Final Report: Developing and Testing Innovative WASH Approaches in Ethiopia

June 2016

Photo Credit: iDE (International Development Enterprises) The photo depicts iDE-trained businesses manufacturing and curing latrine slabs.

ABOUT WASHPLUS

WASHplus project supports healthy households and communities by creating and delivering interventions that lead to improvements in WASH and household air pollution (HAP). This multi-year project (2010-2016), funded through USAID's Bureau for Global Health and led by FHI 360 in partnership with CARE and Winrock International, uses at-scale programming approaches to reduce diarrheal diseases and acute respiratory infections, the two top killers of children under age 5 globally.

RECOMMENDED CITATION

WASHplus, 2016. Final Report: Developing and Testing Innovative WASH Approaches in Ethiopia. Washington D.C., USA. USAID/WASHplus Project.

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This report is made possible by the generous support of the American people through the United States Agency for International Development (USAID) Bureau for Global Health under terms of Cooperative Agreement No. AID-OAA-A-10-00040. The contents are the responsibility of the WASHplus Project, implemented by FHI 360 with CARE and Winrock International as core partners. The contents are the responsibility of FHI 360 and do not necessarily reflect the views of USAID or the United States Government.

ACRONYMS

CLTS	Community-led Total Sanitation
HCD	Human Centered Design
iDE	International Development Enterprises
SNNPR	Southern Nations, Nationalities and Peoples Region
USAID	United States Agency for International Development
WASH	Water, Sanitation, and Hygiene
WRP	Whitten & Roy Partnership

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EXECUTIVE SUMMARY

This report was prepared by iDE as part of an effort to develop a sanitation marketing approach to stimulate local markets to provide sustainable sanitation solutions in rural Ethiopia. This report details the work done on refining sanitation products and business models, researching pit collapse issues, developing sales management strategies, and implementing trainings conducted for business and sales agents. It also includes challenges encountered, opportunities, and next steps in scale-up.

In the final six months, we were able to build a successful sanitation market in the project *woredas* (districts) with businesses and sales agents actively selling and households actively buying hygienic sanitation products. This should result in improved health and wellbeing for households in the project area as well as increased income for local businesses and sales agents.

The total sales figure of 400 latrine slabs starting in June 2015 reinforces the findings of our sanitation pilot project, namely strong latent demand and households' willingness to purchase more aspirational latrines in rural Ethiopia.

Within the nine-month period, iDE:

- refined the existing latrine product and developed three product designs that suit the needs of households in terms of transportation, affordability, and aspiration (desirability);
- conducted a deep dive assessment on pit collapse issue and developed a product prototype through the human-centered design approach (HCD).
- refined the business model, especially determining ideal price points for products that ensure affordability for households, as well as attractive margins for sales agents and manufacturers to maintain their businesses;
- designed a sales agent engagement strategy and developed marketing materials; and
- recruited and trained additional businesses and sales agents in each woreda in the four regions.

Overall, the project was successfully completed with all activities accomplished. Field testing and pit lining activities were somewhat challenging, as the rainy season made movement difficult around the villages. The findings of the project serve as the foundation for strategies for scaling-up sanitation marketing in rural Ethiopia, and iDE has developed a plan for next steps toward broader regional scale-up. Recommendations include those for products, business models, promotional strategies, and partners to develop a successful rural sanitation marketplace.

INTRODUCTION

Between February 2, 2015 and October 31st, 2015, with support from USAID's WASHplus project and the Vitol Foundation, iDE implemented a project to scale-up rural sanitation marketing in rural areas of four regions of Ethiopia. This project built on the success of iDE's UNICEF-funded pilot project to continue developing markets for sanitation by:

1. Continuing to develop and refine the design of the latrine products (pit liner and slab) as well as the business model for sales and delivery of the latrine;
2. Developing sales training and marketing materials for sales agents and manufacturers.

We have found that in the phase following a sanitation marketing pilot project, investing the right groundwork to prepare for scale pays huge dividends down the road. This involves:

- Ensuring the product developed in the pilot meets the needs of customers in the broader scale-up area, and refining as necessary
- Similarly refining the business model to ensure the right balance of affordability for households and profitability for latrine producers and sales agents
- Developing the written, verbal, and visual tools that will help sales agents and producers to market and sell the latrine products, particularly by focusing on households' needs rather than the product itself (human-centered sales)
- Training and coaching producers and sales agents on sales skills and the use of sales tools, as well as establishing the right staffing structure within iDE's field team to ensure producers and sales agents are supported throughout scale-up

iDE used HCD to prototype three latrine slab options to address pit collapse. Further, iDE improved the business model using human-centered sales to develop sales and marketing tools to engage latrine producers and sales agents. In doing so, we have laid the groundwork for widespread scale-up of sanitation markets in rural Ethiopia.

