 30 days. Sometimes, payment for a previous order is required at the time of a new order.

Suppliers reported that many end consumers buy latrines on credit, with a down payment of 30% to 50%. Terms are typically not specified, with repayment often over three months but can be up to one year. Concrete producers reported that defaults are common and are a problem.

Actors in more rural areas reported that supplying on credit was essential to getting the sale. In urban areas, credit to end consumers is less common (partly because the supplier is less likely to know the consumer).

For many of those consulted, the management and recording of debtors and creditors is very elementary. Many of these businesses often have a poor understanding of cash flow. This was substantiated by the banks' credit officers who lend to them.

The focus group of concrete producers agreed that creditors and debtors was the biggest challenge for their businesses.

Masons have an advisory role

As discussed above, masons have a key relationship with the end consumer. They are often consulted first when a consumer decides they want a latrine. Masons will be relied upon to advise on materials required and the expected cost, as well as the cost of construction.

However, this role is limited to those buying an "ideal latrine". It is not clear to what extent this is because masons only know this type of latrine, or whether only those consumers who want the ideal latrine first approach masons. That is, the customers who seek masons' advice can afford expensive latrines. To the extent that it is the case, then the usefulness of masons key relationship with customers may be restricted to the higher end of the market.

High price of latrines is a key issue

The high price of the typical latrine means that most Cambodians cannot afford one. This limits the size of the market.

Masons do have an incentive to encourage people to build a more expensive latrine if it means more work for them. However, many masons said that a lot more people would buy latrines if they

could be made cheaper. Many masons we interviewed did appear to appreciate the trade-off between price and volume and some indicated a willingness to install cheaper latrines. They said they would be prepared to work for less in return for greater volume and regularity of work.

Some building material suppliers did report customers buying latrine components for a less than $100, and one mason reported a total latrine cost of $150. Cheaper latrines are being built in Kampong Speu.

4. Water Supply Chain

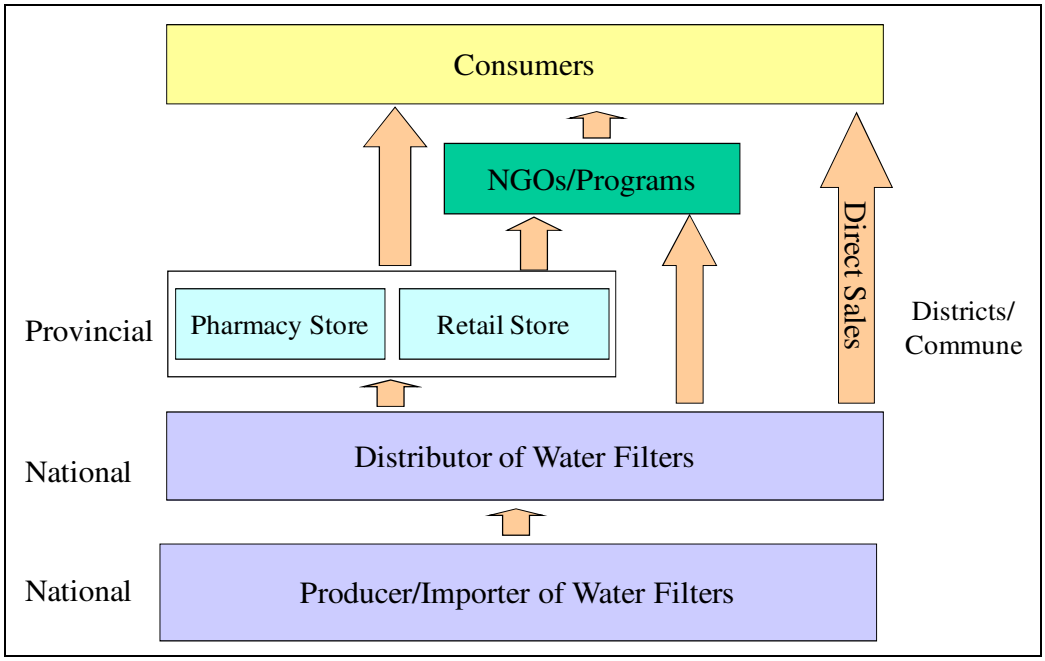
This section describes the results of interviews with actors in the water supply chain. The results provide an overview of the water supply chain in the target area within Kampong Speu.

There are a number of quite different water products and services. A such, there are multiple supply chains. These chains sometimes intersect, but some are distinct. We discuss three main categories of water products and services: filters, wells and pumps, and water storage.

4.1 Water Filters

Water filters (or water purifiers) in this report refers to point-of-use household filters. They come in two broad types: ceramic and mineral. The ceramic filters evident in the Kampong Speu market are made in Cambodia, while mineral filters are imported.

Figure 8: Filter supply chain map



Source: EMC.

Local Filter Manufacturers

There are two producers of water filters in Cambodia: Hydrologic (formerly a project of IDE) and Resource Development International (RDI). A third manufacturer, Cambodian Red Cross (CRC), has ceased production.[13] All three were once non-profit organisations. Hydrologic is now being run as a profit-seeking social enterprise, producing and distributing the 'Rabbit' brand filter. Filters are produced at facilities in Kampong Chhnang and Kandal.

Manufacturers sell to NGOs, private wholesalers and retailers, health clinics. Major NGOs such as Plan and World Vision have long formed part of the distribution network for locally produced filters. IDE has even exported filters from Cambodia.

Some years ago, about one-third of IDE's distribution was through private sector channels, the remainder through NGOs. Private sector distribution has grown over time to account for more than half of sales. Hydrologic states that it does not intend selling to NGOs in the future. In 2006, Kampong Speu accounted for around 5% of IDE's ceramic filter sales.

[13] CRC had a close relationship with IDE, even co-branding their filters.

Production costs are estimated at around $7 to $8 per Rabbit filter. Hydrologic is scaling up its production, planning to double its output, which may result in lower production costs. Wholesalers in Phnom Penh report acquiring Rabbit filters “from an NGO” for $9 per unit. It is not clear if this “NGO” is the manufacturer or a middleman. If it is the manufacturer, this implies a gross manufacturing margin of 12% to 25%.

Filter Importers

Imported water filters are commonly available in Cambodia. These mineral water filters are mostly imported from Vietnam. There are a number of brands available at different sizes. They include “Seoul”, “Nova”, “Mastu” and “International”.

Importers are individual traders and are generally not registered businesses. They are sole proprietor entrepreneurs, mainly Vietnamese nationals who have good business relationships with manufacturers in Vietnam, but also Cambodians. They import products directly from Vietnam based on orders from wholesalers/distributors. They have good relationships with government border officials on both sides.

The importers are general traders. They import a variety of products, ranging from kitchenware to filters as well as daily consumption items such as fruits and vegetables.

Business relationships

They generally have very good business relationship with suppliers/manufacturers in Vietnam and the wholesalers in Phnom Penh. Based on their many business interests, they also have good business relationships with wholesalers in key markets in Phnom Penh - for example, Olympic Market and Orussey Market.

The importers cover all costs associated, including transportation, taxes, and border fees (formal and informal), and deliver the products to the wholesaler. However, all transactions are cash on delivery. No credit is available to wholesalers or distributors.

Importers will sometimes introduce new products to their customers, but no marketing is undertaken.

Wholesalers

General characteristics

Wholesalers or large retailers are sole proprietor market entrepreneurs who engage in buying goods in bulk and sell wholesale to provincial retailers or in some cases retail directly to end consumers. The enterprises are small scale and family-based. They are registered with the local market authority. They pay annual patent tax and other tax obligations.

They are located in major markets in Phnom Penh such as Olympic and Orussey Markets. They usually sell many other items such as kitchenware, plastic products, and so on. They usually sell more than one kind of mineral water filter and many also stock ceramic water filters (the Rabbit

brand). There are a large number of businesses supplying filters at these markets. The products are widely available.

Business relationships

They have good business relationship with both their suppliers and customers. They usually have a number of trusted suppliers who regularly supply to them based on their own orders. Most of their supplies are from Vietnamese traders and Cambodian middlemen. Suppliers do not provide credit; they must pay cash on delivery. One reported that it was very easy to order filters from Vietnam.

The majority of their monthly sales are to provincial retailers with whom they usually have close relationships. Less than 20% of their sales are retail.

Typical margins

The typical gross margin earned by wholesalers on water filters is around 10%. They mark-up each filter by $0.50 to $2.00, selling filters for $9.50 to $25.00. Table 6 below describes the typical wholesale selling price and gross margin to Phnom Penh wholesalers for a number of filter products.

Table 6: Water Filter wholesaling in Phnom Penh

Type of water filter	Unit cost to wholesaler	Unit wholesale price	Typical gross margin	Gross margin, %
Seoul – 15 litre	$10.00	$11.00-$12.00	$1.00-$2.00	10%-20%
Seoul – 17 litre	$11.00	$11.50-$12.00	$0.50-$1.00	5%-9%
Seoul – 23 litre	$14.00-$15.00	$16.00-$17.00	$2.00	13%-14%
Nova – 16 litre	$9.00	$10.00	$1.00	11%
Mastu– 22 litre	$17.00	$19.00	$2.00	12%
International – 16 litre	$12.00-$14.00	$13.50-$16.00	$1.50- $2.00	12.5%-14%
International – 22 litre	$21.00	$22.00	$1.00	5%
Rabbit – 25 litre	$9.00-$9.20	$9.50-$11.00	$0.30-$2.00	3%-22%

Source: EMC.

Margins often depend on the customer and the size of the order. For example, some wholesalers reported selling Rabbit filters to NGOs (such as World Vision) in small bulk quantities (10 to 20 units) for $9.50 per filter. We also know of at least one retailer (see below) in the target area that bought Rabbit filters for $9.50. Yet wholesalers reports selling Rabbit filters for up to $11.00.

Wholesalers reported selling around 200-300 water filters per month, 90% to 95% of which is to provincial retailers. One stated that during August and September 2009 it was selling around 20 units per day. Most of these are Seoul, International and Nova brands. Sales of Rabbit filters are around 10-30 per month, a lot of which are sold to NGOs. One wholesaler at Orussey Market held around 50 Rabbit filters in stock. It don't have any clients in Kampong Speu. Many wholesalers stock filters, but only some include Rabbit brand in their stock. Those not stocking Rabbit said that it was not profitable to do so, or complained that it is easily broken.

All wholesalers report selling few filters to Kampong Speu, simply because they receive less orders from there (in turn, retailers in Kampong Speu report low demand for filters. See below.). One wholesaler stated that of the provinces where they have customers, Kampong Speu accounted for the smallest share of sales. Wholesalers sell a lot more filters to retailers in other provinces such Kampong Cham, Siem Reap, and Kampong Thom.[14]

At least one wholesaler appeared to have reasonable product knowledge, stating that imported filters were not of good quality but they sold better because they are more attractive.

[14] Of these, Kampong Thom has a lower population than Kampong Speu.

Retailers

General characteristics

Retailers stocking water filters are micro-enterprises based in the provincial town. Very few retailers outside of Chbar Mon stock water filters (we found one in Kong Pisei selling Seoul filters). Provincial retailers outside the provincial town have low awareness of water filter products.

Retailers are usually general stores and pharmacy shops. They are family-run businesses and usually have no hired staff. Pharmacies stores are licensed pharmacies under the supervision of the Department of Health (which may offer health product promotion opportunities).

Retailers sell a variety of products ranging from light construction materials, souvenirs, kitchenware, and so on. Filters are a very small part of their total sales.

In Kampong Speu town, there are three general stores that sell water filters. Most of the filters sold there are Seoul or International brands. One pharmacy in Kampong Speu sells water filters, and only Rabbit brand. This pharmacy is supplied by a wholesaler at the Olympic Market in Phnom Penh.

Water filters are slow moving consumer goods whose size and price also influence the type of retailer willing to carry the product. Retailers are not averse to stocking filters if they fall within their product range (for example, retailers selling household goods or health-related retailers such as pharmacies), and if they believe the stock will sell quickly enough.

General stores are introduced to filter products by their suppliers in Phnom Penh with whom they usually have a good relationship. Sometimes the retailer will have to arrange transport themselves to collect new stock. They will phone their order to the Phnom Penh wholesaler, and then send money with a driver to collect the order. Such informal and small-scale transportation arrangements add to the final cost of filters. One retailer said that when they tried to order more filters the wholesaler would offer free delivery is they ordered several hundred units. The retailer decided not to order any and has stopped stocking filters (also citing insufficient customer demand).

At least three retailers used to sell filters but had discontinued. Two reported having previously sold CRC filters. In addition, the Cambodian Red Cross itself and the Provincial Department of Women's Affairs had previously supplied locals with filters. The Department of Women's' Affairs stated that it ceased selling CRC filters two years ago, and also expressed concern about the quality of these filters.

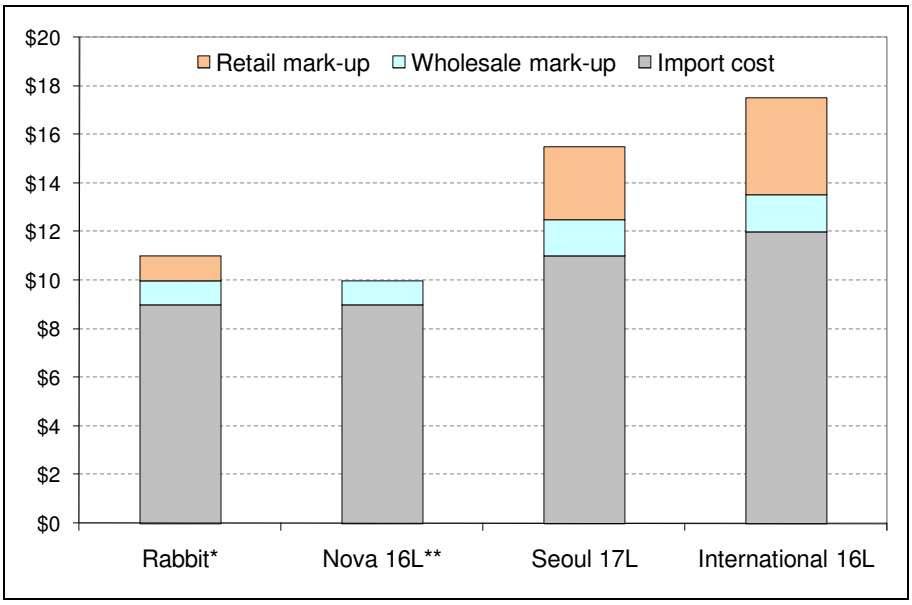
Typical margins

Final retail prices vary for different filter brands (Figure 9), with Rabbit among the cheapest. However, the Kampong Speu Cambodian Red Cross stated that imported mineral filters were more visually appealing as well as price competitive with ceramic filters.

Typical retail gross margins for filter products ranges from 10% to 20%, dependent on the retailers relationship and negotiation with customers. However, the retail mark-up sometimes has to also cover transportation costs, so these margins exaggerate the retailers' true profits from filter sales.

Retailers report introducing filters to their regular customers, but sales volumes are very low. Retailers reported selling one to three units per month. Some months, a retailer will not sell a single water filter.

Figure 9: Costs and mark-ups of different water filters



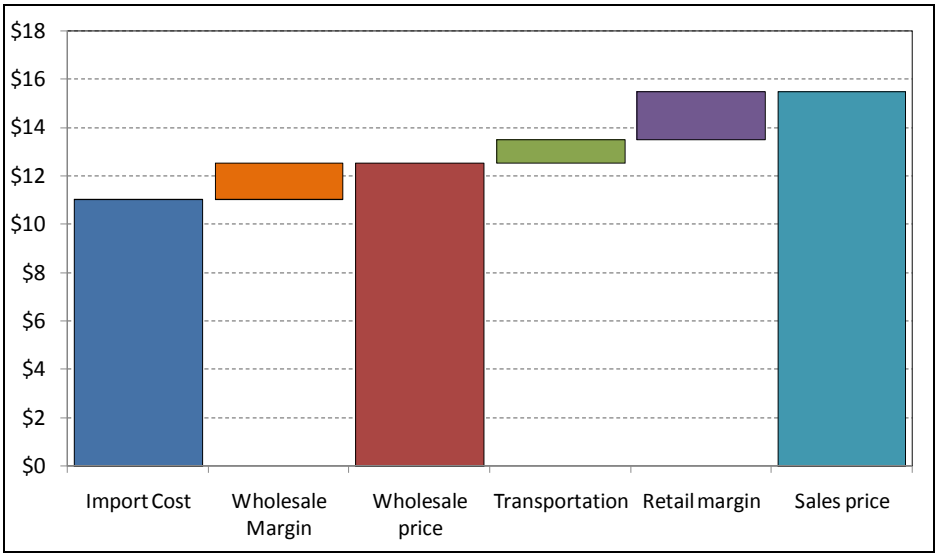
* Estimated local manufacturing cost, not "Import cost", for Rabbit filters.

** No retail sales of Nova filters identified in target area, so no retail mark-up shown here.

Source: EMC.

Figure 10 demonstrates that mark-ups for filters are not excessively large. The final cost to the end consumer is still dominated by the import cost. Also, a portion of the retail mark-up (one-third to one-half of the mark-up) is to cover transportation to the province, implying lower gross margins to the retailer than shown in Figure 9.

Figure 10: Seoul brand, 17 litre water filter



Source: EMC.

One retailer reported it had sold eight or nine mineral filters in the previous year and it currently stocked around ten filters (both Seoul and International). The store owner was introduced to the filter products by their regular Phnom Penh wholesale supplier. Another reported selling three to four filters per month, about three-quarters of which were to households. They had six or seven units in stock when we visited.

Direct sales

Some water filter products are distributed by direct sales to the final consumer. This might involve the national distributor of the filter employing its own sales team.

Also, peddlers on motos buy a range of household items from a retailer or small wholesaler and then travel to more rural areas, selling door to door. We were unable to interview any of these actors.