1. PROJECT ACTIVITIES

1.1 Refine latrine product prototypes

iDE used several rounds of prototype testing for new and existing product development through building, testing and learning. The **prototyping process involves** iterative cycles of brainstorming, prototyping and user testing to develop a product or service. The team worked through three rounds of prototyping for latrine slabs, which were informed by the preferences of villagers around latrine designs; knowledge and use of basic latrine parts; and methods used to transport, move and install their slabs. The key deliverable was a set of product designs with technical specifications for latrine slabs.

Prototyping process: Four new latrine slab product designs were presented to families for prototype testing in the first round. The prototype development builds on the previous market development study (more information here).

Product Features

1. Split Slab: This product's technical specifications are similar to the existing latrine slab except that it is split into three parts. This product design is developed to address transportation issues for households living far from the point of production. The base version of this slab type is a simple pit latrine with a hole cover and sealed vent. When a household has enough cash to purchase the ventilation pipe, they would simply take the seal off the vent and install the ventilation pipe, which then upgrades the slab to a VIP latrine. This is beneficial as households tend to install the slab upon delivery and are able to use it while they save for a ventilation pipe.

Specifications: The slab is 120cm in diameter, has a 4.5cm outer thickness and a 4cm inner thickness for drainage. A 50cm-long rope on all joints ties the slab together for installation. Once installed, the openings are sealed with cement to avoid any gaps where dirt could accumulate.
Price: between ETB 330-368 (US $16-18) without ventilation pipe but including commission of sanitation advisors and profit for manufacturers.

2. Small Oval Slab: This option offers households a latrine slab at a very low price. It is designed to be used with a wooden slab. Households would plaster the rest of the wooden slab with mud once they have installed the small slab. Besides its affordability, the slab is easy to wash without spoiling the wood. It also has very good drainage, and it is easy to cover the hole to protect flies.

Specifications: Slab weighs around 20kg, is 5cm thick, and is reinforced with 6mm diameter wire rod.
Price: between ETB 80-100 (US $4-5)

3. Slab with Ceramic Pan: This product option offers households an aspirational pour flush toilet in areas where water supply is sufficient (e.g. near woreda towns).
Specifications: 80cm x 80cm square slab, ceramic pan, with thickness of 5 cm, reinforced with 8mm rebar
Price: estimated between 400 – 450 (US $19-22) Ethiopian Birr.

4. Slab with Tire: This product option incorporates a used car tire and small concrete slab that fits in the center of the tire. The product is durable while utilizing less concrete and offers an alternative to wood. The slab is placed directly on the dug pit.
Specifications: Total diameter is 120cm. Slab diameter is 60cm, reinforced with 6mm wire rod, footpads, and squat hole similar to previous iDE design.
Price: estimated between ETB 300-350 (US $14-17)

These products were tested in four regions, the Southern Nations, Nationalities and Peoples Region (SNNPR), Tigray, Amhara, and Oromia). Feedback was further synthesized to modify the products. In total, three rounds of testing have been conducted and the products were finalized afterwards and production training provided to manufacturers.

Learning from prototype testing[1]

First round learning: Results of first-round testing indicated that most households prefer a slab that can cover the pit and has no additional cost associated with the substructure. Households dig their pits with a diameter of around 1m and the split slab has diameter of 1.2cm. Therefore it perfectly covers the pit without additional material. In addition, for those households who live far from the woreda center, it is easy to load and transport.

Some households preferred the small slab because it is affordable, easy to transport, and can be installed on their existing latrine. The slab is also aesthetically pleasing besides its functions. However, households preferred the size of the drop hole to be bigger to allow ease of targeting and better cleanliness.

[1] More information on the tools used to gather feedback from households on prototypes is included as Annex 2.

With the tire slab, households like the fact that it is big and can cover the pit. However, they feel that it is not stable and might be scary for children to use. They also suggested that it might not be easy to clean and dirt might accumulate between the slab and the tire.

Second round learning: After feedback was collected from the first round, modifications were made on the product according to customers' desires. Some of the changes include; size of drop hole for small slab, rope for tying the split slab, and thickness. After second round testing, the tire option was dropped because most households disliked the fact that it is not sanitary and can be difficult to install.

In this round, the split slab was modified to have rope built inside the slab to tie the slab together once installed to increase stability. The slab is then sealed with cement mix to cover any gaps in the slab. The slab was also offered with or without ventilation pipes to give customers options at different price points. Most would prefer to have the ventilation pipe installed in the future when they can afford to buy it.

For the small slab, the size of the drop hole was increased and given an oval shape to make it easy for households to use without messiness, which is especially suitable for children.

The size of the ceramic pan slab was increased to 1m x 1m to enable households to install the slab without any reinforcement (wooden logs). This actually reduces reinforcement costs for households.

Third round learning: Third round feedback was collected to make final changes to the designs. Generally, small modifications were made in this round on factors such as drainage, sharpening edges and the like, which led to finalizing the products.

Final recommended product options presented for households:

- Circular slab with 120cm diameter, 4.5cm outer thickness and 4cm inner thickness, in two configurations (one piece or split for ease of transportation)
- 1m x 1m slab with ceramic pan
- Small oval slab with 5cm thickness

These product options are all available for purchase by households. However, it is important to indicate that when prototype tests were done, preferences varied by region as each differs in terms of culture, geography, raw material availability, etc. Based on these preferences, manufacturers in all regions were trained on the original slab, the split slab (requires minimal additional metal dividers), and the regionally preferred prototype.

Regionally preferred prototypes were as follows:

- Tigray: Ceramic pan, good for areas near woreda and water access
- Oromia: Oval slab
- SNNP: Split slab, good for reaching remote areas
- Tire slab: Not desired; eliminated as an option
- Original slab: Preferred overall

Overall, the original slab was still vastly preferred product since it is easy to install and reuse. Second was the split slab, which is a variation on the original slab that allows for easier transport.

Sales by Slab Type			
Original Slab	**Split Slab**	**Oval Slab**	**Ceramic Pan Slab**
349	36	5	10

The following are some of the factors that affect differences in demand within and between the regions:

- Source of income: in areas where farmers grow cash crops (especially in SNNP and Oromia), farmers have more stable year-round income sources
- Cultural differences: in some cultures, there are more "early adopters," where in other cultures some people are hesitant to adopt a new technology until they see others using it first
- Geography: population density and remoteness of the *kebele* (a ward or neighborhood) from the woreda have an effect on the size of the market in a given area

Next steps in the process

Mold design and manufacturing

Three different mold designs for the recommended products were developed and sent to the manufacturing workshop for fabrication. The molds have simple designs and can be made at a local woreda metal workshop. For the split slab, manufacturers will only need to add a bit of additional metal to the molds they're already using, meaning additional cost to produce this option is low.

Manufacturer training

Manufacturers were trained on the new product designs and provided with new molds. In total, 20 manufacturers in eight woredas of SNNPR, Tigray, Amhara, and Oromia regions have been trained. The training includes both practical and theory sessions. In addition, manufacturers are trained on price calculations, measurements, working with sales agents, and promotion techniques. The training included a one-day introduction and 2-3 days of practical sessions. After that, manufacturers are asked to produce five slabs each for certification. Based on the quality of production, the manufacturers are certified and recognized by iDE and enter into a contract. The contract is entered to allow iDE control quality standards, price setting, quality of raw materials, deliveries and the like. It does not control however such things as number of sales, to whom they sell or market size, and producers are free to continue selling after the contract with iDE has expired.

Input Costs

The following details the input costs for the various materials that go into the products. These prices often fluctuate according to differences in region and season. The price below is based on average costs of materials in SNNP, Oromia, Amhara and Tigray regions. The price usually increases the further the regions are from the capital city (Addis Ababa). Reinforced iron bar is the most expensive raw material used in manufacturing the slab.

Cost of raw materials across the regions												
No.	**Item Name**	**Unit of measurement**	**Price in Birr and *USD***									
			Addis Ababa		**SNNPR**		**Tigray**		**Amhara**		**Oromia**	
1	Rebar 8 mm diameter	piece = 12 m	110	*5.50*	130	*6.50*	125	*6.25*	140	*7.00*	140	*7.00*
2	Cement	50 kg	140	*7.00*	150	*7.50*	140	*7.00*	150	*7.50*	160	*8.00*
3	Wire rod	kg	33	*1.65*	35	*1.75*	35	*1.75*	35	*1.75*	35	*1.75*
4	Black wire	kg	35	*1.75*	40	*2.00*	40	*2.00*	40	*2.00*	40	*2.00*
5	Sand	M^3	400	*20.00*	320	*16.00*	320	*16.00*	450	*22.50*	340	*17.00*
6	Gravel	M^3	500	*25.00*	500	*25.00*	500	*25.00*	500	*25.00*	500	*25.00*
7	PVC	Pcs = 75mm diameter & 6m long	140	*7.00*	150	*7.50*	150	*7.50*	150	*7.50*	160	*8.00*

Tested selling price

In a market-based approach, material and non-material costs must be transferred to consumers for a business to be profitable and thus sustainable. Therefore, in addition to the materials and labor costs, profit for the producers and commission to the sales agents must also be included. Ultimately, producers operate as independent businesses; they are not owned or controlled by the project and are subsequently free to set their own prices. The project did not fix prices but rather tested a retail price based on the price calculations outlined in the following table. Actual profit margins will vary and prices will fluctuate based on changing input costs, accessibility of labor, and competition within the marketplace. Labor costs vary from producer to producer; workers are usually paid on a daily basis. The cost ranges from 70 to 200 Birr per day depending on experience and skill of the laborer. Labor rates are slightly higher than the usual rate. Labor costs were determined through working with the producers who felt it necessary to provide a higher rate to their workers for the more specialized sanitation products offered in the project.