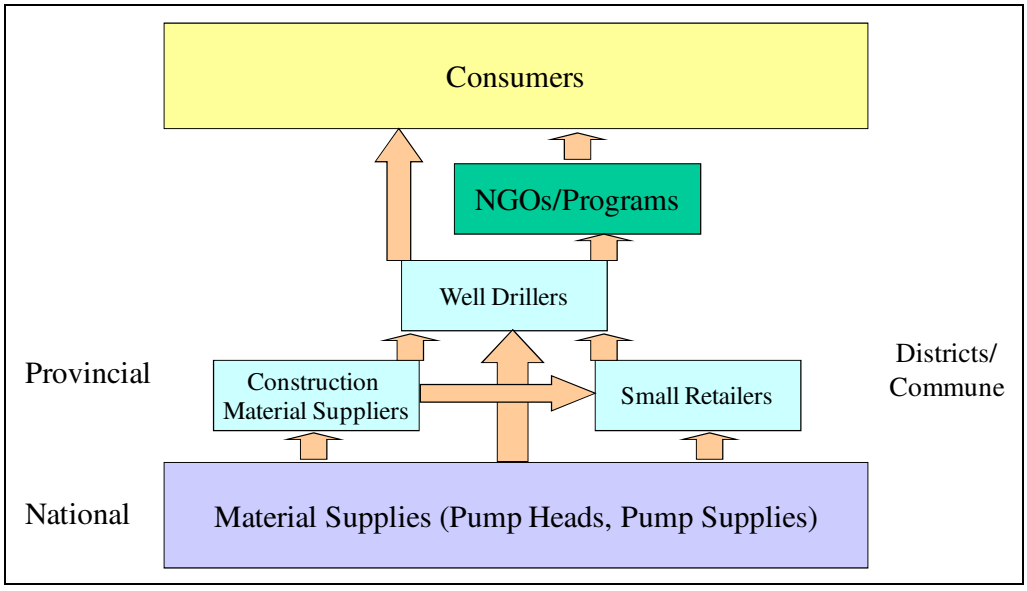
4.2 Water Pumps

There are a variety of water pumps brands and sizes available. Many are imported, although some are manufactured locally.

Local Manufacturers

There is a local manufacturing company in Cambodia, located in Phnom Penh, producing "Afridev Pump Head" and its accessories. Afridev is a UNICEF standard pump and is usually used by NGOs and other development programs. In Kampong Speu, in particular, Afridev is used given the difficulty in getting access to water. It requires a deep well and large PVC piping. Most of the manufacturer's orders are from well drillers and it has no specific provincial distribution arrangements. The pump is sold for around $450 to $500.

Figure 11: Water pumps and well driller supply chain



Source: EMC.

Distributors

A better-quality and higher price Afridev pump is imported from India. It is more popular and supplied by a distributor in Phnom Penh. They have a sales team and distribute their products to different channels but most sales are to well drillers.

The sales price of the Indian Afridev is much higher than the locally produced model, and sales volumes also appear to be much higher. It sells for around $700 to $800.

Afridev is mainly used by UNICEF and other NGO or government development programmes. In a few cases, large farm holders also use them but household use is rare.

Retailers

Retailers are provincial construction material suppliers and market retailers. Those consulted did not stock the Afridev pump head and its accessories but they instead stocked other types of pump products, usually cheaper options aimed at local people. These cheaper pumps are mainly used in areas where access to water is reasonably easy. In some selected areas of Kampong Speu (for example, Phnom Sruoch district), Afridev is reportedly required given the limited access to water and the required depth of wells to access safe water.

Well Constructors

Well constructors/drillers are either micro or small enterprises. Some of them operate with license from the Department of Industry, Mines and Energy while the others do not. There are many of them in Kampong Speu. They drill and construct the well, including supply and installation of a pump. These wells are typically for a community, not a household. Their cost puts them beyond the affordability of many families.

Large projects usually call for bids and large well drillers usually win the contract. Large drillers are usually contracted by development programmes such as UNICEF for the construction of pump wells in schools and for other public buildings such as hospitals or health centres. Usually well drillers are awarded the whole package to construct pump wells, including materials and labour.

Drillers usually employ skilled labour as technical chief and labourers to support in pump well construction.

One well driller stated that well depths of 24m to 40m are required to obtain good water. The cost of a well is between $1,450 to $3,000. It might take up to 10 people 3 days to construct the well. He reported having constructed 300 wells in total in Kampong Speu. There is usually insufficient work in Kampong Speu, so drillers also work in other parts of Cambodia.

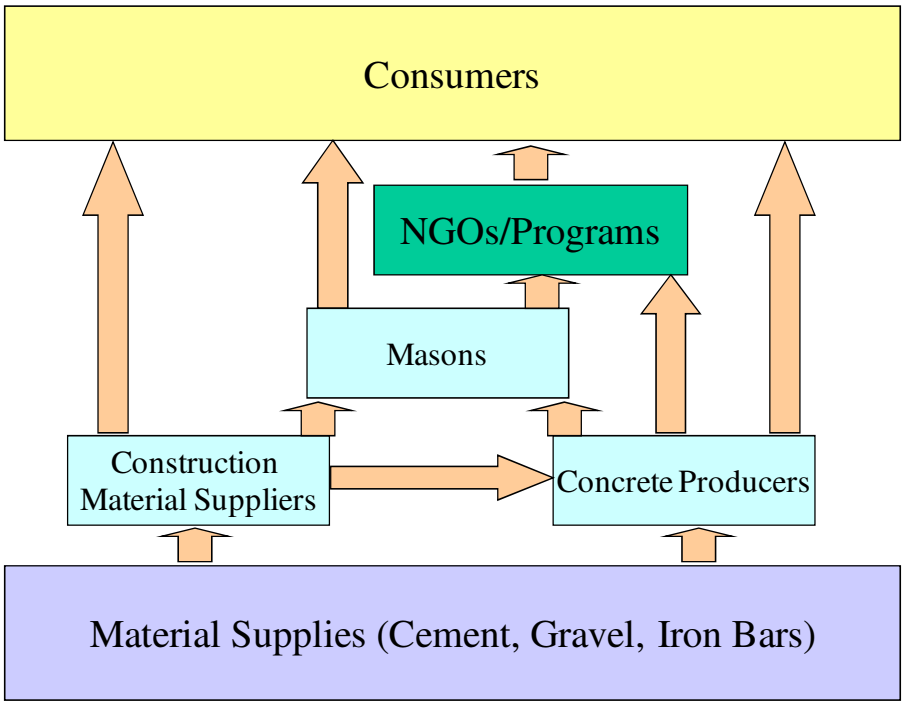
Well drillers require a drilling rig (semi-manual rigs cost about $1,500, more advanced $4,000 and up to $9,000), compressor ($500 to $6,000, depending on rig), truck ($2,000 to $4,000). Other costs involved in drilling a well include fuel, labour, platform (cement, iron), hammer, parts, tubing.

4.3 Water Storage

The same building material wholesalers and retailers described in Section 3 are also often involved in the supply of water storage products including jars, concrete tanks and material for wells. Concrete producers say that around 25% of the concrete rings they produce are for wells, and 15% for water tanks. Wells and tanks are therefore about one-quarter of their total business (concrete rings being around 60% to 70% of total output).

Other concrete producers are involved in the production of large concrete tanks, typically around 35 cubic metres. These tanks require significant amounts of cement, sand and gravel, as well as iron, wire and PVC piping.

Figure 12: Water tank supply chain



Source: EMC.

Jar producers

Five businesses were identified that solely concentrate on concrete jars ("peang"). Many other concrete producers also make jars as part of their overall concrete product mix.

Water storage jars come in various sizes, starting as small as 125 litres up to 450 litres (plus 3,000-litre 'jumbo' jars produced by UNICEF for schools). 2 people can make 3 jars per day. Jar producers often contract labour at a price per jar of 5,000 to 6,000 reil. Jar producers require a truck, or at least a moto cart, to deliver product to customers.

Margins and profits for concrete jars are shown in Figure 4 and Figure 5 on page 18. One producer reported selling around 20-30 jars per month. Others estimate 10-20 and 10-30 per month. Sales are seasonal, however, typically peaking early in wet season.

One jar producer says he puts his name and phone number on the jars he makes to try to promote repeat business.

Larger concrete producers said that jars are about 10% of their total concrete products.

Water storage systems

We encountered a number of entrepreneurs in the target area who are storing water and supplying it to their local community. They source water by pump from a well or pond, and store it in a series of tanks (usually concrete rings, as in the picture on the right below). They then sell this to consumers either on site or sometimes they deliver. These operations are profitable and suppliers claim there is unmet demand. At least one supplier is planning to expand operations. The owners are typically very entrepreneurial and have other business activities.

Demand is seasonal, with consumers reverting to other sources in wet season. However, the water is not treated. We understand that investment in treatment technology to bring the water up to sufficient quality would cost around $30,000.

4.4 Additives

Additives are tablets and powders added to water to make it potable. These are faster-moving consumer goods (especially compared to water filters) with certain advantages. However, we saw no evidence of these products within the target area and retailers had little or no awareness of them. When asked, a number of people mentioned Abate, used for mosquito control not to make water potable. No other knowledge of water treatment products was shown among retailers. The three pharmacies visited did not stock any - even the pharmacy stocking Rabbit filters. This pharmacist mentioned hospitals or health centres as a source for chemicals to improve water.

PSI is re-launching its Aquatabs product. It is not targeting Kampong Speu. PSI works with RHAC as a local partner in Kampong Speu for distribution of other products. At this time RHAC has not decided to include water disinfection tablets in its product range. There may be opportunity to support them to target Kampong Speu.

4.5 Key Observations

Water filter distribution costs are high but not excessive...

The wholesale, retail and transport mark-ups for water filters are not large (as illustrated in Figure 10). Transport costs for products to the provincial capital and district centres are generally moderate. For example, we estimate that to transport one filter from Kampong Chhnang to Kampong Speu costs less than 50 cents (assuming a truck carrying a full load, which is not always the case). Some retailers in Kampong Speu reported transport costs from Phnom Penh of $1 per filter. One retailer indicated that they had not re-stocked because of transport costs (but also mentioned the lack of demand for filters). This suggests that improvements in the downstream supply chain will unlock some value. However, most of the final price is the production or import cost. Upstream improvements in the filter supply chain will create the most value but are hard to attain.

... and there are limitations in the 'last mile'

However, while the mark-ups might not be overly large, the distribution of water filters is currently quite limited. Regardless of costs and mark-ups, filters are not distributed to much of Kampong Speu or are only done so very sporadically and 'randomly' (by moto peddlers, for example). Generally, distribution channels are quite informal. The lack of access to filters for many parts of the province may be because transport costs for the 'last mile' can be three times the cost per kilometre of transport from factory or port to Chbar Mon (smaller vehicles carrying smaller quantities, plus lower quality roads, particularly in wet season). Furthermore, many consumers do not have access to filters at all through their local retailers. Particularly outside the provincial capital, the supply chain simply does not reach the final consumer. The extent to which this is because of a lack of demand for filters is not clear. Possibly greater demand for filters in these areas would lead to an extension of the distribution networks to meet the demand. But creating this demand is difficult when the product is not visible locally.

Fewer filters available now?

The availability of filters in Kampong Speu seems to have fallen in recent years, with retailers reporting CRC ceasing production as a factor. A number of retailers reported to having previously sold the Red Cross filters but no longer do so. It would appear that IDE or other suppliers have not replaced this. One reason may be that the supply of CRC filters involved some level of subsidies that have not been replicated.

Wholesalers and retailers supported previous consumer research that mineral filters are preferred over ceramic filters. Imported mineral filters are certainly more visibly prevalent throughout the supply chain than ceramic filters.

No supply of additives

We found no evidence of a supply chain in additives (tablets or powders) in Kampong Speu. Local businesses, including pharmacies, displayed very little awareness and knowledge of these products. The only product businesses were able to mention was Abate (which is for mosquito control, not potable water). There could be scope to encourage dynamic pharmacies to stock additives.

Retailers are willing to stock new products

Retailers say they are willing to take on a new product, if it will move quick enough. Retailers who had discontinued selling filters said it was because of insufficient demand. However, retailers do not only respond to consumer demand, as has been suggested elsewhere. Some retailers said they had been influenced to stock a product by their regular wholesaler in Phnom Penh. Upstream supply does have some ability to change the downstream product mix.

Retailers who sell bottled water may be less willing to supply water filters.

Demand is irregular and seasonal

Filter sales are irregular, therefore businesses need more regular complementary products to maintain consumer contact (soap might be one such product).

For producers of water storage products, demand is seasonal. Business is significantly stronger in wet season. Hence, suppliers often rely on other products. For example, concrete producers sell fewer jars in dry season but are more active in house construction.

Key differences with sanitation supply chain

Less complete chain

In sanitation, business further up the supply chain, such as importers and large wholesalers, are less dependent on sanitation products and services than are downstream businesses (concrete producers and masons). However, for water, many downstream suppliers, such as local retailers, also are not heavily reliant on water products. Latrines might represent 60% of a concrete producer's business, but selling water filters accounts for a fraction of a retailer's business. Concrete products for water (rings for wells, jars) are also a small proportion of total output for many such businesses. There are exceptions, such as those that produce only jars.

Furthermore, in sanitation most consumers have access to a mason and know where they can buy materials for latrine construction. For some water products (filters and additives) consumers do not know where to access these products (and in fact are not even aware of the products). The 'last mile' of the supply chain appears weaker in water than in sanitation.

Less credit from suppliers

Credit is less common in the water supply chains than in sanitation. There is definitely less trade credit in the supply of filters. Suppliers often do not receive credit from those upstream. An exception is concrete producers involved in the manufacture of water storage products, some of whom do receive formal credit. These are the same businesses producing concrete rings for sanitation.

Weaker product knowledge/awareness

In sanitations, businesses have some knowledge of latrines. This knowledge may be limited to a specific, ideal type, but it is better than nothing. In water, many suppliers have very little knowledge of products such as additives, although there is more knowledge of filters and a lot more knowledge of water storage such as tanks and jars.

5. Supply Chain Strategies – Guiding Principles

The WASH Project requires strategies to improve access to water and sanitation products and services that are market-based, sustainable and with measurable results. Strategies should be as 'hands-off' as possible. The Project aims to improve the profitability of the private sector actors in the supply chain, through business improvements, supply chain efficiencies, and/or improved integration.

In addition, we believe the Project should observe these principles:

Facilitation rather than delivery

It is rare to have all the resident expertise that can provide assistance for a diverse set of constraints or training for a wide range of competencies. Furthermore, investment in delivery personnel and assets makes it more difficult to react proactively to changing market demands. A facilitation role that can utilise a coordinating position in the supply chain would therefore be more consistent with market-based and sustainability principles. It enables the Project to more effectively work with leading, expert private sector organizations in the delivery of services.

Services rather than products

The emphasis needs to be on responsive services that enable the supply chains to function, not on replicating parts of the supply chain or on the direct provision of products.

Private sector focus rather than NGO/Government

Furthermore, it is imperative that the WASH Project invoke a private sector, customer-facing, results-oriented culture.

Demand-driven rather than supply-driven approach

Here by "demand" we do not mean final consumer demand for products and services, but rather what is being demanded by the supply chain actors. Facilitating the provision of services that are in demand - either by actors seeking specific skills or in areas where suppliers' demand for product and services is real - is critical to long-term sustainability and success.

It is therefore important to understand the desires of and constraints faced by the supply chain businesses. This means engaging with them regularly, listening to them and responding accordingly.

A demand-driven focus will encourage more suppliers to become involved and also will improve longer-term sustainability. Merely imposing services that are thought to be beneficial will be less attractive and successful.

> *"The sustainability of the small scale sanitation providers is always vulnerable making the need for a supportive, flexible and understanding relationships with the private sector an essential factor for success. It is imperative that the they are represented in programme design decision making processes."*
>
> - Jenkins and Sudgen, 'Rethinking Sanitation: Lessons and Innovation for Sustainability and Success in the New Millennium', Human Development Report Occasional Paper, UNDP, 2006, p.28.

Treat supply chain participants as customers not program beneficiaries

Key to providing meaningful support is to view the supply chain participants as customers rather than beneficiaries. In essence, the program should work to support individuals or businesses in the areas where they need assistance – allowing the businesses to drive the services that will meet their needs, not the other way around (as above, demand-driven rather than supply-driven).

In this approach, it is also important that the program be flexible, going where its customers require. Service providers implementing activities of the program should seek to provide services where they are most useful, where they are least disruptive, and in ways which focus on improving businesses' bottom line.

The Program should therefore will be willing to see and to encourage competition within the supply chains. The overall goal is to increase the number of household's accessing water and sanitation products and services. It should not matter if this is being delivered by fewer, larger suppliers or more, smaller suppliers.[15]

This approach will also ensure that the Project faces the incentive to keep the costs of accessing the program's services low. High program access costs will discourage participation or can result in having to assure participants of certain business growth. Such assurances might require more hands-on assistance, or might mean an unwillingness to help a larger number of businesses or to see increased competition, to the detriment of final consumers.

We do not think that working with a larger number of suppliers is an impediment to the Project. We see greater risks of market distortion by picking one or two 'winners'. No promises should be made that there will be a certain sized market for participants. Just that the total market will get bigger (thanks to demand-side activities) and they should participate to help them capture some of this growth.

[15] Within a limit. Monopoly supply is generally not desirable.

6. Recommended Supply Chain Strengthening Strategies - Sanitation

6.1 Introduction

The essential problem is that too few people have latrines. The main cause of problems for the supply chain is a lack of scale. Most sanitation supply chain problems appear to stem from this. The latrine market is simply too small.[16] Lack of scale is not particular to latrines, it is a problem faced by many industries in Cambodia because population density is low[17], but it is even more acute in latrines, given the nature of the product (infrequent purchases) and current low penetration.

Hence many actors supply other products and/or services besides latrines. There is not enough business from latrines alone for most of them to specialize. For some actors, the infrequent nature of latrine sales and the absence of specialization means that they lack some skills and knowledge with regards to latrines.