		Split slab		**Small slab**		**Ceramic slab**	
No.	**Item Name**	**Birr**	***USD***	**Birr**	***USD***	**Birr**	***USD***
1	Manufacturing cost	239	*11.95*	48	*2.40*	315	*15.75*
2	Profit	80	*4.00*	20	*1.00*	80	*4.00*
3	Commission	30	*1.50*	30	*1.50*	30	*1.50*
Selling price (Average)		**349**	***17.45***	**98**	***4.90***	**425**	***21.25***

1.2 Refining the Business Model

The business model developed hypothesizes what customers want, how they want it, as well as how a business can organize to best meet those needs, get paid for doing so, and make a profit. The business model is meant to represent core aspects of the sanitation business including sales strategies, promotion strategies, price, and delivery mechanisms. The previous model linked the household to the manufacturers (businesses) with direct door-to-door and group sales tactics managed through trained sales agents, use of market day promotions and promotional tools, and a number of delivery options to families.

The refinement process involved working thoroughly on redesigning sales agent engagement strategies (identification, selection, recruitment, training, and commission structure), determining best price to

optimize affordability and cash flow for businesses and sales agents, and ensuring marketing materials resonate with customers and are usable for sales agents.[2]

For this process, iDE teamed up with Whitten & Roy Partnership (WRP), a globally renowned sales training firm whose contribution has been critical to the success of iDE's flagship sanitation marketing program in Cambodia. Their input has been valuable to the refinement of the business model in Ethiopia, as well.

A. Price

One area that needed refining in the business model was the price. It is very crucial and yet very difficult to find a price point that is affordable for households with enough margin for manufacturers and sales agents to be motivated to continue producing and selling latrines.

WRP's findings during their first round in-field investigation indicated lack of motivation among sales agents and manufacturers because of low commission rates and minimal profit margins. Under the previous model, sales agents received US $0.40/slab and manufacturers made a profit of US $1.50-2.40/slab. This sometimes resulted in order delays from producers and sales agents dropping out.

In response to this, various pricing models were tested to find the sweet spot of affordability and profitability to ensure that demand remains high while businesses and sales agents are still motivated to sell. After such investigation, the recommended commission rate for sales agents was US $1.50/slab and profit margin of US $4.00/slab.[3] It was also possible to prove that the prices were suitable/affordable for households as more than 400 slabs were sold in three months, even though the sales started during the rainy season, when households have little disposable income.

B. Sales Agent Engagement Strategy

Further findings of WRP indicated that sales agents lacked sales skills. Sales conversations were focusing on the product first, whereas iDE has learned that approaching the conversation from the point of the customers' needs is more effective. Further, agents had little training and struggle with territory management. In addressing the findings, the team developed and delivered successful sales agent engagement strategies.

As a result, iDE has redesigned the sales conversation to be more human centered. The goal is to individualize and personalize the problems of not having a hygienic latrine and demonstrate to households that the slab is a solution to their problems. As such, the sales conversation becomes problem centered and not product centered.

iDE designed and delivered a system of in-class and in-field trainings followed by weekly coaching. This was also supported by the creation and delivery of training materials, including sales tracking tools, promotional tools and coaching tools. Sales tools and sight sellers were improved to reflect contextual and real-life situations to help sales agents to more effectively market the product. In addition, a sales management structure was designed to outline how iDE staff works with the sales agents.

The territory management strategy helps sales agents in grouping of households for sales presentations targeting the low hanging fruit first. The existing cell system (kebeles are grouped into cells – 50 to 60 households are in one cell) also contributes positively to grouping households for sales presentations. In addition, increasing the number of sales agents, their working days, clearly defining sales management roles,

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[2] Further information about the business model is included in Annex 1, including detail on demand across the product types and regions and sales agent evaluation/retention.

3 $1.00 for the smaller slab, as the investment in time and materials is lower. Although this difference in margin could result in producers being less likely to make the oval slab, this hasn't panned out in practice, as producers built slabs in response to customer demand.

designing weekly check-in calls, and personal conferences all were part of the territory management structure that was created.

C. Marketing Materials

When designing the marketing materials, it was important to make sure that tools are easy to use and simultaneously comprehensible for customers. Previous sales tools mainly focused in promoting the product and lacked the sense of local context.

The new sales tools (sight sellers) focused on the user's problem of not having a hygienic toilet and the costs of the problem, making sales conversation more human centered and not product centered. To design all marketing materials, local graphic designers and photographers were hired and sent to the field to capture the real local context of people's lives and latrines. The pictures and the sales conversations designed were then combined to develop sight sellers and other marketing materials like posters and banners. All materials are translated into local languages for the four regions.

In general, the marketing materials include: sight sellers, manuals with sales conversations for sales agents, record books, posters, and banners. Other promotional items designed are bags, t-shirts and umbrellas for sales agents and sometimes to be used by health extension workers. Pictures of bags, t-shirts and umbrellas are included as Annex 3. The main purpose of the branding is to identify the individuals as sanitation advisors, but there hasn't been a brand fully developed for the latrine products yet as iDE has done in other programs. This will require a substantive assessment due to the cultural and language diversity in rural Ethiopia, and iDE will explore branding more thoroughly in the scale-up phase.

1.3 Recruiting and Training

Additional sales agents and businesses were recruited and trained after the refining the business model. Refresher training for the existing sales agents and businesses was also provided. The recruitment process started in SNNP region and continued to the rest of the regions consecutively. The process followed a set of steps including posting an advertisement with clear criteria, a written exam (more like an application explaining why they want the job), followed by an interview with iDE staff and WRP staff. In total, 80 sales agents were recruited and trained.

Sales training was conducted with WRP's in-field consultant, iDE's marketing expert, and iDE Global WASH staff. The training included a two-day classroom session followed by in-field training and coaching. The training content focused on developing sanitation advisors' sales skills, including approaching and connecting with families, using a problem-led sales approach, how to use sales tools, and closing sales. Follow-up coaching was also conducted in the field while sanitation advisors were actually on the job. This included advising and guiding them through each presentation to families on what went well and what could be improved.

Sales incentives and sales tracking: Designing sales targets for each sales agent was also part of the training, in which sales targets for three months were outlined with input from the sales agents themselves to determine realistic numbers. For each sales target achieved, sales agents were rewarded with certificates and phone credit. This was supported by a well-designed sales tracking tool developed by the team. Sales agents were required to record the number of presentations, sales numbers and delivery numbers on their record books, which could then be shared with iDE WASH staff. The staff collected the sales data weekly and reported to the iDE Ethiopia office to be registered on the master record book capturing all sales data from all regions.

After the sales training, sales agents began to sell in their kebeles. The team continued weekly check-ins, personal conferences, and in-field observations to make sure targets were achieved. The WRP team also

trained the iDE team on fundamental sales skills, managing attitude, coaching, and supporting sales agents down the line.

Training Businesses: Sixteen businesses were trained on new product designs and business models. Businesses were trained on technical aspect of production, mold production, setting prices, working with sales agents and managing territories.

1.4 Pit Lining

Continuing from the deep dive assessment on pit collapse issue, the team worked on further investigations to address this problem, which occurs in some areas of the project regions. Factors contributing to pit collapse include the landscape, soil texture and climate, e.g. heavy rains (high water tables), which can all affect the durability of latrine pits and discourage households to build a new toilet. Based on the following lessons learned from the pit lining deep dive, iDE will identify areas where pit lining may be necessary within the geographical areas chosen for scale-up. Once these areas are known, we can begin to assess willingness to pay and a potential business model for including a pit lining product option and/or providing training or advice to households on producing their own pit lining.

Before testing different pit lining solutions, iDE's technical team spent three months studying the root cause of pit collapse by digging eight pits with different shapes and sizes in different locations of two kebeles (four pits in each) of the East Badewacho woreda (SNNPR). The Woreda Health Office had previously identified a serious pit collapse problem in these two kebeles (Ajeba chelfo and Bulgita), which is why they were selected for the study. The test was conducted partly in the dry season and partly in rainy season to help understand the impact of each. Feedback from field was collected and analyzed every 15 days.

Results found

- The pit collapse problem is mainly due to a weak formation of soil (black loamy soil). In most of the tested locations in the two kebeles, the weak soil formation is found starting from an average depth of 1m - 1.2m below the ground.

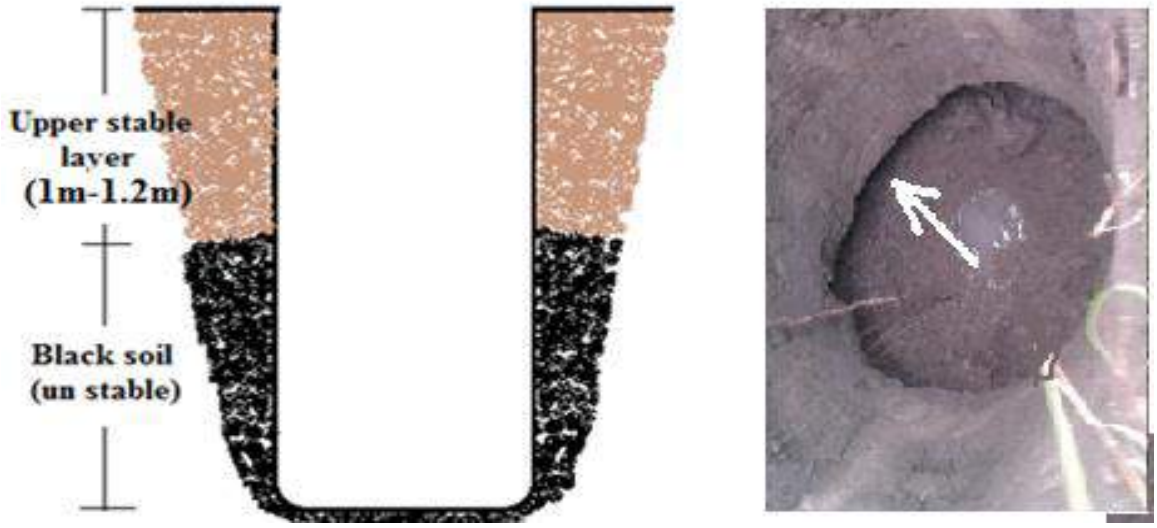


Figure 1: Soil formation of Ajeba chelfo and Gera Bulgita kebeles

- The pit collapse starts from the bottom and ascends upwards in both kebeles, unlike other locations where collapse starts from the top and descends to the bottom.