For more people to have latrines, we believe that demand-side interventions are most important. The local latrine supply chain in the WASH Project target area *should* respond to an increase in demand, because:

- The private market is already supplying most latrines;
- Barriers to entry are not too high;
  - The required capital to start a small business is not excessive and formal finance is available,
  - There are few or no regulatory barriers,[18]
- The quantity of suppliers and consumer access to them is better than in many parts of Cambodia, particularly given that the target area includes a National Road;
- According to businesses, the latrine market in the target area has been growing; and
- Some, albeit limited, linkages between actors exist already.

However, past evidence from CLTS programs shows that supply does not respond adequately to demand-only strategies. Our research found that within the supply chain in the target area:

- The concept of a "latrine" among many actors is the expensive ideal;
  - These latrines are beyond the affordability of most people.
- The skills and knowledge of many actors are limited, including:
  - Technical skills, including lack of product innovation,
  - Business management skills, including marketing,
  - Relationships (with other supply chain participants, with customers, with stakeholders).

Hence, while demand-side initiatives are paramount it remains important to augment demand-side strategies with supply chain strengthening. EMC has identified a number of interventions that should ensure the supply chain does respond adequately when demand-side interventions raise household demand for latrines.

6.2 Three Desired Outcomes

To strengthen the water and sanitation supply chains in the target area, the project should aim to:

[16] "Market" defined here as the number of latrines being bought. Potential demand for latrines is far greater than this if affordability can be improved (discussed more below). That is, the addressable market is unpenetrated.

[17] There are around 100 people per km^2 in Kampong Speu, compared to, for example, over 1,000 in Bangladesh. Although low population density constrains the market, it also means that some sanitation problems such as moving or emptying pits are not as accute as in high-density urban settings.

[18] An exception is latrine waste disposal, which is a monopoly in Kampong Speu, granted by local authorities.

1. Increase market size (through both affordability and addressability);
2. Improve actors' skills and knowledge; and
3. Improve linkages and information flows.

We explain each of these three in turn below, and then specific actions for each are detailed in the following section.

1. Increase market size

Increasing the size of the market is a goal in itself (more people acquiring latrines), but as discussed above, a lack of scale stemming from the small market is the major driver of supply weakness.

The size of the market can be increased a number of ways:

Demand-side interventions

The WASH Project will undertake an extensive program to raise consumer demand for sanitation products and services. This is not addressed in this Report, which focuses on supply-side strategies, but it is a crucial component of the overall WASH Project strategy. However, we do think the WASH Project should engage the private sector in defining its demand-side approach, including larger companies with expertise in consumer marketing.

Research and Development (cheaper latrines)

More people would buy latrines if they were cheaper. The current offering on the market is simply too expensive for most Cambodian households. A cheaper design would increase size of the latrine market significantly by satisfying the large demand that is currently not being served by the market.

Research and Development into cheaper latrines has been carried out by the WASH Project. Shelter costs can be reduced significantly by using zinc or fibro-cement sheeting with a metal or bamboo frame, instead of bricks. A small shelter could be built with materials costing around $45 to $50 and a large shelter for around $100. This is a significant reduction compared to ideal latrine costs depicted in Figure 6 ($200 to $350 for a shelter).[19]

Further R&D is being conducted into a pre-fabricated floor, thinner concrete rings and a water concrete container.

Another option is a shelter made from cheaper cement bricks. This would involve smaller savings, and may still require significant mason services, and so the costs savings will not be as large as zinc sheeting. However, the design may be more appealing to a segment of the market.

However, in order to reach the most people, and be consistent with the guiding principles in the previous section, particular latrine models should not be prescribed.

Improved production efficiency

As discussed, more affordable latrines will result in larger, or more penetrated, market. Improving the efficiency of businesses in the supply chain will lower their production costs, allowing cheaper latrines to be produced while maintaining margins.

Production costs can be lowered by new production techniques and skills, but also by improvements in business and financial management. As discussed above, a large number of the businesses in the supply chain have difficulty with debtors and management of cash flow. Average unit costs can be reduced through improved technical or management efficiency.

[19] Ideal latrines costs are high not only because of materials used but also because of the size of the latrine, which may also include bathroom.

Supply-side marketing (marketing *by* the supply chain)

In addition to the Project's social marketing campaign, businesses in the supply chain can be encouraged to undertake their own marketing. This also has the potential to increase the size of the market.

However, this activity is probably of secondary importance, at least initially, given the extensive demand-side marketing planned by the Project. Businesses may also feel that they don't need to do marketing when it is being doing by others. However, getting the supply chain to understand the benefits of marketing is important for longer-term sustainability.

There are some problems to overcome. Most businesses that we consulted, even the entrepreneurial ones, do not undertake any marketing activities and are reluctant to do so. Changing this mindset could take time. Involving respected upstream partners is helpful in overcoming this (discussed more below).

Direct Subsidies

Another way to increase the size of the market is to directly subsidise latrines. However, subsidies are generally distortionary and lead to outcomes that are not sustainable. They do not lead to viable private sector supply nor lasting demand. Households tend to expect or wait for subsidised provision of latrines. Artificially increasing demand temporarily is not consistent with the guiding principles discussed above.

Yet there are positive externalities from latrine construction, so a case can be made for some level of subsidy. However, programs involving subsidised latrines appear to have had limited success.[20] We think that any subsidies for the WASH Project should be in-kind, through the provision of services (such as R&D and coordination) that otherwise would not be provided by the market.

Bulk purchases

Bulk purchases can increase the size of the market and take advantage of any scale benefits. Some NGO programs have used bulk purchasing to lower the cost of latrines. A number of the businesses that we spoke to had supplied NGO programs in the past.

Direct bulk purchases by the WASH Project are discouraged, for the same reasons that direct subsidies are not favoured but also because they remove the relationship between the supplier and the consumer. The business contracts with the Project and not the end consumer. However, there may be a coordinating role for the Project in helping a village or group to simultaneously acquire latrines. This should involve local suppliers, and purchasing at market prices.

Bulk purchasing might also enable on-site casting, although concrete producers said that onsite casting was not feasible.

2. Improve actors' skills and knowledge

Many actors in the Kampong Speu latrine supply chain are very simple, informal businesses. To ensure the supply chain responds to the increase in demand, their skills and knowledge in some areas could be enhanced. Improving skills (business as well as technical) will help to lower unit business costs, allowing cheaper latrines while maintaining margins (above). This is also necessary to ensure the benefits from the Project R&D (also above) are maximised. That is, that the benefits from the R&D are disseminated to the supply chain. Areas for improvement are:

- Technical skills and knowledge;
  - For example, cheaper latrine designs and thinner rings,
  - General technical skills to improve product quality, reduce wastage, and reduce production times,

[20] See for example, Jenkins and Sudgen, 'Rethinking Sanitation: Lessons and Innovation for Sustainability and Success in the New Millennium', Human Development Report Occassional Paper, UNDP, 2006; and 'Feeling the Pulse. A Study of the Total Sanitation Programs in Five States', WaterAid India, 2008.

- Business management skills, including financial;
  - General business management skills,
  - Appropriate record keeping and debtor management is lacking for many businesses. Improved financial management, cost accounting and financial accounting will not only help them run their business better and improve cash flow, but can help them to access formal credit,
  - Marketing knowledge and skills.

Improved skills and knowledge should also result in improved flexibility, so that businesses can better respond to demand for different sanitation products and services, not only a particular latrine design and price point. This will enable more people to be served, ensuring less demand is left unmet.

We also found that some actors at the local level are:

- entrepreneurial;
- willing to be involved in training or learning more; and
- prepared to improve their technical and business skills (perhaps with the exception of marketing).

These actors should form the nucleus of those targeted for training.

We do not recommend developing "in-house" training expertise. Indeed, the functional skills required to properly develop these products for market require, in some instances, very deep and real expertise. The program should therefore focus on identifying opportunities, building demand for training among target entrepreneurs and linking training providers with these individuals/businesses. Wherever possible, businesses within the supply chain should be engaged to provide training, for example upstream material suppliers (discussed below). Otherwise, some training can be outsourced to private sector training companies. This facilitation rather than delivery approach will enable the program to be more responsive to organic opportunities that arise and will ensure that the organization does not invest in assets that lose relevance over time. The approach is more sustainable than direct provision of training by the WASH Project team. Such "embedded technical training"[21] not only improves skills and knowledge, but also business relationships.

Furthermore, skills and knowledge improvement need not always be delivered by formal structured training. Informal meetings, exposure visits and other activities can also be used to disseminate information and improve overall skills.

Some technical training can be linked to the roll-out or launch of new latrine designs developed by the R&D team.

3. Improve linkages and information flow

As described in Section 3, a number of linkages already exist within the latrine supply chain in Kampong Speu. However, information does not always flow freely throughout the chain. Improving linkages will assist in the spread of information and will speed up the supply side response to increased demand.

Considerable linkage improvement can be delivered through the pursuit of the activities required to deliver Outcomes 1 and 2 above. For example, through training sessions or exposure visits (described below). As such, it may be important that training includes participants from across the supply chain, not only one element of it.

But since improved linkages are a goal in themselves, activities can be arranged for no other purpose than to bring the supply chain actors together. For businesses to have the incentive to

[21] This phrase is used by the USAID-funded Cambodia MSME project.

attend such sessions, a nominal activity may be required (for example, a presentation from a cement company – see below) but the main, unstated, purpose will be to get businesses talking to one another.

A more formalised structure that improves linkages, such as forming a business association, is possible. But this may not be required in the initial stages of the Project and, consistent with the guiding principles, should be a result of the businesses' expressed requirements.

The WASH Project could facilitate and host Forums that bring together various stakeholders, from both the private sector, NGOs and government. This will also be useful in helping to improve the local business environment, should the businesses feel this is necessary.

Engaging with the supply chain to achieve these outcomes

After selecting the geographic region to begin the program (see below), the Project should indentify which actors to engage with. This may require some basic evaluation of the actors. Initial engagement should be through interest group meeting(s) before more formalised activities are implemented.

Who to engage?

At the top of the supply chain are the large building material suppliers. We believe these companies should be contacted and encouraged to participate - companies such as BPC, Chip Mong Group and K Cement. At this level, it may take some work to convince them to participate. There is less need to be selective. Whoever of the large, national businesses can be convinced to participate will help. Large suppliers already have name recognition, which will help in attracting others to the program. They also have a lot of skill and market knowledge that they can share.

For the local supply chain, basic selection criteria could include:

- Involvement in more than one type of business;
- Size of business (large businesses, such as the big suppliers in Chbar Mon, may be less interested in participating);
- Proportion of business that is latrines;
- Has formal credit (indicates that has already passed an assessment by a bank or MFI). However, this is difficult to observe and banks or MFIs are unlikely to share client lists;
- Length of history in running the business; and
- Recently invested in business upgrade or expansion.

There also will be a certain degree of self selection of program participants. Businesses willing to participate in a meeting that offers them little more than free information (that is, no direct pecuniary benefits) are signaling that they are the sort of business the program should work with.

We have already identified a number of businesses in the local supply chain that we think should be considered (listed in Appendix 2). These are businesses that we interviewed or that participated in focus group discussions and were keen, entrepreneurial and/or progressive.

We recommend working broadly with businesses, especially initially, rather than trying to pick a few winners.

Where to engage?

An obvious starting point is an area that contains CLTS villages. The potential for the upgrading of dry pit latrines offers some "lower hanging fruit" that will help with early success, which in turn will encourage more supply chain participation.

Regardless of location chosen, the involvement of upstream actors who are not located in the area will be required.

We suggest starting where there is an overlap between:

- Entrepreneurial businesses willing to be involved; and
- CLTS village(s).

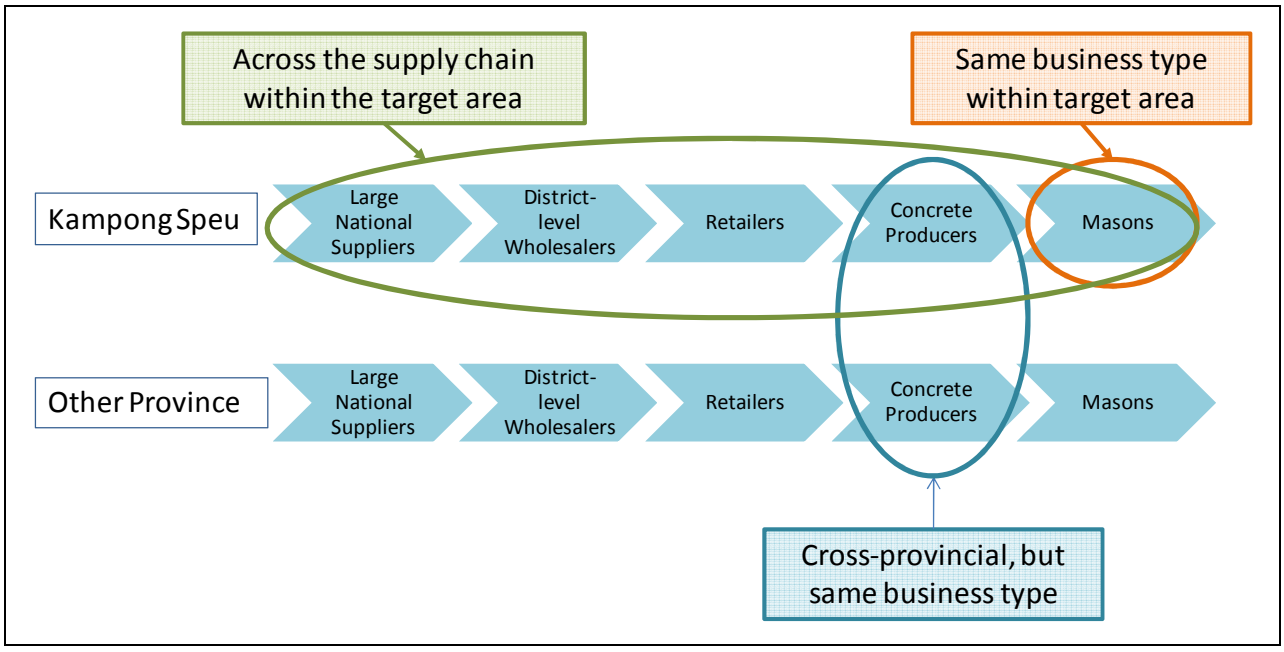
Chbar Mon is home to more advanced businesses. But these larger enterprises are often comfortable with their current business growth and so may be less willing to participate. Other districts with medium-sized, willing businesses may be more suitable. Business in more rural areas, while sometimes less entrepreneurial, are keener to receive help in expanding or upgrading their business.

How to engage?

The method of engagement might depend on which actors are being targeted. Large building material suppliers, for example, should be given a value proposition: their involvement will give them good PR and marketing, and it will help grow demand for their products. The Project should make it clear to large upstream suppliers that their involvement will be administratively simple (the Project will provide staff for coordination). This might help large businesses to take a larger role and eventually be a driver of the Project.

Different activities will engage differently with the supply chain. Some activities might work only with one type of business in Kampong Speu, some will involve the entire local supply chain, while others might include members of the sanitation supply chain from outside the target area. These approaches are depicted in Figure 13.

Figure 13: Three types of engagement with the supply chain



Source: EMC.

Where possible, activities involving businesses from across the supply chain are preferred because these have the added benefit of helping to improve linkages and information flows.

6.3 Specific Interventions and Activities

In summary, we believe the WASH Project should engage with all segments of the latrine supply chain. This engagement should be through facilitation of the improvement in skills, dissemination of R&D, and improved linkages and flow of information, as described above. Consistent with the guiding principles, wherever possible members of the supply chain themselves should drive and deliver the services and activities that achieves this (with encouragement and facilitation – or even

nudging - from the WASH Project team). In some cases, such as formal generic training, established private sector training providers should be used.

Delivery mechanisms should be cognisant of the potential for limited literacy among some supply chain actors.

Activity 1 – Interest Group Meeting

Hosting interest group meetings will help to identify the entrepreneurial businesses within the supply chain. Initially all the local actors identified as having potential can be invited to an interest group meeting. All levels of the supply chain should be targeted for this, from building material suppliers to masons. At the meeting, businesses should be encouraged to identify key constraints and issues, with discussion of possible solutions facilitated by the WASH Project. The resulting interventions and activities from these meetings might include training, exposure visits and so on, as discussed below. When subsequent Project activities are offered because they result from businesses' discussion at interest group meetings, they have more credibility and acceptability.

At the first of these meetings, the Project's activities should be explained, including the demand-side marketing program. Explain to supply chain actors that social marketing will happen and they can benefit from it; that they should be ready for increased latrine demand. Many should see the activities of the promotion campaign in their communities. Supply chain actors were aware of other sanitation and hygiene promotion campaigns, citing them as one reason for rising demand for latrines. It will be important to explain what the WASH Project's demand-side campaign could mean for them, and to ensure that there is sufficient supply of materials (especially for new designs). Explaining the S-curve of latrine adoption witnessed elsewhere will help them to see the huge potential for their business. This intervention could be combined with explaining that lower margins but much greater volume is a good thing. Some businesses interviewed indicated a preparedness to operate at lower prices for higher and more stable volumes.[22]

In addition to explaining the demand-side campaign at this initial meeting, selected businesses could be regularly informed about upcoming direct marketing in villages in their local area so that they can respond. This alert could be by way of newsletter, phone call or SMS[23].

Activity 2 – Latrine Design Workshop

As discussed in Section 3, many masons have narrow knowledge of latrines, generally restricted to the 'ideal latrine' which is extremely expensive. Yet masons also play an important role in advising consumers. Hence, training masons in new, cheaper latrine designs should be a very effective way to increase access and hence the size of the latrine market. The Project's R&D work in new latrine designs should be presented at such workshops.

Other actors should also be included in this workshop, particularly building material suppliers who will be providing inputs for latrines (such as zinc sheeting) that, although not new in themselves, are less common in latrine construction.

Activities 1 and 2 could be combined into the one session.