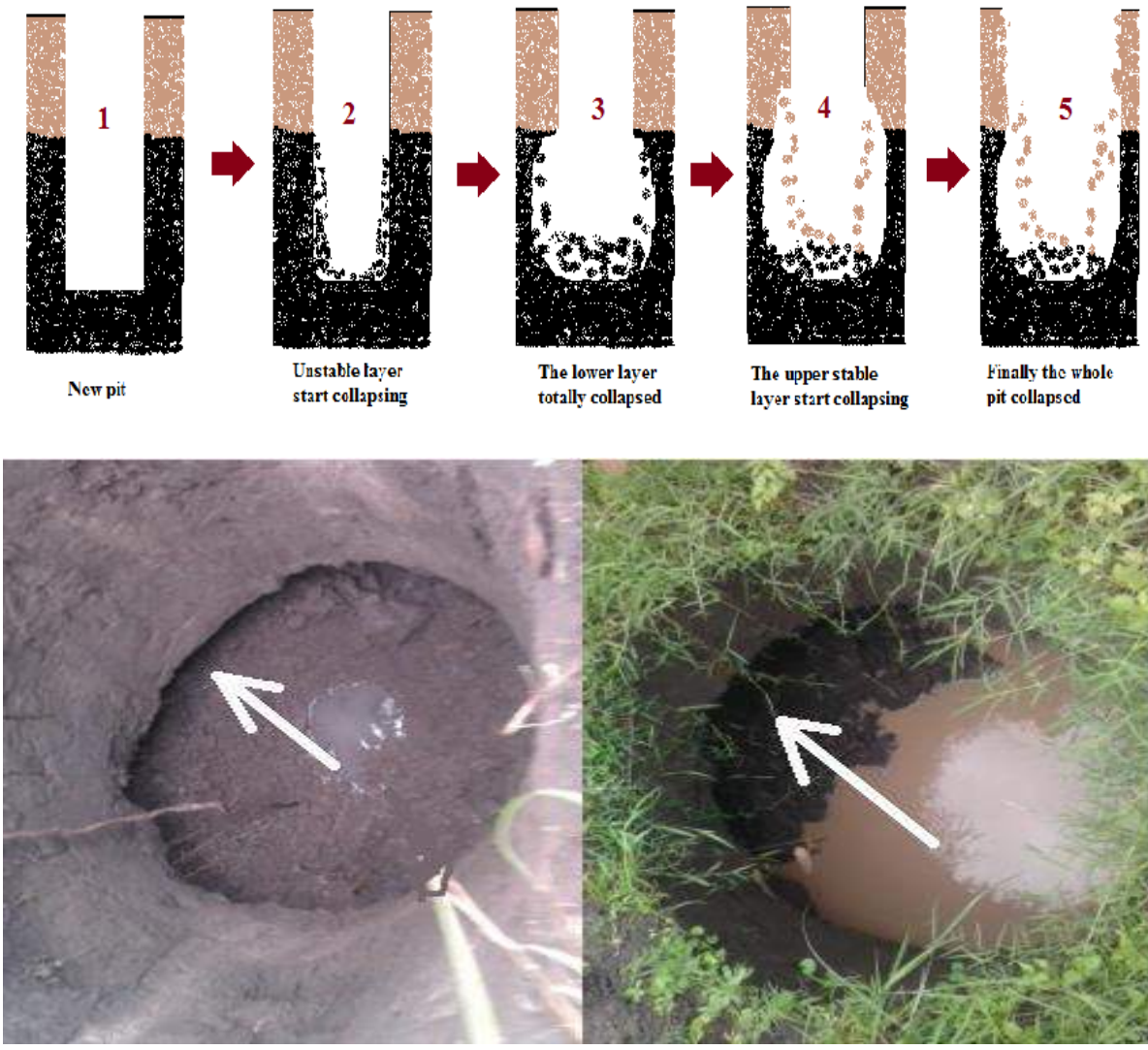


Figure 2: How pit collapse happens

- High water table can cause pit collapse in specific places.

The field test that was conducted to identify the cause of pit collapse demonstrated that the lack of quality soil plays a strong role in collapsing pits. To prevent pits from collapsing due to poor soil conditions, iDE tested different solutions that ranged from varying the shape, size (width and diameter) and depth of the pit to prototype different pit lining materials.

A. Testing pits with different considerations

I. Circular vs. Rectangular Pit

Circular pits are more stable because of the natural arching effect of the ground around the hole and because there are no sharp corners to concentrate stresses. Additionally, circular pit linings are very stable and can be made relatively cheaply. In iDE's test, rectangular pits started collapsing only a week after the rainy season started, while circular pits lasted a month. While a few households preferred to dig square or rectangular pits because they are easy to dig and resemble building domestic houses, most households had already discovered that round pits are more stable than rectangular ones.

II. Inclined or "V" pit vs. Straight pit

Our test proved that inclined pits last twice as long as straight pits in areas having pit collapse issues. The problem that iDE discovered, however, is that V-shaped pits are usually difficult to dig because they require a basic understanding of geometry and do not allow the person digging enough space to move as the pit narrows with depth.

Figure 3: pit with different shapes

III. Testing pits with different size

Our field study indicated that apart from the shape, size also influences pit stability and the risk of collapse. Pits with small diameters are more stable than pits with large diameters. In areas of unstable soil, it is recommended to compensate the volume by digging pits deeper rather than making them wider.

IV. Testing pits with different depth.

The maximum depth iDE tested in the field was 3m. Our field test result in the two kebeles showed that 3m pits have almost the same lifetime time as 2.5m and 2m pits with the same shape. That said, pits should not be made too deep in areas with serious soil stability issues, as a pit collapse during the excavation may have dangerous consequences for the people digging.

B. Prototyping pit linings solutions

Our field test indicated that the pit lining should be round and that the material used should be easily available and affordable. Accordingly iDE tested the following pit lining options.

I. Wood

Wood is one of the most easily accessible materials in the two kebeles. To line a pit with a depth of 3m and a diameter of 1m, we used approximately 10 pieces of eucalyptus wood with a diameter of 100 mm at bottom. We proved that building a wall out of wood using this method can overcome the problem of pit collapse, but the process is time-consuming. It is difficult to position cross-struts to provide a proper retaining wall, and the structure is prone to rotting. Moreover, households would have to invest about 600 Birr to build the wood pit lining.

II. Used oil drums

Used or empty oil drums can be purchased from the nearby woreda town, are easily installed, and can resist the load from collapsing soil to prevent pit collapse. Before installation, the bottom plate must be removed and small holes must be made on sides for liquid to infiltrate. Due to corrosion, a used oil drum only works for one pit (not easy to re-use) and the price of one piece of used oil drum is 400 Birr.

III. Used tires

Due to growth of the construction sector in Ethiopia, there is a huge surplus of used truck tires in the scrap market, namely "Gomma tera". Before installing the tires as a pit liner, we cut them to size (widely available size is 1m diameter and 0.3m width) and trimmed the edges. Used tire liners are easy to install and not susceptible to corrosion. The price per meter for a 1m diameter tire is about 270 Birr in the Gomma tera market.

IV. Cement soil Mixture

Results from field tests in both Ajeba Chelfo and Bulgita kebeles indicated that the top 1 - 1.2m of soil is stable and has a property of clay. As such, iDE's technical team decided to test a soil-cement mixture as a potential pit lining. We utilized used oil drums as a mold by filling and compacting the sides with a dry soil-cement mixture combined with a small amount of water. The first prototype was very successful and overcame the problem of pit collapse. As a result, we favored this technique over the three methods discussed above because it is easy to build (can be built by local artisans living in the kebele), it is not expensive, easy to access, the structure is stronger, and it is not exposed to corrosion or rotting.

Figure 4: soil cement mixture pit lining

Setting cement to soil ratio

The next step was coming up with an appropriate cement to soil ratio. Accordingly, we tested different ratios ranging from 1:5 to 1:12 (soil to cement) and finally decided that a 1:10 ratio is strong enough and economical enough given that we only need to line a soil profile subjected to pit collapse problem only.

Making molds

On the first circular prototype, we learned that the used oil drum mold could be difficult to remove because it has grooves on its sides. As a result, we decided to make a ring with a diameter of 1m and width of .3m from a sheet metal with 2mm thickness shown in the figure below.

Figure 5: mold for pit lining

2. ACCOMPLISHMENTS

Within the project period we accomplished all of the project objectives, which were to:

- refine the existing latrine product and develop three product designs to suit the needs of households in terms of transportation, affordability and aspiration (desirability)
- conduct a deep dive assessment on pit collapse and develop a product solution through prototyping using the HCD
- refine the business model, especially determining the best prices for the products that are affordable for households and attractive for sales agents and manufacturers to maintain their businesses;
- design a sales agent engagement strategy and develop marketing materials
- recruit and train additional businesses and sales agents in each woreda in the four regions
- sell 400 slabs to households through the designed model and more than 1,400 slabs indirectly (for institutions).