Activity 3 – Exposure Visit

Hosting a trip of local businesses to a different province to meet with latrine supply chain actors there is a useful way to increase knowledge and foster links with other businesses. A range of businesses from the supply chain can be taken to visit a successful business in another province. A visit to another project, such as IDE in Svey Rieng, would be useful for supply chain participants.

Attendees could witness new and improved production techniques, different ways to manage a business, and meet with successful entrepreneurs to see how they plan and have invested in their business. Participants might also learn more about market linkages and may obtain ideas on solving technical and business issues.

[22] This discussion could be a prelude to general financial and business management training (see below).

[23] Although the availability of text messaging in Khmer is very limited which will constrain the usefulness of this medium.

One of the main benefits of this activity is to bring suppliers together and get them talking to one another.

The Project could consider inviting local government officials to attend these visits. This will help build this stakeholder relationship.

Activity 4 – Training I – Products and technical skills

We envisage a number of activities to improve the skills and knowledge of actors within the supply chain. Again, wherever possible this training should be in response to businesses' own requests or comments about desired assistance (made during Activity 1). Also, it should be delivered by actors within the supply chain.

This first training session utilises the skills and experience of the large national building material suppliers. These upstream suppliers are sophisticated businesses. They have the incentive and the resources to participate in a program that will result in more demand for their products.

Businesses in Kampong Speu are supplied by the likes of BPC, K Cement, Camel Cement, and Chip Mong Group. Many of these companies host annual "workshops" where major distributors are invited to Phnom Penh to hear presentations on new products or marketing schemes. One building material supplier in Kampong Speu reported attending such a session from a brick and cement company. The Project should try to encourage one or more of these large suppliers to host such an event in Kampong Speu. Using a recognised name within the industry could create a lot of interest and publicity for the WASH Project. It would motivate businesses to be involved and join other activities. Although these sessions are more promotional than training, they are a good way to bring actors together to expand their knowledge. They could be combined with other presentations from the WASH Project team, including the introduction of latrine 'kits'.

Activity 5 – Training II – Practical financial management

As discussed, one of the main constraints for many businesses in the supply chain is management of creditors and debtors (and hence cash flow). A local bank or MFI, particular one already lending to the sector, should be encouraged to attend a meeting of businesses to explain some basics of small business finance. The MFI could also promote its own products. The incentive for the MFI to participate is the potential for new clients. The WASH Project could suggest to the MFI that it has already reduced some of the potential credit risk for the MFI by having selected businesses for this training based on certain criteria.

MFI interest may be limited at first since the main constraint for MFI lending is not insufficient clients, but rather source of funds. However, the MFI market is becoming more competitive and such marketing will become more attractive.

Activity 6 – Training III – Business management

In conjunction with the technical training discussed above, many of the businesses would benefit greatly from more structured business management training. Basic business training helps ensure that services/products are sold profitably, that business expansion is done efficiently and services are provided with a customer-focused orientation. Also importantly, small businesses must be provided with the skills (and support) to access customers and engage in the selling process.

There are a number of providers of generic business courses for SMEs in Cambodia. The Cambodian Federation of Employers and Business Associations (CAMFEBA), among others, offers a three-day course aimed at small, family-run businesses. The course covers a range of topics including business management, planning, finance, and marketing. It claims the delivery methodology is suitable for "low-income people with little formal education".

The cost of the CAMFEBA course, conducted in Kampong Speu, is $1,350 for up to 25 participants.[24] The Project would have to provide a venue and refreshments, so we estimate the total cost would be around $1,500. For 25 participants, this is $60 each ($20 per day). This is equivalent to one month's profit on concrete ring sales for many businesses (Figure 5).

A key question for the Project is who will pay for this training. Ideally, the participants would pay for it all themselves. The WASH Project may consider a partial subsidy. If subsidised, we recommend very careful selection of participants such that resources are not wasted. This selection could include reviewing the extent to which lessons from previous activities have already been implemented. Requiring participants to fund at least some of the cost themselves (say 50%) will ensure only those most likely to benefit from the training will attend.

Activity 7 – Business Forum or a Working Group

The Project could facilitate a forum of businesses and certain local government officials to discuss issues and developments. If identified by actors as a constraint, the Project could usefully assist in creating a dialog between the businesses and local government to raise issues of concern. Many small businesses do not approach local officials with problems, because of real or perceived costs of doing so. This is particularly true for informal businesses. The Project would allow concerns or issues to be aggregated and raised anonymously, lowering these costs. Improved dialog with government may assist removing impediments to business growth and profitability.[25]

Activity 8 – WASH Market Centre

It is rare for theoretical or formal business training such as that in Activity 6 to sufficiently drive successful business operations – particularly for relatively untrained business managers. Some on-going, one-on-one provision of supporting information is often required.

Hence, the Project's in-house Business Development staff, in addition to facilitating the activities discussed above, could be a repository for relevant support information and materials to assist local businesses and enhance information flows in the supply chain. We envisage the Project's office, located in the centre of Kampong Speu, would become the *WASH Market Centre*. This support should be consistent with the guiding principles of Section 5.

Broadly, the Centre would be both a repository and also a disseminator of relevant market information for all businesses and stakeholders. This would help overcome problems indentified in both the sanitation and water supply chains. The main aim will be to help supply to respond to the increase in demand.

Information could be provided covering a range of areas:

- Demand Identification. Central to this function is the appropriate estimate of demand for the products and services. The program should be able to identify demand – at the village, commune or district level – for a specific service or product, as a support function for its entrepreneurs. Helping businesses understand what consumers want and how to provide it at a cost they can afford.
- Links to suppliers and potential customers. While many entrepreneurs are solid producers and practitioners of their craft, many struggle to effectively identify profitable markets and links with buyers or to service providers. This could include links to training.
- Access to Finance. Most MSMEs in Cambodia, have difficulty securing affordable working and investment capital to grow their enterprises. This is largely due to a lack of fixed assets for collateral and high interest rates. The Centre could provide information on accessing

[24] This is the price quoted to EMC. There may be some scope to negotiate a lower price, perhaps a NGO rate. Price includes all materials, plus certificates for participants. AAA Cambodia Co. offers a similar three-day course, for $2,100 (if conducted in Kampong Speu). Other training companies include HR Inc. and VBNK.

[25] This activity could be linked to the WASH Project's broader stakeholder engagement activities, but we do see it as being driven by the supply chain itself.

finance, explaining different finance products and concepts, who to contact to apply for a loan, and so on.

- Association Development. In many cases associations can play an important role in improving the economics for an industry. We think that the businesses should determine themselves whether and how they want to form an association. It may be some time before they are ready to do this. But the WASH Centre can assist in this development with general information and advice and could even become a secretariat for the association – if the members wanted. It is important that any association provides services that its members value.
- Alert businesses about upcoming direct marketing campaigns in their local area.

We see the WASH Market Centre as an important strategy not just for sanitation, but also for the water supply chain and it is discussed more in Section 7.

Sustainability

The sustainability of the WASH Market Centre needs to be considered. When the Project ends what will become of the Centre? There will be functional sustainability in the sense that much of the knowledge will be retained by the people involved. But it may also be the case that after a period of time the Centre has served its purpose and ceases when the Project moves on. However, financial sustainability could be achieved in a number of ways.

As a provider of information, the Centre's published materials may have wide appeal and therefore be able to sell advertising. This might be particularly interesting to the large upstream suppliers who already undertake advertising and marketing activities. A similar example is GTZ's 'Stay Another Day' tourism booklet which is moving towards commerciality.

If the supply chain actors form a business association with the Project providing secretariat services, then it may be possible that association membership fees could contribute to the running of the Centre. If the private sector felt that the Centre was worthwhile they would be prepared to keep it going. For example, some suppliers might like it to act as a show room.

Another way to assist in sustainability would be to invite counterparts from the Provincial Department or Rural Development to work, part-time, at the Centre. A per diem might be required to achieve this. But it would help transfer some of the skills and knowledge to the Department.

Part of the Project's M&E should include an evaluation of the Centre, its usefulness to the private sector and lessons for future similar Centres in other regions.

6.4 Risks or possible barriers to success

We have identified some potential risks to the success of the program:

- IMF debt-forgiveness funds might be used to provide subsidised latrines in target area, distorted incentives for both consumers and producers;
- Participants in the program who become more efficient and competitive may be better-placed to win large contracts from other NGO programs. Provided the NGO is paying them a market rate, the problem is more of a demand distortion (we assume the consumers are not paying the full cost of the NGO-provided latrine). At least this NGO is using the local private sector to (perhaps partially) deliver the product. In a light-handed program, participants cannot be banned from seeking these contracts. Development agencies are a reality of the Cambodian market – just as large Government contracts are a reality in many other industries around the world.
- Persuading people that this is the right approach. Not everyone understands hands-off, market-driven approaches. There can be political pressure to be more active or distortionary. Particularly since a market cannot be changed quickly. It takes time and some stakeholders may be impatient to see results;

- Obtaining the involvement of large upstream suppliers involved could take time. Getting them involved requires people with the knowledge who can talk to large private sector businesses in their own language, understanding their position and trade-offs. People with these skills are not always easy to find;
- A number of businesses in the target area have experience with other NGO programs. They may be willing to be involved initially, expecting some form of subsidy. Time may be wasted dealing with these businesses or getting them to understand that the benefits of this program are different (and better and longer-lasting). The costs of this risk are greater the fewer businesses the program works with – that is, if select only a few and some turn out to be inappropriate because they were expecting subsidy. It is therefore important to evaluate participants' suitability (regularly).
- There is also a risk that the Project works with the supply chain actors, but that the increase in demand does not eventuate and participants become discouraged.

7. Recommended Supply Chain Strengthening Strategies - Water

7.1 Introduction

In water, the essential problem is that too few have access to the various water products and services. These products exist in Cambodia, but are not being acquired by most consumers. The majority still boil water (if they do anything). Partly this weak demand for products is a product of affordability, but it is also because of poor information flows and an incomplete supply chain that does not effectively reach the end consumer (water filters are cheaper than boiling over one year). Like sanitation, the problems stem from the small market size and lack of scale. However, the water supply chains also have some differences from sanitation, discussed in Section 4.

7.2 Three Desired Outcomes

The same three desired outcomes apply equally to water as they do to sanitation, namely:

1. Increase market size (through both affordability and addressability);
2. Improve actors' skills and knowledge; and
3. Improve linkages and information flows.

Options to achieve these are also similar to sanitation:

- Demand-side interventions;
- Research and Development (cheaper water storage products, for example);
- Improved production efficiency;
- Marketing *by* the supply chain;
- Direct Subsidies;
- Bulk purchases;
- Training;
- Meetings to share information and improve linkages; and
- Information dissemination.

These points are described in more detail in Section 6.2.

Who to engage

As with sanitation, the WASH Project should engage with all segments of the water supply chain (Figure 13). Some of the same businesses will be involved, such concrete producers, and so some water supply chain actors will benefit from the generic training provided to sanitation suppliers.

In sanitation we recommend engaging with large upstream suppliers to tap their expertise. Similarly in water, large distribution companies should be used where possible. Even companies that are not necessarily in the water supply chain could be very useful. Companies such as Mega Products, Dynamic Pharma and Diethelm Keller all have extensive distribution networks with knowledge and expertise of selling products in all regions of Cambodia. They would have good insights into effective marketing and distribution techniques in the Cambodian context. Similarly, companies like Unilever, Coca-Cola and the breweries are very effective at distributing fast-moving consumer goods to the most remote regions of Cambodia. These could be more applicable to water additives than products such as filters and pumps.

Where to engage

The location of activities will depend a lot on the area chosen for sanitation activities, leveraging the Project's resources. Also, since latrine owners tend to be better-informed about hygiene, more effective results should be achieved by focussing on areas that either already have high latrine penetration or where the Project will be working to increase penetration.

How to engage

As with sanitation, engagement will vary by actor and activity, but where possible, activities involving businesses from across the supply chain are preferred because these have the added benefit of helping to improve linkages and information flows.

7.3 Specific Interventions and Activities

The same guiding principles apply to water strategies as to sanitation. That is: market-based; sustainable; supply-driven; and facilitation rather than provision. We therefore recommend a similar approach to engaging with the water supply chain businesses to that outlined in Section 6. Where possible, we look for opportunities to bundle with or leverage the recommended interventions for sanitation, while recognising the differences between the water and sanitation supply chains.

Of the sanitation Activities in Section 6, we think Activities 3, 4 and 8 to be the most beneficial to the water supply chain. These will address the core supply chain inefficiency of a lack of information dissemination. Addressing information gaps is even more important in water than in sanitation. But all of the sanitation activities are applicable to water.

Activity 1 – Interest Group Meeting

As with sanitation, hosting an initial interest group meeting helps to identify the entrepreneurial businesses within the supply chain. At the initial meeting, the Project's demand-side marketing can be explained. Businesses should be encouraged to identify key constraints and issues, with discussion of possible solutions facilitated by the Project.

Participants should understand that future activities have arisen because of the discussion at this interest group meeting. This should ensure the relevance of the activities and increase their appeal.

We think it particularly important to communicate the message of the demand-side work to wholesalers of filters in Phnom Penh. They currently sell little to Kampong Speu and think that demand there is very low. They also have shown they can influence the product stocked by local retailers. However, they may not attend an interest group meeting in Kampong Speu. Hence a meeting in Phnom Penh could be considered (or combined with an exposure visit to Phnom Penh, as described in Activity 3 below).

Activity 2 – Product Information Workshop

Unlike latrines, to our knowledge the Project has not undertaken significant R&D in water products. However, knowledge of water products and services is particularly weak among many supply chain actors. Retailers would benefit from increased knowledge of the costs and benefits of different filters and other products.

Also, a large number of actors could benefit from the dissemination of knowledge about rainwater harvesting systems. Many of the relevant actors are also in the latrine supply chain: building material suppliers and concrete producers. Even masons could learn more about rainwater harvesting since they may be able to get work installing these systems and they already have a close relationship with the end consumer.

Activity 3 – Exposure Visit

Hosting a trip of local businesses to a different province to meet with supply chain actors there is a useful way to increase knowledge and foster links with other businesses. Attendees could witness new and improved production techniques, different ways to manage a business, and meet with successful entrepreneurs to see how they plan and have invested in their business. Participants might also learn more about market linkages and may obtain ideas on solving technical and business issues.

One of the main benefits of this activity is to bring suppliers together and get them talking to one another.

It might be particularly useful to take retailers to a ceramic water filter factory. We also think that retailers should be taken to Phnom Penh to meet filter wholesalers and distributors. Wholesalers currently think demand in Kampong Speu is insufficient. Meeting a group of retailers who are selling filters will help them to over the risk hurdle of supplying to Kampong Speu. It will also help introduce retailers to new products, and educate them about the benefits of costs of different types of products.

Activity 4 – Training I – Products and technical skills

This training session utilises the skills and experience of the upstream manufacturers. These upstream suppliers are generally more sophisticated businesses than wholesalers and retailers. They have the incentive and the resources to participate in a program that will result in more demand for their products. This incentive is even greater for local filter manufacturers than it is for building material suppliers.

The WASH Project should facilitate training sessions in Kampong Speu by manufacturers and national distributors of water products. The suppliers would explain their product, its features and specifications, its benefits, how to market it, in-store promotion options, recommended pricing (and margins), other marketing and promotion activities that they will be undertaking, how to order stock, finance terms (if available), and so on. Organisations hosting these sessions could include Hydrologic, PSI and RDI, but also large distributors various FMCG (including water products) such as Dynamic Pharma and Diethelm. If these organisations know that there will be a meeting of a large number of retailers (and retailers in a region where there will also be a social marketing campaign) they should have good incentives to attend.

We think that those supplying well water should be included in training. They are currently selling water that is not necessarily potable. Increasing their knowledge and getting them involved in the program will help increase hygiene awareness. They also could be a useful distribution agent for other products since they are already in direct contact with the end consumer.

Also, masons could be trained in rainwater harvesting systems and concrete producers could learn about ferro-cement jars and water storage products (these are cheaper and withstand shock better than concrete or brick water storage).

Activity 5 – Training II – Practical financial management

Participation in Activity 5 (financial training from a MFI) would be particularly useful for the water supply chain businesses, given the current lower prevalence of credit compared to sanitation. As with Activity 6 below, this could be run with the sanitation suppliers to reduce overall cost.

Activity 6 – Training III – Business management

Given the economies of formal training (fixed total price regardless of number of participants), including water supply chain participants in Sanitation Activity 6 (generic business management training) will help defray the cost per participant. However, the benefits from including local water product retailers, for example, in this training may be limited given how small a proportion of their business is accounted for by water products.

Activity 7 – Business Forum or a Working Group

The Business Forum activity discussion in Section 6 should also include the water supply chain. Many of the issues will be similar.

Activity 8 – WASH Market Centre

The WASH Project's physical presence in Kampong Speu will allow for a repository of currently missing market information and a centre for the dissemination of this information throughout the supply chain.

There is a lack of information throughout the supply chain about product availability, who are the suppliers and distributors, prices and margins, where marketing materials can be obtained, and so

on. Each manufacturer and distributor may wish to undertake elements of this themselves, but none do because the costs are prohibitive to do it at a local level for a single producer. By aggregating information, the WASH Market Centre improves the efficiency of information provision.

Section 4 showed that upstream distributors can influence what is stocked by retailers. Providing both with more information not only about products but also the location and contact details of each other will help increase end consumers' access to products.

Removing information gaps, combined with demand-side social marketing, will help to improve the efficiency and size of the market for water products and services, helping distributers to serve customers more cheaply, including reducing unit transport costs which can also be a constraint. Wholesalers may learn about a wider range of products that will enable bundling of the distribution of products to retailers, potentially reducing unit transport costs. By providing information on all available products, retailers will be able to offer a wider, and more informed, choice to consumers.

We see the WASH Market Centre as being the key supplier of this information in Kampong Speu.

A range of information could be provided, such as:

- Repackaged demand-side promotional materials such that they are targeted at retailers and distributors.
- All producers' marketing material. This could also be produced into a single product. That is, a booklet with all information, contact details, product specifications, recommended prices/margins, photos, the pros and cons of each product, and so. This could then be distributed to retailers throughout the Project's target area.
- Results of the WASH Project's demand survey. Market demand mapping will help retailers and wholesalers understand potential demand in their area.

Information could be packaged into different products aimed at different segments of the supply chain, as shown in Table 7.

Table 7: Water Information supplied to different audiences

Target audience	Content
Retailers*	Product information, marketing materials. Behaviour change marketing materials. Database of wholesalers and distributors. Product cost comparisons.
Distributors/Wholesalers	Retailer and manufacturer databases. A simple margin calculator . Maps of potential demand in Kampong Speu and associated retailers
Manufacturers	Databases on retailers and distributors, and also raw material providers. Scientific studies on different technologies.
Governments/stakeholders	A combination of the above, plus information on the WASH Project, etc

* There are different types of retailers (FMCG and those supplying water storage products and pumps) which may require different information.

AMK, a MFI, which has an explicit social mission, is interested in leveraging its existing network of branches and credit officers to promote non-financial products and services. It may be another distribution channel for information produced by the Centre.

By being physically located in the centre of Kampong Speu, the Centre could stock product samples and host demonstrations on their use; providing credible, independent product information and advice. Product demonstrations could even be held from time to time in the provincial and district markets. Individual manufacturers might be unlikely to do this, but the WASH Project could do it simultaneously for a range of products.

In addition to being a repository of information, the Centre should actively disseminate this information. For example, by providing printed information to all retailers or hosting meetings of retailers to explain products and local demand, etc. Furthermore, wholesalers and manufacturers should be informed that retailers will be receiving this information.

The Centre would establish a reputation with supply chain businesses and other stakeholders in the community. Staff would acquire knowledge to answer queries or refer queries to the relevant organisations. As such, information could be provided by a Hotline phone number (with this number prominent on printed materials being disseminated).

As mentioned in Section 6, if local businesses ultimately decide to form an Association, the Centre could provide good support and advice on this.

The Centre could run a trade fair or exhibition. This would include product demonstrations. These demonstrations could include a range of water products, including rainwater harvesting. The Centre could run a competition for rainwater harvesting system designs.

Other possible activities include:

- Work with PSI and RHAC to target Kampong Speu for Aquatabs. Obtaining the involvement of a company like Dynamic Pharma might help make Kampong Speu very attractive to PSI.
- Pharmacies are supervised by the Department of Health. There may be opportunities for raising their product knowledge through the Department.
- Perhaps a local garment factory be involved to design a collapsible canvas peang.

7.4 Synergies with sanitation strategies

There are a number of synergies for water with the sanitation strategies discussed in Section 6. As already discussed, some businesses operate in both supply chains, such as building material suppliers and concrete producers. These are involved in supplying water storage products, pumps, and components for rainwater harvesting systems.

Activities for these suppliers will benefit both water and sanitation. Also, the WASH Market Centre is intended to serve both supply chains.

Any trade fair/exhibition type activities can combine water and sanitation to lower overall costs.

On the demand side, latrine owners are typically better informed about hygiene. Therefore they should be targeted for water marketing. The WASH market centre can help suppliers of water products to identify areas where there is high latrine ownership and therefore potentially greater demand for products.

Furthermore, if a latrine owner is more likely to be interested in water products and services, they may be scope for bundling. If masons and others are well informed not only about latrines but also products such as pumps or rainwater harvesting, they may be able to cross sell water products and services.

7.5 Risks or possible barriers to success

Some of the risks to the program's success are the same as those for sanitation, such as:

- Persuading people that this is the right approach. Not everyone understands hands-off, market-driven approaches. There can be political pressure to be more active or distortionary. Particularly since a market cannot be changed quickly. It takes time and some stakeholders may be impatient to see results;
- Obtaining the involvement of large upstream suppliers involved could take time. Getting them involved requires people with the knowledge who can talk to large private sector

businesses in their own language, understanding their position and trade-offs. People with these skills are not always easy to find;

- A number of businesses in the target area have experience with other NGO programs. They may be willing to be involved initially, expecting some form of subsidy. Time may be wasted dealing with these businesses or getting them to understand that the benefits of this program are different (and better and longer-lasting). The costs of this risk are greater the fewer businesses the program works with. It is therefore important to evaluate participants' suitability (regularly).
- There is also a risk that the Project works with the supply chain actors, but that the increase in demand does not eventuate and participants become discouraged.

Another risk is:

- Ensuring WASH Market Centre provides the right information. If private sector-driven, the right information usually should be provided. But parts of the private sector are themselves poorly informed. Hence the need to get the involvement of all elements of the supply chain.

8. Cost estimates

Many of the activities described in this report are relatively low cost. For example, meetings might only require the hire of a venue and the provision of basic refreshments. Some per diem might have to be paid for a special presenter, such as a representative from a large upstream supplier. For example, we estimate the total cost of an interest group meeting to be $50.

Even subsidising 50% of the formal business training is not a large expense. The greatest costs are for the rent and staffing of the WASH Market Centre.

Activity	Units	Unit Cost	Total	Comment
Initial Program - 1 Commune/District				
Interest Group Meetings	2 meetings	$ 50	$ 100	1 for sanitation and 1 for water
R&D workshop	2 meetings	$ 50	$ 100	1 for sanitation and 1 for water
Exposure visit	2 visits	$ 200	$ 400	1 for sanitation and 1 for water
Training I	2 meetings	$ 100	$ 200	1 for sanitation and 1 for water
Training II	1 meetings	$ 75	$ 75	Santitation and water combined
Training III	1 courses	$ 750	$ 750	50% paid by participants. Santitation and water combined
Working Group Meeting	1 meetings	$ 75	$ 75	Santitation and water combined
Sub-total			**$ 1,700**	
Roll out - 4 Districts/31 Communes, 1 year				
Interest Group Meetings	8 meetings	$ 50	$ 400	Half for water half for sanitation
R&D workshop	31 meetings	$ 50	$ 1,550	1 per 2 communes for each of water and sanitation. (Too many?)
Exposure visit	16 visits	$ 200	$ 3,200	Half for water half for sanitation
Training I	8 meetings	$ 100	$ 800	Half for water half for sanitation
Training II	4 meetings	$ 75	$ 300	Santitation and water combined
Training III	2 courses	$ 750	$ 1,500	50% paid by participants. Santitation and water combined
Working Group Meeting	4 meetings	$ 75	$ 300	
Sub-total			**$ 8,050**	
WASH Market Centre	**Unit**	**Per month**	**Annual cost**	
Rent and utilities, cleaning	1	$ 350	$ 4,200	
Salary and overhead - staff 1	1	$ 115	$ 1,380	Administrative
Salary and overhead - staff 2	1	$ 403	$ 4,830	Supply Chain Coordinator
Salary and overhead - staff 3	1	$ 863	$ 10,350	Centre Manager
Trade Fair/Exhibition	2		$ 2,000	
Sub-total			**$ 22,760**	
Total annual			**$ 32,510**	
One-off costs				
Information materials design			$ 2,400	Design Group: $40/h for design and layout. 10 hours for one 10-page document in Khmer.
Printing			$ 5,940	500 copies of 6 materials @ $1.98 each
Sub-total			**$ 8,340**	
TOTAL 3 YEARS			**$ 105,870**	

Appendix 1 – Supply Chain Mapping

Figure 14 and Table 8 below show the estimated total number of actors in the supply chain in the target districts, by district and by commune. This is by no means completely comprehensive. We feel that this is a low-end estimate, since there are likely to be some actors in the more remote communes of which we are not aware.

Figure 14: Supply chain map

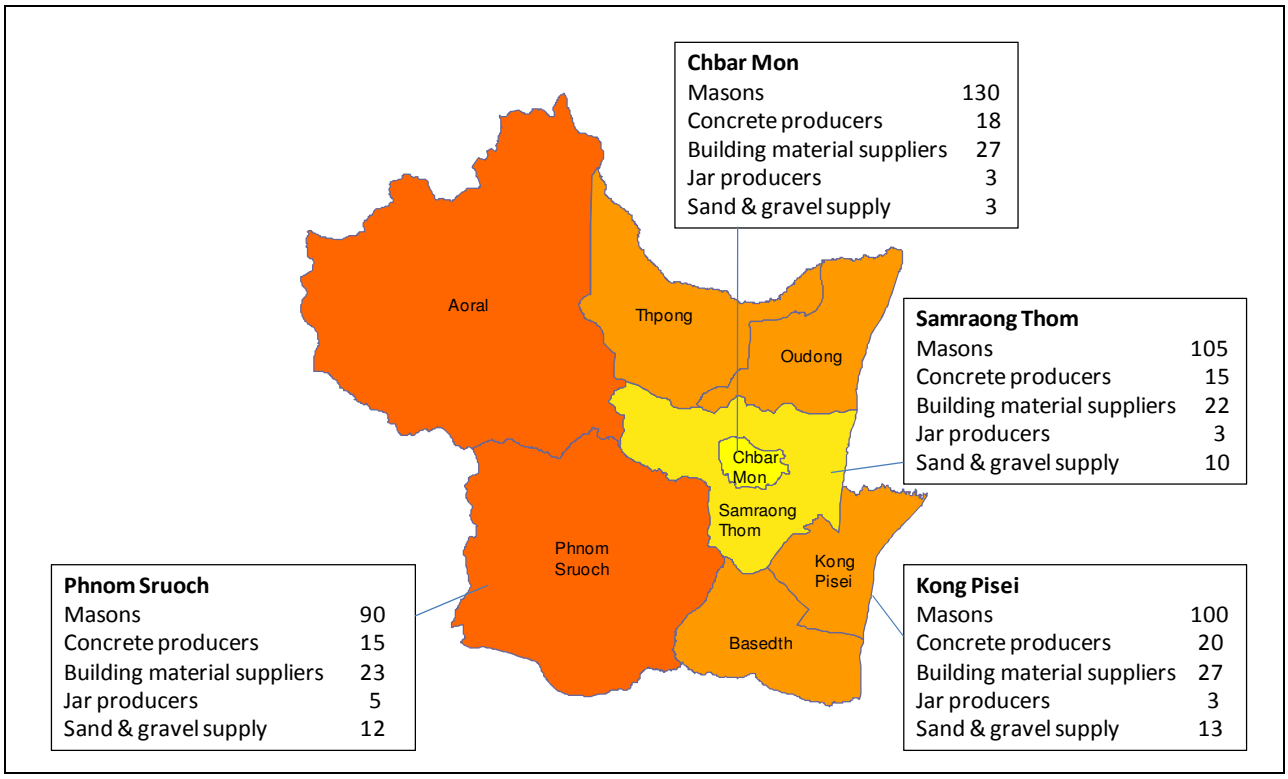


Table 8: Estimated total number of supply chain actors, by commune

Commune	Masons	Building material suppliers	Concrete ring producers	Jar producers	Sand and gravel suppliers	Filter retailers
Chbar Mon						
Rorka Thom	25	7	6	1		1
Sophor Tep	30	5	3	1	2	1
Chbarmon	50	10	4		1	8
Svay Kror Van	15	3	2			
Kandoa Dom	10	2	3	1		
District Total	**130**	**27**	**18**	**3**	**3**	**10**
Samraong Tong						
Tror Paeng Korng	30	8	5		2	3
Vor Sor	25	6	3	1	1	1
Ror Laeng Kreul	10	5	3			
Sen Dei	25		2	1	1	2
Tang Krouch		2	1			
Kahaeng						
Ror Laeng Chek	15	1	1	1	2	
Thomta Or					2	
Skouh					2	
District Total	**105**	**22**	**15**	**3**	**10**	**6**

Commune	Masons	Building material suppliers	Concrete ring producers	Jar producers	Sand and gravel suppliers	Filter retailers
Phnom Srouch						
Mohasang	15	4	2	1	3	3
Kirivon	20	5	3		2	3
Ou	10	4	2			
Traeng Tror Yeung	35	8	4	3		5
Pour Angkrong	10		2			
Tang Sya			1		4	
Prey Rom Doul			1	1	2	
Somraong		2			1	
District Total	**90**	**23**	**15**	**5**	**12**	**11**
Kong Pisei						
Rorka Koh	20	5	2		1	
Prey Gneat	10	3	1	1		2
Snom Kropue	15	4	9			
Chong Rok	30	10	6			4
Veal		2	1	1		
Angporpel	25	1				
Teuk Laak					2	
Srong					2	
Stok					2	
Preah Nipean		2	1	1	6	
District Total	**100**	**27**	**20**	**3**	**13**	**6**

Names and contact details for many of the above businesses are listed in the next two Appendices.

Appendix 2 – Suggested Businesses to Engage

The businesses listed below are those that our team feels are the most entrepreneurial and/or keen and willing to participate (of those we met). The WASH Project should not limit itself to these but can use this list as a starting point.

Appendix 3 – List of Interviewees

The table below is a list of those interviewed for this Report.

Appendix 4 – One-on-one Interview Summaries

As summarised in Table 2 and listed in Appendix 3, a total of 96 one-on-one interviews were conducted by the team. A summary of some of these discussion is presented below, grouped by business type. Much of the data collected during these interviews, such as margins, is not presented below but is captured in Sections 3 and 4.

Large building material suppliers

The large building material suppliers we interviewed are located in Chbar Mon. They sell a range of products, including: sand, cement, bricks, concrete, paint, latrine pans, tiles, plastic piping, water tanks and iron sheeting. These business typically stock more than one type of each product. For example, five different brands of cement.

They all started out as small family businesses. Now they employ 10 to 15 workers each. One also has a further 25 workers producing concrete and other products. One has been in business for nearly 20 years. Another only five years. They are registered with the Department of Commerce.

They are supplied by a range of companies, including importers based in Phnom Penh such as BPC, Chip Mong, Campaint, Camel Cement, Elephant Cement, and the local K Cement. Bricks are sourced from manufacturers in Muk Kampol District, Kandal Province. One month's credit is typically offered by upstream suppliers. One reported receiving only one week's credit from Phnom Penh suppliers. One large supplier reported obtaining technical assistance from cement and tile companies.

They report that their customers are smaller wholesalers and retailers, consumers and NGOs such as World Vision, LWF and UNICEF. For sales direct to end consumers, one estimates that 90% are through a mason. Another supplier pays commission to masons who bring customers. One says that business is stronger after the rice harvest in December and January.

One supplier estimates daily revenue of $2,000 to $3,000 with an average profit margin of about 10%. They do not do any marketing, but some of their large upstream suppliers advertise on radio and tv. One business uses their truck to bus villagers into town twice a day, charging them 5,000 riel each.

A driver is paid about $85 per month, other workers $60, plus food.

The minimum cost of a latrine is $37, but can be up to $400 or $500. There is now more demand for latrines because people know about the benefits of them.

Major constraints include: customers who pay late, price fluctuations for some materials, and the economic slow-down this year.

Small and medium building material suppliers

Small and medium material suppliers stock similar products as the large suppliers, but typically with less variety. They are also often concrete producers. They are family businesses with no or only a few workers (up to 5, sometimes casual, who earn around $35-$40 per month). One stated that they had four relatives in similar businesses.

The are supplied by the large suppliers in Kampong Speu, as well as those in Phnom Penh.

Some of these suppliers said they have never supplied to an NGO. One reported that NGOs are hard to deal with, requiring a lot process before deciding to buy, and "sometimes they ask from our shop but buy from others' shop". Those who had supplied NGOs said they provided concrete rings and other materials for wells.

They report selling direct to villagers and to those living in town.

Some obtain credit from MFIs such as ACLEDA.

Latrines make up varying proportions of their business. One supplier reported 20%, another 40%. Suppliers report selling 3 to 6 latrines per month, but none in some months.

One said the minimum price of a latrine is around $70. Another said $140. They report that customers buy all latrine components in a set.

The report customers buying latrines because of less forest and because they know the benefits. However, poor people don't have enough money to buy latrines, and they are not aware of hygiene like city people. They think it would be good to raise awareness among those poor and uneducated people to understand the importance of hygiene.

Chinese and Thai pans are the most popular.

Many villagers cannot afford to buy a latrine, and mostly villagers' perception of a latrine is the ideal one that costs around $400-$500.

Transport distances and difficulties, particularly in wet season, are highlighted by those in more remote districts such as Phnom Sruoch.

As with large suppliers, customers paying late is a constant complaint. They have to offer credit to get the sale, but chasing customers for payment for a few months to get full payment is a problem.

Some report that latrine affordability is a major problem, especially for those in poorer regions. One stated that material prices are rising, but customers' incomes are not. It is getting harder. Her sales of latrine products have fallen because the villagers' living standard is getting low. Even people who are now aware that they should have latrine cannot afford to buy one.

Some say they have no capital for expansion (despite some obtaining credit from ACLEDA).

Concrete producers

Many concrete producers are also the building material suppliers above.

Cement and iron are bought from wholesalers in Phnom Penh or Kampong Speu. Stone is sourced from Phnom Sruouch; sand from Samraong Tong.

Business is stronger in dry season. Business was stronger in 2007-08.

Around 80% of rings are for latrines, the rest for wells.

Masons

Mason 1

One latrine costs $300-$35$ for small and from $500-$600 for big. For all my work 40% is doing latrines. Now latrine making is increase because they know clearly about its advantage and I need $70-$80 for one latrine, and we spend 2 weeks for complete it and we need labour 3-4 people. The labour costs 12,000R-23,000R according to skills.

Mason 2

The cheapest latrine costs $150, but up to $500 according to the size of it.

He gets from $70-$80 for one latrine and he spends own week with 4 people to do it and he can do 4-5 latrines for one month.

Constraints include hard soil to dig as well as wet soil.

Retailers and pharmacies

A retailer selling kitchen utensils also sells Seoul filters. Filters are a very small part of their business, with around 3 or 4 sold per month. They had 6-7 filters in stock when we visited. They

sell three different sizes, each with a mark-up of $1 to $2 per unit. All their stock is supplied from Phnom Penh. They have no hired labour, only family members. Business is better during the dry season and the wedding season.

The owner of the xx pharmacy store near the Kampong Speu market believes they are the only supplier of water filters recently, but she sells only with a small number. Not many people ask for water filters. She sells 2-3 Rabbit units each month. She buys them for $9.5 and sells for 11$.

Two pharmacies did not stock anything to purify water and had little or no knowledge of these products. One pharmacy stocked Rabbit filters.

Filter wholesalers

Filter wholesalers were interviewed at the Orrussey and Olympic markets in Phnom Penh.

[Name Removed], Ourussei Market

Purchase from: There are few Vietnamese suppliers who deliver to her store. There is no company name, they supply as individual. Those supplier bought from Vietnam and import to Cambodia.

She distributes to all the 24 provinces and cities. Very few sales to NGOs.

Product types

- Seoul (Korean branch, but it is Vietnam product)
- Nova (Korea branch, Vietnam product) and
- International (Thai product)

Sell price

1. Seoul:
- 15 Litre = $11
- 17 Litre = $12
- 23 Litre = $16

2. Nova:
- 16 Litre = $10

3. International:
- 16 Litre = $ 13.5
- 22 Litre = $ 22

In average her gross margin could be between $0.50 - $1 per item.

Estimate she sells around 10–20 units per month for retail and around 100–200 units wholesale distributed to other provinces. Distribution to Kampong Speu is the lowest, unlike Siem Reap, Kampong Thom, Kampong Cham and other provinces.

The number of sale for each branch is quite similar, because the design looks quite similar as well as the quality, and there are various colours to choose. The different is the size only.

Transportation is the responsibility of those Vietnamese suppliers, they deliver to many stores in different markets in Cambodia. After the goods delivered to the place money has to be paid immediately.

She also distributes to her preferred clients in many provinces, however, transportation is the responsibility of those clients. Usually, those clients in the province order via telephone and then send the money with a driver (who they trust).

The Vietnamese water filter is not good quality, but people just buy it because it is quite cheap and look nice and attractive. It is better to filter the water then drink the water directly.

She doesn't sell the water filter which made in Cambodia because not many people are interested to buy, maybe because of Cambodian perspective that Cambodian product is not good and not standard as the import products from other countries.

This year the number of sale is not as good as last year, she guesses that maybe people already bought it from last year and they still have it.

[Name Removed], Olympic market

Sell all kinds of utensil, electronic products, and water filters. Purchase from Vietnamese suppliers who import from Vietnam. Mostly sells wholesale to retailers. Some retail sales and used to have some sales to NGOs. Wholesale is to some to stores in Phnom Penh and other provinces, but she doesn't have any clients in Kampong Speu.

Filter types:

- Seoul (Korean branch, but it is Vietnam product)
- Nova (Korea branch, Vietnam product)
- Mastu (Korean branch, Vietnam product)
- International (Thai product)

Sell price:

1. Seoul:
   - 15 Litre = $12
   - 22 Litre = $19
2. Nova:
   - 16 Litre = $10
3. International:
   - 16 Litre = $ 18
4. Mastu
   - 25 Litre = $ 20

On average her gross margin could be around $1 per item.

In the last two months she sold around 20 units per day. Previous few years sales were even better and she could sell around 30 – 50 unit per day.

Her observation is that the Vietnamese products of water filter have been available at Cambodian markets for around 3-4 years, just at the same time as the Rabbit water filter were available at that time. It is easy to order from Vietnam as she don't have to go directly to Vietnam, that will reduce transportation and other cost in crossing to the border.

[Name Removed], Orussey Market

Sells utensils and plastic products. Sells Rabbit filters. Buys Rabbits for $9 and sells for $9.50, $10 or $11, depending on the customer and the quantity. She says she can sell around 20-30 units per month; some to NGOs (who come to her store) and a few to consumers. She appears to be one of the largest wholesalers of Rabbit filters at Orussey market. She currently stocks around 50 Rabbit units.

She is supplied with Rabbits by a relative that works with an (name not known) NGO that distributes Rabbit filters. Delivery is free to her store. She orders by phone.

She has no clients in Kampong Speu.

[Name Removed], Orussey Market

Smaller wholesaler. Buys Rabbit filters for $9.20 and sells for $9.50 or $10. Sells around 5 to 10 units per month but sometimes even less.

She buys the filters from an NGO but does not know the name of the NGO. She does not deliver to Kampong Speu.

We also briefly questions about 10 other wholesalers at Orussey market about filters. A number of them stock Seoul, Nova and Mastu filters but not Rabbit. Some of these said they are not interested in selling Rabbit because it is not profitable and it is easily broken.

Jar producers

[Name Removed], Phnom Sruoch

Prior to become a water jar producer, he worked as the motorbike chart taxi driver. Because motorbike cart taxi make less money, then he has decided to start new business as the water jar producer three years ago in his village by seeing the market opportunity for him to earn money to support his poor family.

He make only water jars. He purchases all jar material from nearby shops. He has no hired labour, only himself, his wife and his brother.

Sells some to people in the new villages in Phnom Sruoch district. Sells some jars to an NGO for disabled people,

He can produce 3 water jars a day; one (375L) with the cost of 50,000 Riel, and two (250L) with the cost of 35,000 Riel. He also has but his name along with his telephone numbers on the top of the water jar so that people who want to buy his jar can just call and he will deliver with his modest truck.

There are three sizes of the water jar:
- 125L = 25,000 Riel
- 250L = 35,000 Riel
- 375L = 50,000 Riel

The profit that he could make from one jar is between 5,000 Riel – 10,000 Riel. However, if the destination is near the profit can be around 3,000 – 5,000 Riel.

The high sell season is during rainy season, it is because during rainy season villager want to have more water jar to store the water as much as they could. From what he knows, some cases one house can have from 5- 10 water jars.

To make 3 water jars; one 375L and two 250L he uses: 1 and pack and a half of cement, sand, wire (5-6 thread of wire per jar).

Well drillers and water tank constructors

[Name Removed], well driller, Chbar Mon

He does this job since 1993. He buys material from Phnom Penh.

Customers include UNICEF, World Vision, LWF, Seila, other NGOs and some companies and villages.

For one well need: PVC tube, Cement, Stone, Small PVC tube, Wire, Iron, Pump.

Depth from 24m to 40m is necessary for good water.

The cost is from $1,450 to $3,000 for one well. And one well he spends 3 days with 10 people, 5 people are technicians, 2 people are transporters, and 3 people are concrete spreading. All of them have experience. Technicians earn $100-$150 per well. Transporters and masons earn $20 for each well.

He estimates that in Kampong Speu he has made around 300 wells. He says that Kong Pisei and Phnom Srouch are hard to dig.

MFIs

[Name Removed], ACLEDA Kampong Speu branch

There are a few numbers of concrete ring producers and building material suppliers who use ACLEDA's services.

Loan types: Micro Business loan, Medium Enterprise loan, Small business loan, Car loan, house rent loan, money transfer, etc (the loan types for each branch are the same as the head office).

Loan size: From the past experiences, concrete ring producers and building material suppliers get the loan size from $5,000 up to more than $10,000.

Loan term: Officially, the loan term is 24 months however; those borrowers usually try to return all the credit they took before the deadline (4 – 6 earlier as soon as they have money). Because they don't want to pay the interest rate every month which is the burden for them.

Interest rate: between 1.5% - 1.7% for the loan size from $5,000 - $10,000.

Collateral requirement: house or land title, recognition of the behaviour/characteristic from local authority, assessment of the ability to return, and agreement that recognised by local authority.

ACLEDA in Kampong Speu has worked to promote their product and service to all parts in the province. That aims to enable people have a better understanding the use and the circle of money.

He commented that through his experience with assessment for credit, most borrowers don't know about their cash flow, and they don't really have clear business plan. Those people didn't go to school and know nothing about financial issues, so they just practice their own way from others and some from their family practice. However, ACLEDA staffs assist them also would give some advice how their client should invest/ use the money in the right ways that can get benefits.

Recommendation from the Interviewee:

- Do more marketing/ promotion to other parts in the rural
- It is quite hard, because some people dare not to take risk
- Usually people farther from the town know very little about the credit and business plan
- Some old people mind-set still thinks that borrowing credit from the bank is a risky task, so they chose not to do.

[Name Removed], Branch Manager, PRASAC

Provides services to 2 concrete ring producers and 3 building material suppliers (in Krong Chbamorn).

Loan size: the amount of money which concrete ring producers and building material suppliers borrow is between $5,000 up to $10,000 or more.

Loan term: Officially, the loan term is 26 months however; those borrowers usually try to return all the credit they took within 20 months as soon as they have money. Because they don't want to pay the interest rate every month which is the burden for them. It is because people there are very responsive.

Interest rate: 1.8% for the loan size of $5,000 - $10,000 and 1.7% for $10,000 - $15,000.

Collateral requirement: Go to visit clients' house and do assessment, house or land title, recognition of the behaviour/characteristic from local authority, assessment of the ability to return, and agreement that recognised by local authority.

He said that his firm doesn't have a lot of activities and there is not any promotion like other big entity like ACLEDA. However, there is some promotion and explanation to rural business people about the credit.

He said that some of his clients know only about their monthly revenues and expenses.

[Name Removed], Branch Manager, SATHAPANA

Provides loans to 3 building material suppliers recently, there used to be 1 concrete ring producer last year, and later there is no more credit offer because the client want to get big loan size (in Krong Chbamorn).

Loan size: usually from $5,000 up to $10,000 that concrete ring producers and building material suppliers take to expand the business.

Loan term: Officially, the loan term is 24 months however; those borrowers usually try to return all the credit they took earlier before time which stated in agreement.

Interest rate: 1.8% from $2,000.

Collateral requirement: Go to visit clients' house and do assessment, house or land title, ID card/birth certification, photo (both husband and wife), recognition of the behaviour/characteristic from local authority, assessment of the ability to return, and agreement that recognised by local authority.

Department of Women's Affairs

The Administrative Manager of the local Department of Women's Affairs said that they used to get Rabbit filters from Cambodian Red Cross. But once they had sold out they didn't get any more. She stated that the filters were poor quality. One that she bought did not filter out small particles, she said.

Appendix 5 – Focus Group Discussion Notes

Masons – 1 and 2

General Information

Facilitator	Mao Savin
Assist facilitator	Aun Dany
	Sun Vannak
Observer	Sokhal
Approach	Participatory discussion using pre-set discussion guide
Date	31 August 2009
Place	Paeng Lue village, Sangkat Ror Car Thom, Khan Chbar Morn, Kampong Speu Province

Participant Details

No	Name	Occupation	# of years experience	Address	Contact
1		Mason	15 years		
2		Mason	10 years		
3		Mason	8 years		
4		Mason	15 years		
5		Mason	10 years		
6		Mason	10 years		
7		Mason	1 year		
8		Mason	15 years		

Introduction

The facilitator started by introducing the team and objectives of the discussion. The participants were then asked to introduce themselves and their experience in mason work.

After the introduction, the facilitator introduced key topics for the discussion and *split the participants into two groups* (hence we consider this to be two focus groups).

The following topics were introduced during the discussion: the masons' experience in building latrines, materials required in building a latrine, cost estimate of material and labour, the masons' views on latrine building including trends and reasoning behind the trends, the challenges they face, and if they have any suggestions or recommendation to overcome their challenges as well as to increase the availability of latrines in their communities.

Typical latrine in their area

The most popular latrines they build often in a rural community are ideal latrines with ceramic pour flush squat pan and concrete structure above the ground. **The popular size of this latrine is 1.5m X 2m.** They estimate the materials required and approximate cost as following:

Above the ground

№	Materials	Unit	Quantity	Unit Price(Riel)	Total (Riel)
1	Solid/hollow brick	Piece	1,200	120	144,000
2	Ventilation block	Piece	6	2,000	12,000

№	Materials	Unit	Quantity	Unit Price(Riel)	Total (Riel)
3	Cement	Sack	12	20,000	240,000
4	White cement				
5	Zinc roofing	Sheet	5	11,000	55,000
6	Wood	Piece	3	31,000	93,000
7	Nail	Box	3	4,100	12,300
8	Sand 1				
9	Sand 2	M3	3	25,000	75,000
10	Gravel 1x2	M3	1	28,700	28,700
11	Gravel 4x6	M3	1	28,700	28,700
12	Latrine pan with concrete slab	Unit	1	102,500	102,500
13	Latrine pan without concrete slab				
14	Floor tile	Case	2	27,300	54,600
15	Wall tile	Case	6	10,000	60,000
16	Zipon (Air flow PVC pipe)	Unit	1	12,300	12,300
17	White lime (wall paint)	Container	2	6,000	12,000
18	Red soil (wall paint)	Kg	3	3,000	9,000
19	Door	Unit	1	61,500	61,500
				Sub-total	**1,000,600**

Under the ground

№	Materials	Unit	Quantity	Unit Price	Total Riel
1	Concrete ring (4-8 rings)	Unit	5	20,000	100,000
2	Concrete ring cover	Unit	2	15,000	30,000
3	Pipe (PVC 1000mm)	M	1	4,100	4,100
Sub-total					**134,100**
Total-materials					**1,134,700**
Labour cost ($120)					**492,000**
Grand Total in (Riel)					**1,626,700**
Grand Total in (USD) : Ex. Rate= 4,100					**397**

It takes them about 5 to 7 days with 3 masons to build the above latrine. However, 3 to 4 more days is required in case of rain.

The above price is estimated based on their past experience of latrine construction, and it is subject to change according to the market price of the materials. The masons in this group seem to have a very good knowledge of building latrines. They seem to also have good relationships with building materials suppliers. For example, one of the masons (more skilled) called a material supplier during the discussion to ask for the price of a latrine pan.

Consumers normally come to masons to consult before making a decision to build a latrine for their house/family. The typical consultation is on the materials required, price estimate and labour cost. There is no cost to consult with a mason. Usually it is with a skilled mason. The masons usually have a say in material selection because of their experience in building latrines.

They mentioned that customers are clever; they usually ask masons to go with them and check a few places for quotes before making purchase.

The masons' observation on latrine building trend

All of them agreed that there has been a dramatic increase in the number of latrines. Their work driven by latrine building has also increased in the past few years. The peak time is in late 2007 and in 2008 when land price were high and many people built houses including latrines.

Though the number of house construction has since slowed; their work with latrine building remains stable or increasing.

According to their observation, they believe the following are key factors to contribute to the increase in building of latrines:

- People/villagers are better aware of the hygiene issues due to television and radio program and NGO programs in their areas.
- Having latrine at home is very convenient, especially during night time as it is quite dangerous (animal like snake in the field/jungle).
- No more forest to hide and most spare land have been properly fenced as private property and not allow going inside for defecation.

Normally, people in the villages want to build latrine and shower room together because more convenience for their daughters.

They believe more and more people want to build latrine but most of them can't afford the current latrines. If there is way to reduce cost with similar latrines they build, more people will build them.

Marketing and sales

Masons usually don't have any marketing or sales strategies. They are very passive but word-of-mouth brings them businesses. People usually go to skilled masons to bring them businesses or sometimes they get businesses through their friends or other masons. The skilled masons or chief mason will then contact semi-skilled or unskilled masons to do the job.

Challenges in building a latrine

All of them know how to build latrines through their construction work and most of them used to be workers in Phnom Penh. Usually building a latrine is much easier than building a house but some challenges they face are:

- Stones: when digging the land, there are big stones in some areas that are a problem as they don't have drilling machines. So they use more labour to dig the pit for the concrete rings (and the concrete rings are quite heavy).
- Rains: It would be the problem if there is rain while they are constructing latrine, especially in the village where most people build the latrine outside the house.
- Electricity accessibility: constructing latrine in very rural village is hard because there is no electricity to use with machine to cut tile, in some cases the constructors need to use hand and other tools to cut the tile that takes time.
- Transportation: some villages are quite far that takes a long time to travel to.

They find that latrine construction is greater in rainy season than dry season. For masons, rainy season is easy to get water access and soil condition is better to dig. For users, probably they are more difficult to defecate at field because of rain and water so this is a driving factor to force them build a latrine for convenience.

Comments from masons

- People, especially those in rural areas, are not well aware of the hygiene issues and raising their awareness about hygiene and cleanliness will lead to more people building latrines,
- If more people build latrines, they will have more jobs to do.
- Because they experienced some villages get support from NGOs, they believe subsidy by NGOs will help push people to build more latrines.

The team's observation

- This group of masons have good knowledge about latrines and hygiene issues. They are usually the first person that people come to see prior to their decision to build a latrine. They can be a good promoter with additional training in hygiene and sanitation issues.
- The masons tend to estimate prices on the high side because it is easier for them to have excess material to work with rather than wasting time when material is not available. The fluctuation of material prices also contributed to the high estimate.
- They are very willing to participate in the program because they are eager to find a stable job. With more jobs and stable condition, they agreed to work at a lower rate.

Concrete Producers

General Information

Facilitator	Mao Savin
Assist facilitator	Aun Dany
	Sun Vannak
Observer	N/A
Approach	Participatory discussion using pre-set discussion guide
Date	01 September 2009
Place	Tror Paeng Mean village, Snom Kror Puer commune, Korng Pei Sei, Kampong Speu Province

Participant detail

No	Name	Occupation	# of years experience	Address	Contact
1		Concrete producer – posts, rings, etc.	10 Years		
2		Concrete producer – posts, rings, etc.	3 Years		
3		Concrete producer Building material supplies Catering services Water supplies	10+ Years		
4		Concrete producer – posts, rings, etc.	5 Years		
5		Concrete producer – posts, rings, etc.	3 Years		
6		Concrete producer – posts, rings, etc.	10+ Years		

Introduction

The facilitator started by introducing the team and objectives of the discussion. The participants were then asked to introduce themselves and their experience in concrete producing and other business work.

During the discussion, the facilitator managed the discussion and brought in topics for discussion. The following questions/issues were brought in during the discussion.

1. Type of concrete they produce and reasoning behind
2. Description of concrete ring they produce and detail cost estimate of items they produce the most comparing to those used in latrine building
3. The use of concrete rings and trend of usage
4. Marketing and sale strategies if any
5. Challenges/difficulties in doing their businesses
6. Discussion around NGO programs in their community and how it affects their businesses
7. Discussion around new product design and their willingness to participate
8. Suggestions and recommendations

9. Any other issues/businesses

Concrete producing businesses, type of concrete and materials required

Concrete producing businesses boomed in 2007 and 2008 when people were capitalising on the high price of their land. Many houses, latrines and open wells were built and all of them mentioned that they could not cope with the high demand though materials were very expensive and the prices of concrete products were higher.

However, business has been relaxed since the beginning of this year and production has slowed down. Most of the participants' businesses presently are run mostly by their family members (family labour); only one or two external labour have been maintained due to the decrease in demand.

Another important point: they all agreed that sales of concrete rings for latrines still continue and they believe more and more people are building latrines for their households. They believe a few factors to contribute to the growth of latrine building in their community:

1. No more forest or bush to hide and rainy season makes it difficult to defecate outside in the bush.
2. More people build latrines and they follow each other. People seem to feel proud to have a nice latrine at their house.
3. People can afford to have latrine because they have additional income from their daughter's working in garment factories. Usually when they return home, they want latrines because they use to the practice of having latrine at factories.
4. The local authorities are working hard to promote sanitation, especially latrines, and they even force people to have latrines otherwise they will not issue certificate for wedding or other ceremonies (CLTS Villages).

The most common types of concrete they produce as following:

1. Concrete rings are about 60% of the total concrete products and they estimate about 70% of these are for latrines, 15% for open wells and 15% used for water tanks (water storage).
2. Concrete posts are about 20% of the total concrete products and they are used in house construction
3. Concrete pipes for drainage are about 10% of the total concrete products and they are used by factories or local authority for drainage
4. The remaining 10% includes water containers (water jars), small concrete posts, etc.

Among all concrete products, concrete rings are in highest demand so they produce more than any other. Concrete rings offer reasonably low profit margin but technically more convenient than concrete post.

The demand for concrete posts lately is very low because there are not many people building new houses. They are very heavy and difficult to produce and lift up and down. Some of the participants mentioned that they stopped producing the posts and they will not enter into the production of posts again and all agreed that concrete posts are not very profitable and require hard work.

Components for producing one concrete ring (1m x 0.5m)					
No	**Item**	**Unit**	**Quantity**	**Unit price (Riel)**	**Total (Riel)**
1	Stone	container	1.5	1,700	2,550
2	sand (big)	container	3	800	2,400
3	Wire (3 mm)	kg	1	3,000	3,000
4	Cement	kg	25	353	8,815
Sub Total					**16,765**
Worker fee per unit					2,000
Total					**18,765**

The selling price of a concrete ring (size: 1m x 0.5m) is around 18,000 – 20,000 per ring dependent on the distance of transportation to the customer.

The production costs to produce one unit of concrete ring of this size could be more expensive than the selling price. However, if they produce several (3-4) concrete rings at a time they could save some materials and those can be used to produce one concrete lid or cap with a selling price of around 15,000 riel.

Components for producing one concrete post (20 cm x 3.5m)					
No	**Item**	**Unit**	**Quantity**	**Unit price (Riel)**	**Total (Riel)**
1	Cement	Sack	1	18,000	18,000
2	Sand	Container	6	900	5,400
3	Gravel	Container	3	1,700	5,100
4	Iron bar	kg	15	2,500	37,500
Sub Total					**66,000**
Labour cost (contract)					5,000
Total					**71,000**

The selling price of a concrete post (size: 20 cm x 3.5m) is around 80,000 riel per ring dependent on the length of transportation.

The concrete post is very heavy and margin sometimes is not sufficient to cover labour and transportation. The sales of concrete post are less frequent but usually larger orders. Since the beginning of this year, new house construction has been slow, so very few sales since then.

NOTE

Typical concrete producers produce all kind of concrete products including concrete rings, concrete lids/caps, concrete pipe for drainage, concrete posts, concrete stands, water containers, etc. and many also sell building materials especially materials for latrines including ceramic pans, concrete slabs, sand, gravel, brick (hollow brick and solid brick), tiles, etc.

The origins of concrete producers are normally masons and building materials suppliers. We found many masons turn to be concrete producers. Usually, they have close business or personal relationship with building materials suppliers if they don't sell these materials, and they can get these materials for those who want to buy a complete set of latrine materials.

Marketing and sales strategies

When asked about marketing and sales strategies, the participants did not know what we were talking about. When asked about the promotion or advertising, they laughed and said they did not do any of the activities. If they do, it means they don't believe in their products.

Mostly sales are done through business/personal relationships. Usually, buyers come to the place and ask for the things they need. In a few cases, masons recommend to buyers.

Where do they source inputs/materials?

- Sand and gravel from local suppliers in the province – Prek Thnout, many quarries in the province
- Bricks can be sourced from local producers or Kandal province
- Cement, ceramic pans and tiles (wall and floor) and sometime concrete slabs are directly distributed by the upstream companies on a regular basis or order basis
- Other materials can be sourced from local larger building material suppliers with whom they usually have a close personal relationship i.e. relatives

Challenges

- Credit sales are offered to almost all customers. Usually, people do not have all the required cash to buy materials for producing a house or latrine. Credit can last as long as one year or some customers run away and never pay their debt. They all agreed that this is the biggest challenge for their business because they only get a short credit from their own suppliers (the usual term is to get new stock by paying for the previous purchase)
- Transportation: There are some cases that the concrete rings were broken because of the long distance transported and the poor condition of the road.
- Not sufficient sales to maintain their businesses. They need to hold a lot of stock plus credit sales, they can't afford to produce more.
- Material prices of inputs fluctuate a lot and it is difficult to keep up with the latest changes. Sometimes, they sell at a loss because of higher material prices.
- Lack of capital to expand their business: though almost all of them agreed that microfinance plays key role in assisting cash flow, they still site the lack of capital to expand their businesses.

Suggestions/recommendation from participants

- Provide loans without or lower interest rate to expand their businesses and solutions to reduce the risk of default from their customers is great but they don't know what to do yet at the moment
- Currently producers usually don't talk with each other if they are not related; setting up an association for knowledge and information sharing can be very good. They also express willingness to learn from other producers in other provinces
- Partnership with the NGO is their most preference option. They are happy to learn from the organisation the new product development technique and they are happy to cooperate with the organisation with a reasonable margin (little less than the current margin is ok) with regular businesses.
- They are happy to talk in further and to participate in any discussion with the organisation.

The team's observations

- The discussion was very active and it was the first time they talk to each other and some good information was shared. For example, most of them complain about similar issues especially with difficult suppliers.
- Lack of information is a key constraint they are currently facing and their business skills, especially relating to marketing, remain very weak.
- Some of them are genuine rural businessmen and they are eager to partner for growth.

Masons - 3

General Information

Facilitator	Mao Savin
Assist facilitator	Aun Dany
	Sun Vannak
Observer	Aun Heng Ly
Approach	Participatory discussion using pre-set discussion guide
Date	01 September 2009
Place	Toulsotin Village, Angporpel Commune, Kongpisey District, Kampong Speu Province

Participant Details

No	Name	Occupation	# of years experience	Address	Contact
1		Mason	19		
2		Mason	20		
3		Mason	5		
4		Mason	5		
5		Mason	9		
6		Mason	3		

Introduction

The facilitator started by introducing the team and objectives of the discussion. The participants were then asked to introduce themselves and their experience in mason work.

During the discussion, the facilitator managed the discussion and brought in topics for discussion. The following questions/issues were brought in during the discussion.

1. Type of latrines they know and build
2. Description of a good latrine and latrine they build the most
3. Materials required and estimate cost details including rationale behind their estimate
4. Latrines in their communities including trend and behaviour of their communities in building latrines
5. NGO programs on water and sanitation in their communities and how they affect their businesses or work
6. Origin of their skills in building latrines and challenges in building a latrine and latrine building businesses
7. Their overall observation on sanitation and latrine in particular
8. Any other issues/businesses

Kind of latrines they know in their community

Based on experience and their knowledge of latrine, there are 3 main types of good latrines:

1. Ceramic pour flush squat pan (the most common type used by his community)
2. Western style raised toilet bowl with pour flush (No one in their community use this because it is more expensive)
3. Western style raised toilet bowl with cistern (No one in their community use this because it is more expensive and no pipe water)
4. Dry pit latrine (not many in their community and perceived as not so clean nor hygiene).

Typical latrine in their communities

As indicated earlier, there are several types of latrine, but from their experience the most popular latrine their community build and use is the ceramic pour flush squat pan because it is easily available, cheap and easy to use.

The most common type of structure is concrete room with common size of **1.5m X 2m.** The followings are materials required and their estimate on costing details:

Above the ground:

№	Materials	Unit	Quantity	Unit Price(Riel)	Total (Riel)
1	Solid/hollow brick	Piece	1,200	135	162,000
2	Ventilation block	Piece	6	1,200	7,200
3	Cement	Sack	1	401,800	401,800
4	White cement	Kg	5	1,500	7,500
5	Zinc roofing	Sheet	4	17,000	68,000
6	Wood	Piece	4	32,000	128,000
7	Nail	Box	6	1,500	9,000
8	Sand 1	M3	1	42,000	42,000
9	Sand 2	M3	3	28,000	84,000
10	Gravel 1x2	M3			
11	Gravel 4x6	M3	1	63,000	63,000
12	Latrine pan with concrete	Unit			75,600
13	Latrine pan without concrete	Unit			
14	Floor tile	Case	2	31,500	63,000
15	Wall tile	Case	14	21,000	294,000
16	Zipon (Air flow PVC pipe)	Unit	1	6,300	6,300
17	White lime (wall paint)	Container	2	4,500	9,000
18	Red soil (wall paint)	Kg	1	4,500	4,500
19	Door	Unit	1	143,500	143,500
				Sub-total	**1,568,400**

Under the ground

Nº	Materials	Unit	Quantity	Unit Price	Total Riel
1	Concrete ring (4-8 rings)	Unit	6	22,000	132,000
2	Concrete ring cover	Unit	1	15,000	15,000
3	Pipe (PVC 1000mm)	M	1.5	10,000	15,000
4	Plastic cover	Piece	1	4,100	4,100
Sub-total					**166,100**
Total-materials					**1,734,500**
Labour cost ($150)					**615,000**
Grand Total in (Riel)					**2,349,500**
Grand Total in (USD) : Ex. Rate= 4,100					**573**

Based on their past experience, to build a latrine requires 3 masons for a period of 7 days. There is usually skilled mason and 2 semi-skilled masons or 2 labourers but they usually prefer semi-skilled masons because they can handle different tasks.

Skilled mason is usually contracted by the owner and take charge the construction. He usually makes some margin from his contract. The following detail estimate of labour cost of building a latrine:

- Skilled mason @$5/day x 7 days = $35.00
- Semi-skilled mason @$4/day x 7 days x 2 masons = $56.00
- 3 meals/day food @$2.5/person day x 7days x 3masons = $50.40
- **Total** **= $131.40**
- **Contractor margin** **=$18.60**

The contract may gain more profit if they can finish the construction earlier without any rain or stones during the period of construction. However, risk could be very high given the fact that more latrines built during the rainy season and Kampong Speu areas stones are quite common. If one or two days is delayed, the contractor may risk losing the profit.

The villagers in their community usually come to ask the mason for the detail price estimate prior to deciding to build a latrine. They also want to consult the type of latrine to be built and labour or contract cost of building by masons, so that they can prepare their budget for the complete latrine. Most of latrine owners usually do not have enough cash to build one but they still decide to build because they can get credit from material suppliers.

Sales and marketing

No effort to put on sales and marketing but people would look for them through word-of-mouth of previous owners or they get businesses from their friends, relatives and/or other masons.

The masons' observation on latrine building trend

All masons participated in the discussion expressed that the number of latrines built in their community has been increased from day to day. They estimate roughly 100 latrines have been built by them in their community in the last several years (from 2007) and they believe the following factors are contributing to the increase:

- The knowledge of sanitation is better due to media promotion of NGO programs on TV and more factories in their areas and more people especially women exposed to the practice of having latrines
- No forest or bush to hide and they need to get up in very early morning or wait until late at night. Not very convenient for them
- The people's living condition is better and people can afford to build latrines

Though the number of latrines is increasing but the number remain low compared to the number of families in the village. They estimated around 30% of their community have latrines. More people want to build latrines but they can't afford; if latrine price is lower more people will build it.

Marketing and sales

Masons don't have any marketing or sales strategies. They are very passive but word-of-mouth brings them businesses. People usually go to skilled masons for consultation prior to building a latrine and offer mason the job if reasonable. In other case, masons get businesses through their friends or other masons. The skilled masons or chief mason will then contact semi-skilled or unskilled masons to do the job.

Challenges in building a latrine

The following are obstruction when building a latrine:

- Rocky or hard soil condition
- Rain while building a latrine
- Concrete rings are so heavy and using manual lift up is very difficult
- They experience late payment by owners and some owners are not so cooperative
- Technical expertise in bringing the cost of latrine down. They think it is important to learn new techniques to build a latrine at lower cost. They will have more businesses

Comments from participants

- Masons are the first person when a person wants to build a latrine so building capacity of masons to be a promotion agent is very important to introduce or promote latrine.
- There should a stronger public campaign on sanitation especially the bad impact on health of not having a latrine at home and defecate outside
- Provide additional training to masons on technical aspects of building latrine at a cheaper cost/price
- Pool trained masons with license or so and on call to build latrine when requires
- The participated masons are happy to work with any organisations at a negotiated fees (lower fee) if the contract is on regular basis
- They are happy to discuss further on how to work together between NGOs and the private sector

The team's observation

- Ideal latrines are the only real latrines. They don't usually call dry pit latrines as latrine. No status with dry pit latrine
- The group of masons are very knowledgeable about the latrines they produce and they work in different parts of the country especially many years in Phnom Penh.

- They seem to be very enthusiastic about the progress of latrines in their community and they are very cheerful to participate with any organisations with aim to increase their work or provide them more jobs.

Masons - 4

General Information

Facilitator	Mao Savin
Assist facilitator	Aun Dany
	Sun Vannak
Observer	Aun Heng Ly
Approach	Participatory discussion using pre-set discussion guide
Date	02 September 2009
Place	Chom Car Chek village, Traeng Tror Yeung commune, Phnom Srouch district, Kampong Speu Province.

Participant Details

No	Name	Occupation	# of years experience	Address	Contact
1		Mason	1 year		
2		Mason	10 years		
3		Mason	3 years		
4		Mason	5 years		
5		Mason	5 years		

Introduction

The facilitator started by introducing the team and objectives of the discussion. The participants were then asked to introduce themselves and their experience in mason work.

During the discussion, the facilitator managed the discussion and brought in topics for discussion. The following questions/issues were brought in during the discussion.

1. Type of latrines they know and build
    10. Description of a good latrine and latrine they build the most
    11. Materials required and estimate cost details including rationale behind their estimate
    12. Latrines in their communities including trend and behaviour of their communities in building latrines
    13. NGO programs on water and sanitation in their communities and how they affect their businesses or work
    14. Origin of their skills in building latrines and challenges in building a latrine and latrine building businesses
    15. Their overall observation on sanitation and latrine in particular
    16. Any other issues/businesses

Kind of latrines they know in their community

Based on experience and their knowledge of latrine, there are 3 main types of good latrines:

- Ceramic pour flush squat pan (the most common type used by his community)
- Western style raised toilet bowl with pour flush (No one in their community use this because it is more expensive)
- Western style raised toilet bowl with cistern (No one in their community use this because it is more expensive and no pipe water)

Typical latrine in their communities

As indicated earlier, there are several types of latrine, but from their experience the most popular latrine their community build and use is the ceramic pour flush squat pan because it is easily available, cheap and easy to use.

The most common type of structure is concrete room with common size of **1.8m X 2m.** The followings are materials required and their estimate on costing details:

Above the ground:

Nº	Materials	Unit	Quantity	Unit Price(Riel)	Total (Riel)
1	Solid/hollow brick	Piece	1,500	250	375,000
2	Ventilation block	Piece	6	1,500	9,000
3	Cement	Sack	1	389,500	389,500
4	White cement				
5	Zinc roofing	Sheet	5	15,000	75,000
6	Wood	Piece	8		200,000
7	Nail	Box	7	1,500	10,500
8	Sand 1	M3	5	40,000	200,000
9	Sand 2	M3			
10	Gravel 1x2	M3	1	82,000	82,000
11	Gravel 4x6	M3	1	41,000	41,000
12	Latrine pan with concrete slab	Unit			
13	Latrine pan without concrete slab(from Vietnam)	Unit	1	24,600	24,600
14	Floor tile	Case	4	20,500	82,000
15	Wall tile	Case	7	18,450	129,150
16	Zipon (Air flow PVC pipe)	Unit	1	4,000	4,000
17	White lime (wall paint)	Container			
18	Red soil (wall paint)	Kg			
19	Door	Unit	1	61,500	61,500
				Sub-total	**1,683,250**

Under the ground:

Nº	Materials	Unit	Quantity	Unit Price (Riel)	Total Riel
1	Concrete ring (4-8 rings)	Unit	6	22,000	132,000
2	Concrete ring cover	Unit	1	15,000	15,000
3	Pipe (PVC 1000mm)	M	1	10,000	10,000
Sub-total					**157,000**
Total-materials					**1,840,250**
Labour cost ($200)					**820,000**
Grand Total in (Riel)					**2,660,250**
Grand Total in (USD) : Ex. Rate= 4,100					**649**

Based on their past experience, to build a latrine requires 4 masons for a period of 5 to 7 days. There is usually skilled mason and 3 semi-skilled masons or 2 semi-skilled masons and 1 labourer but they usually prefer semi-skilled masons because they can handle different tasks.

Skilled mason is usually contracted by the owner and take charge the construction. He usually makes some margin from his contract. The following detail estimate of labour cost of building a latrine:

- Skilled mason @$6/day x 6 days = $36.00
- Semi-skilled mason @$5/day x 6 days x 3 masons = $90.00
- 3 meals/day food @$2.5/person day x 6days x 4masons =$$60.00
- **Total** **= $186.00**
- **Contractor margin** **=$14.00**

The contract may gain more profit if they can finish the construction earlier without any rain or stones during the period of construction. However, risk could be quite high given the fact that more latrines built during the rainy season and Kampong Speu especially Phnom Srouch areas stones are quite common. If one or two days is delayed, the contractor may risk losing the profit.

The villagers in their community usually come to ask the mason for the detail price estimate prior to deciding to build a latrine. They also want to consult the type of latrine to be built and labour or contract cost of building by masons, so that they can prepare their budget for the complete latrine. Most of latrine owners usually do not have enough cash to build one but they still decide to build because they can get credit from material suppliers.

The masons' observation on latrine building trend

One of the mason reported that as of to date from the beginning of the year, he has built about 10 latrines by people's own initiatives without any subsidies.

He added that in the last 2-3 years the number of latrines in the community has increased noticeably. To applause with this statement, all other participants nodded to agree with. They elaborate several key factors as following:

- People are well aware of hygiene and sanitation through NGOs and media on radio and TV.
- People realised that it is much more convenient to have one latrine at home, so they don't have to go around the bush especially at night time and during rainy season.

- People might think about sanitation, because they start to realise how important of healthiness, they can save up some money to build a proper latrine for their basic need, rather than spending more money on doctor every month.
- The recent trend, when people build their houses they usually build latrine either attached to the houses or separate place.
- Another interesting notion they raise is that people follow each other and they believe that family with a good latrine shows social status.

They believe more and more people want to have latrines for their families but due to their lack of cash to build one they wait. If there is way to cut down cost at similar latrine standard, surely more people will build them.

Sales and marketing

No sales/marketing effort is done by masons. They laughed when talking about their sales and marketing strategies. They don't think they need to do so.

Challenges in building a latrine

Technically building a latrine is much easier than building a house or school. However, they face some issue especially if there is rain during the construction.

Digging land is also a challenge because of rocks. Rocky area is hard to dig the soil for putting the concrete rings and usually owners do not want to change location of latrine or even they agree to change, some work is already done.

To overcome this problem, they put plastic tent to cover so they can go on working without obstruction from rain.

They all said, people prefer to build latrine during rainy season because during rainy they realise how difficult to go to the field/bush, so they commit their in building a latrine. For masons, it is easier for them to build a latrine in rainy season than in dry season because they can have easy access to water and soil condition is softer though rain may obstruct them during the building.

Comments from participants

- Getting a regular work or job is tough for them as local masons and some of them have to travel to the provincial town or Phnom Penh or other provinces for work. They want to have more work to do either in constructing houses or latrines. They are willing to work with any NGO or contractor at a lower rate if the work or job is regular and stable.
- People in their community still lack of knowledge about the sanitation and their habit of going to the bush remain practical. They want NGOs and local authority to help promote sanitation awareness especially encourages people to build more latrines so that they have more work or job to do.
- Masons are happy to work with NGOs or contractors with regular work and they express strong willingness to learn more about technical aspects of building a cheaper latrine.

The team's observation

- We can conclude from the masons that, when people hear about the word latrine they refer to the ideal latrine which cost a fortune for the villagers.
- Because masons need to travel a long distance to construct the latrines/houses in their community, at the same time all kinds of goods in the areas are more expensive, the labour rates both skilled and unskilled are higher.

- There are not many skilled masons in the area and usually they engage masons from other areas such as Kampong Speu town or surrounding districts.

Masons – 5

General Information

Facilitator	Sun Vannak
Approach	Participatory discussion using pre-set discussion guide
Date	15 September 2009
Place	Andong Sla Village, Tang Krouch Commune, Samroung Torng District, Kampong Speu Province

Participant Details

No	Name	Occupation	# of years experience	Address	Contact
1		Mason	10		
2		Mason	10		
3		Mason	8		
4		Mason	15		
5		Mason	10		
6		Mason	10		

Introduction

The facilitator started by introducing the objective of EMC and WTO and objectives of the discussion. The participants were then asked to introduce themselves and their experience in mason work.

During the discussion, the facilitator managed the discussion and brought in topics for discussion. The following questions/issues were brought in during the discussion.

1. Type of latrines they know and build
2. What kind of latrines that famous for farmers that interest
3. Materials required and estimate cost details including rationale behind their estimate
4. Latrines in their communities including trend and behaviour of their communities in building latrines
5. NGO programs on water and sanitation in their communities and how they affect their businesses or work
6. Origin of their skills in building latrines and challenges in building a latrine and latrine building businesses
7. Their overall observation on sanitation and latrine in particular
8. Any other issues/businesses

Kind of latrines they know in their community

Based on experience and their knowledge of latrine, there are 3 main types of good latrines:

- Ceramic pour flush squat pan (around 10 to 15% were build in their community)
- Western style raised toilet bowl with pour flush (No one in their community use this because it is more expensive)

- Dry pit latrine (around 60 to 65% were build in their community)

Typical latrine in their communities

The most common type of structure is concrete room with common size of **1.8m X 2,3m.** The followings are materials required and their estimate on costing details:

Above the ground:

Nº	Materials	Unit	Quantity	Unit Price	Total Riel	Total ($)
1	Brick (solid)	Piece	1000	120	120,000	28.57
2	Brick (no hole)	Piece	100	120	12,000	2.86
3	Brick (hollow)	Piece	4	1000	40,000	9.52
4	Cement	Kg	500	400	200,000	47.62
5	Zinc	Piece	5	12,500	62,500	14.88
6	Wood	Piece	3	11,000	33,000	7.86
7	Nail	Box	3	1,000	3,000	0.71
8	Sand	M³	1.5	50,000	75,000	17.86
9	ស្នូក អាង	Piece	1	2,500	2,500	0.60
10	Stone 4x6	M³	1	60,000	60,000	14.29
11	Latrine (ceramic) pan with concrete slab	Piece	1	126,000	126,000	30.00
12	Floor tiles	Box	2	16000	32,000	7.62
13	Wall tiles	Box	9	10,000	90,000	21.43
14	White Lime	Bidon	2	4,000	8,000	1.90
15	វ៉ង ការ៉ូ	box	3	2500	7,500	1.79
16	Door	Piece	1	126,000	126,000	30.00
17	Small pipe	set	2	3000	6000	1.43
18	Big pipe for drainage	set	0.5	2000	1000	0.24
19	Glue	bottle	1	1200	1200	0.29
Total Price:					**1,004,500**	**239.17**

Under the ground:

Nº	Materials	Unit	Quantity	Unit Price	Total Riel	Total(USD)
1	Concrete ring	Piece	6	20,000	120,000	28.57
2	PVC 10 Cm	metre	1,5	10,000	15,000	3.57
3	Concrete Cover	Piece	2	15,000	30,000	7.14
4	Coal	Kg	5	650	3200	0.76
Total Price:					**168,200**	40.05
Labour Cost for 1 week					**480,000**	114.29
Total all Cost:					**1,652,700**	**393.50**

Based on their past experience, to build a latrine requires 3 masons for a period of from 6 to 8 days depend on soil to dig; material of farmer cannot come on time and some problem by rain. There is usually skilled mason and 2 semi-skilled masons or 2 labourers but they usually prefer semi-skilled masons because they can handle different tasks.

Skilled mason is usually contracted by the owner and take charge the construction. He usually makes some margin from his contract. The following detail estimate of labour cost of building a latrine:

- Skilled mason @$5/day x 7 days = $35.00
- Semi-skilled mason @$4/day x 7 days x 2 masons = $56.00 or
- Labourer mason @$3/day x 7 days x 2 masons = $44.00
- 3 meals/day food @$2.5/person day x 7days x 3masons = $52.5
- **Total** **= $131.5**
- **Contractor margin** **= - $11.5**

1 latrine sometime use 2 skilled mason and 1 Labourer and some use 1 skilled mason and 2 labourers.

  - For the price 120 $ this the masons said that the farmers pay the food (lunch) every day depend agreement between owner and masons.
  - If the owner digs the hole by themselves the mason take fees only 350,000 riel = 83.33$ for no wall tile and 400,000 riels = 95.23$ for wall tile.

The estimate of the price of mason is material and fees (size 1.8m* 2.3m) = 370$ and real calculation 393.50$

Some of mason has experience from Thailand and Phnom Penh.

The contract may gain more profit if they can finish the construction earlier without any rain or stones during the period of construction and have enough material for building. However, risk could be very high given the fact that more latrines built during the rainy season and Kampong Speu areas stones are quite common. If one or two days is delayed, the contractor may risk losing the profit.

The villagers in their community usually come to ask the mason for the detail price estimate prior to deciding to build a latrine. They also want to consult the type of latrine to be built and labour or contract cost of building by masons, so that they can prepare their budget for the complete latrine. Most of latrine owners usually do not have enough cash to build one but they still decide to build because they can get credit from material suppliers.

The masons' observation on latrine building trend

All masons participated in the discussion expressed that the number of latrines built in their community has been increased from day to day (but less than years 2008). they believe the following factors are contributing to the increase:

- The knowledge of sanitation is better due to media promotion of NGO programs on TV and more factories in their areas and more people especially women exposed to the practice of having latrines
- No forest or bush to hide and they need to get up in very early morning or wait until late at night. Not very convenient for them
- The people's living condition is better and people can afford to build latrines

All mason said that is compare to the year before 2007 is increasing of latrine building but if compare with years 2008 is less than 2008 because:

  - the farmers don't have more money like 2008
  - High pressure on the land in 2008
  - Good economic in 2008 how ever all material in 2008 is highest price the farmers still have money to build.
  - Global crisis on financial for 2009

  - less income in 2009

- In Andong Sla Village there are 70 to 75% they have latrines because awareness of CLTS promoted but only 10 to 15% use the Ceramic pour flush squat pan and 60 to 65% they use Dry pit latrine (the most common type used by his community).
- In Thmey Village they have build toilet only 5 to 10% in this Village because of no CLTS promoted.

Marketing and sales

The masons have strategy to motivate someone who can contact the customer and agree to build latrine with them. They will give commission to that person 5000 to 10,000 riels per Toilet. They are very passive but word-of-mouth brings them businesses. People usually go to skilled masons for consultation prior to building a latrine and offer mason the job if reasonable. In other case, masons get businesses through their friends or other masons. The skilled masons or chief mason will then contact semi-skilled or unskilled masons to do the job. Most of mason work is when they build the latrine always have contact from farmers (neighbour) they come to see the toilet after they ask the price or let the masons calculates the price and agreed to build they toilet at the meantime also. and other way the masons promote the important of Latrine using and promote the cheapest price of material that is a good way farmers interested.

In the future if have some NGO rent them ask daily work for them. They can discount from 20,000 to 18,000 riel per day. And for NGO to build or install toilet spend time only 2 hours they take only 6000 riels per toilet.

Challenges in building a latrine

The following are obstruction when building a latrine:

- Rocky or hard soil condition
- Rain while building a latrine
- Lack of material for mason
- Concrete rings are so heavy and using manual lift up is very difficult
- They experience late payment by owners and some owners are not so cooperative
- Technical expertise in bringing the cost of latrine down. They think it is important to learn new techniques to build a latrine at lower cost.
- Their technical skills is not advanced because they never join the technical training school and they always develop from worker or labourer to semi skills mason and become skilled of mason.
- Some farmers take only good skilled mason like Vietnamese mason.
- Some mason to be good skilled mason if they do this job everyday but if they seldom one by one they can't prepare well of latrine.

Comments from participants

- Masons are the first person when a person wants to build a latrine so building capacity of masons to be a promotion agent is very important to introduce or promote latrine.
- There should a stronger public campaign on sanitation especially the bad impact on health of not having a latrine at home and defecate outside
- Provide additional training to masons on technical aspects of building latrine at a cheaper cost/price

- Pool trained masons with license or so and on call to build latrine when requires
- The participated masons are happy to work with any organisations at a negotiated fees (lower fee) if the contract is on regular basis
- They are happy to discuss further on how to work together between NGOs and the private sector

Observations

- For dry pit latrines the farmers always build by themselves because they understood from CLTS
- The group of masons are very knowledgeable about the latrines they produce and they work in different parts of the country especially many years in Phnom Penh and Thailand.
- They seem to be very enthusiastic about the progress of latrines in their community and they are very cheerful to participate with any organisations with aim to increase their work or provide them more jobs.

Masons - 6

General Information

Facilitator	Mao Savin
Assist facilitator	Aun Dany
	Sun Vannak
Observer	Aun Hengly
Approach	Participatory discussion using pre-set discussion guide
Date	02 September 2009
Place	Som Phan village, Tang Krouch commune, Somrong Tong district, Kampong Speu Province

Participant Details

No	Name	Occupation	# of years experience	Address	Contact
1		Mason	1.5 years		
2		Mason	7 years		
3		Mason	0		
4		Mason	0		
5		Mason	0		
6		Mason	2 years		
7		Mason	0		
8		Mason	0		

Introduction

The facilitator started by introducing the team and objectives of the discussion. The participants were then asked to introduce themselves and their experience in mason work.

After the introduction, the facilitator introduced key topics for the discussion and split the participants into two groups. The masons' experience in building latrines, materials required in building a latrine, cost estimate of material and labour, the masons' views on latrine building including trend and reasoning behind the trend, the challenges they face, and if they have any suggestions or recommendation to overcome their challenges as well as to increase the availability of latrines in their communities.

Typical latrine in their area

There are not many skilled masons in the village; also there are very few families that can afford to build a pour flush squat pan. Sam Phan village is one of the CLTS villages that many households have dry latrines which look quite old.

The most common type of structure is concrete room with common size of **2 X 4m** which has the bathroom, however there are very few as the living condition is quite poor**.** The followings are materials required of both Pour Flush Latrine and Dry Latrine, and their estimate on costing details:

Pour Flush Latrine

Components for latrine for 2 X 4m size					
No	**Item**	**Unit**	**Quantity**	**Unit price (Riel)**	**Total (Riel)**
1	Latrine-pan (ready installed=0.8 m)	Unit	1	($15) 61500	61500
2	Brick	Piece	1,000	150	150,000
3	Cement	Pack	12	19,000	228,000
4	Fine sand (small) (self transportation)	m3	2	30,000	60,000
5	Sann (big) (Self transportation)	m3	2	30,000	60,000
6	Zinc (2.4 m)	Sheet	8	8,000	64,000
7	Stone 1, 2	m3	3		100,000
8	Paint	Kg	8		82,000
9	Wood	m3			156,000
10	Air flow pipe (Si Fong)	m	1	4,000	4,000
11	Pipe (PVC 100mm)	m	1	4,000	4,000
12	Concret ring	Unit	4	18,000	72,000
13	Nail	Kg	1	5,000	5,000
	big head nail	Box	4	800	3,200
14	Concret ring lid	Unit	1	15,000	15,000
15	Pipe (pour water out from bathroom)	m	2	2,000	4,000
16	Door	Unit	1	80,000	80,000
Sub-total					**1,148,700**
Masons fee					350,000
Total cost					**1,498,700**

It takes them about 5 days, with 3 masons to build the above latrine.

Dry Latrine

No	**Items**
1	4 Columns (wood from local natural resource)
2	Wall (wood from local resource)
3	Zinc
4	Nail
5	Door (all kinds of wood that can be used)
Estimate cost is around 50,000 Riel. Generally, dry latrine doesn't require a lot of material that is very cheap, and people can build by themselves or just need labour to dig land.	

The above price of both pour flush latrine and dry latrine are estimated based on their past experience from the latrine constructors, and it subjects to change according to the market price of

the materials. The mason in this group seems to have a low skill and lack of knowledge in building latrines.

The masons' observation on latrine building trend

Even though people in CLTS village people have better awareness of the sanitation that they build dry latrine rather than going to defecate in the field, their understanding and practice is still very limited.

- People/villagers are better aware of the hygiene issues due to television and radio program and NGO programs in their areas.
- Having latrine at home is very convenient, especially during night time as it is quite dangerous (cruel animal like snake in the field/ jungle).
- No more forest to hide and most spare land have been properly fenced.

Normally, people in the villages want to build latrine and shower room together because more convenience for their daughters.

They believe more and more people want to build latrine but most of them can't afford the current latrines. If there is way to reduce cost with similar latrines they build, more people will build them.

Challenges in building a latrine

All of them know how to build latrines through their construction work and most of them used to be workers in Phnom Penh. Usually building a latrine is much easier than building a house but some challenges they face as follows:

- The lack of skills and knowledge: Masons in their village are quite poor and term of knowledge of how to build a good latrine and hygiene awareness, it is because those mason don't have opportunities to go out to work like other masons in other areas.
- Stones: when digging the land, there are big stones in some areas that are struggles as they don't have drill machine. So they use more labours to dig the land to put the concrete rings and the concrete rings are quite heavy.
- Rains: It would be the problem if there is rain while they are constructing latrine, especially in the village that most people build the latrine outside the house.

Comments from masons

- People especially those in rural areas are not well aware of the hygiene issues and raising their awareness about the hygiene and cleanliness more people will build latrines,
- If more people build latrines, they will have more jobs to do.
- Even though almost every household has the dry latrine, those latrines were poorly built.
- People in their village are lazy; they don't use all the local natural resources which already have in the village and they don't have to pay.

The team's observation

- Masons seems have low skills of building latrine.
- The ways that villagers practice is still traditional, even the ways they build the dry latrine
- The dry latrine is poorly built, it is because the villager don't feel good about their dry latrine, as the result they seems not taking care much about the cleanliness and the environment around their poor latrine.
- Both the masons and the villagers have very limited awareness about the hygiene

- There are long and tall reed along the way to the latrine that almost block the latrine, and the latrine was built quite short that difficult to get in. One of the masons told that, because the villagers don't want other people to see their poor latrine and that might not smell good.

In this CLST village, though many household have dry latrine, but there haven't any upgrade of the latrine to the pour flush water yet. It is because villager can't afford to build the expensive one, or because they ignore or their bad habit.