In addition, a number of job opportunities were created because of the establishment of the sanitation businesses. Local government staff (i.e. WASH experts, health extension workers) received capacity building training and continuous coaching on how to manage the business model. Households now benefit from a range of latrine options for their families in closer proximities, which was not the case before.

3. CHALLENGES AND OPPORTUNITIES

Some of the challenges encountered during the project period were:

- Prototyping activities were affected because the rainy season made movement in the villages difficult for testing and talking to households.
- Sales started in June, coinciding with the start of the rainy season, which put a lot of burden on spending for households. This was somewhat reflected on the sales numbers. Since September, we are observing that sales are picking up, which will continue until harvest time.
- The local government provides little support, as the sanitation marketing approach is new, and they are still in the learning process.
- The regions are geographically dispersed, which made the management of the four regions somewhat difficult.

Despite the challenges faced, the project helped iDE to set the stage for much broader regional scale-up of sanitation marketing. As we prepare for scale-up some of the opportunities presented include:

- Primarily, the continued strong sales through this project reinforced our previous finding that there is high demand for improved latrines and willingness among households to purchase them. This bodes well for project scale-up.
- The strong position we're in to build markets for sanitation presents us with an opportunity to work within the broader context of health and nutrition development in rural Ethiopia. We are interested to learn how sanitation marketing can be leveraged alongside other interventions, such as community-led total sanitation (CLTS) and integrated approaches to nutrition, to promote the health of rural Ethiopians and achieve our mission of eliminating death and illness from diarrheal disease.

4. NEXT STEPS FOR SCALE-UP

Scale-Up Activities and Sales Expansion (First 12 months)

Having completed most of the refinement activities, the next step in the process is to expand sales. Rather than growing sales in all regions at the same time, however, it is recommended to begin with SNNPR because it has the highest number of sales to date. From there, we can work through the rest of the regions gradually. The purpose of focusing on one region first is to ensure that sufficient resources are placed into the area targeted for scaling so that a sustainable market is created. The regions are geographically dispersed, which would make sales management very challenging as we expand. In expanding sales, we will be managing a larger number of sales agents, a larger staff, and more woredas and kebeles.

It is recommended that the first year focus on ramping up and gradually expanding sales activities in preparation for a full scale-up by Year 2. The recommendation for first six months of the scale-up project is to conduct a range of preparation activities including recruiting more staff, training more sales agents and producers, and conducting research on appropriate government roles in sanitation marketing. This should be implemented in four to six woredas and will serve to stimulate penetration of a rural sanitation market, facilitate development, and build capacity of all stakeholders in implementing a sanitation marketing program at national level. iDE currently has funding to support this stage through March 2016, and we are actively seeking funding to support full scale-up.

Based on the sales figures to date in Ethiopia and iDE's experience scaling sanitation markets in other countries, we have developed latrine sales targets for a five-year scale-up project with a $5.5 million project budget. This level of funding is anticipated to support a sales force of 64 agents across eight woredas in two regions. Based on the total market size of 253,735 in eight selected woredas in SNNPR and Oromia (households in the woredas lacking an improved latrine), such a project could achieve 76,121 latrine sales in five years benefiting more than 380,000 people (based on a household size of five). Additional funding would allow the project to expand linearly the geographical reach and market and, subsequently, total latrine sales.

Cost-effectiveness considerations

In considering cost-effectiveness, iDE's experience has shown that market development often requires more upfront investment in R&D, value chain development, and training of businesses and sales agents, all of which are necessary for a solid foundation upon which exponential sales growth can happen.

The chart below shows average cost per latrine based on iDE's actual program expenses and total latrines sold across three of iDE's sanitation marketing programs. The figure also shows periods of upfront investment, during which significant investments are made in R&D and hiring. Notably, the trend shows that sales grow exponentially in the aftermath of these investments, while per-latrine program costs stabilize at very low levels. iDE expects similar patterns of investment in Ethiopia, increased efficiencies in reaching scale, and a smoothing out of the cost curve over time. Given the need for improved latrines in target geographies, as well as iDE's prior experience, we also expect a similar trend in sales growth to hold with new investment, which will allow for increased geographic reach and greater market penetration in the areas where the investment is made. Additionally, considerations of cost-effectiveness should include the "effectiveness"

piece of cost-effectiveness. Households continuously use improved latrines when the products are well-designed and well-marketed. This is in comparison with some of the known challenges of other approaches like CLTS, which show high levels of reversion. When considering cost-effectiveness, program managers and policymakers should consider the life-cycle cost of specific interventions, and not just the immediate cost per toilet at time of intervention. Evidence of the differences in life-cycle costing between sustainable versus temporary sanitation solutions can be seen in both research from IRC WASH and WSP's Economics of Sanitation Initiative.

Product Design

The sales results validate the user preference for the original slab design. However, activities from this project have allowed for other designs to be available to those who may have other constraints or needs. Any further design research should focus on investigating additional complementary hygiene products.

Business Development

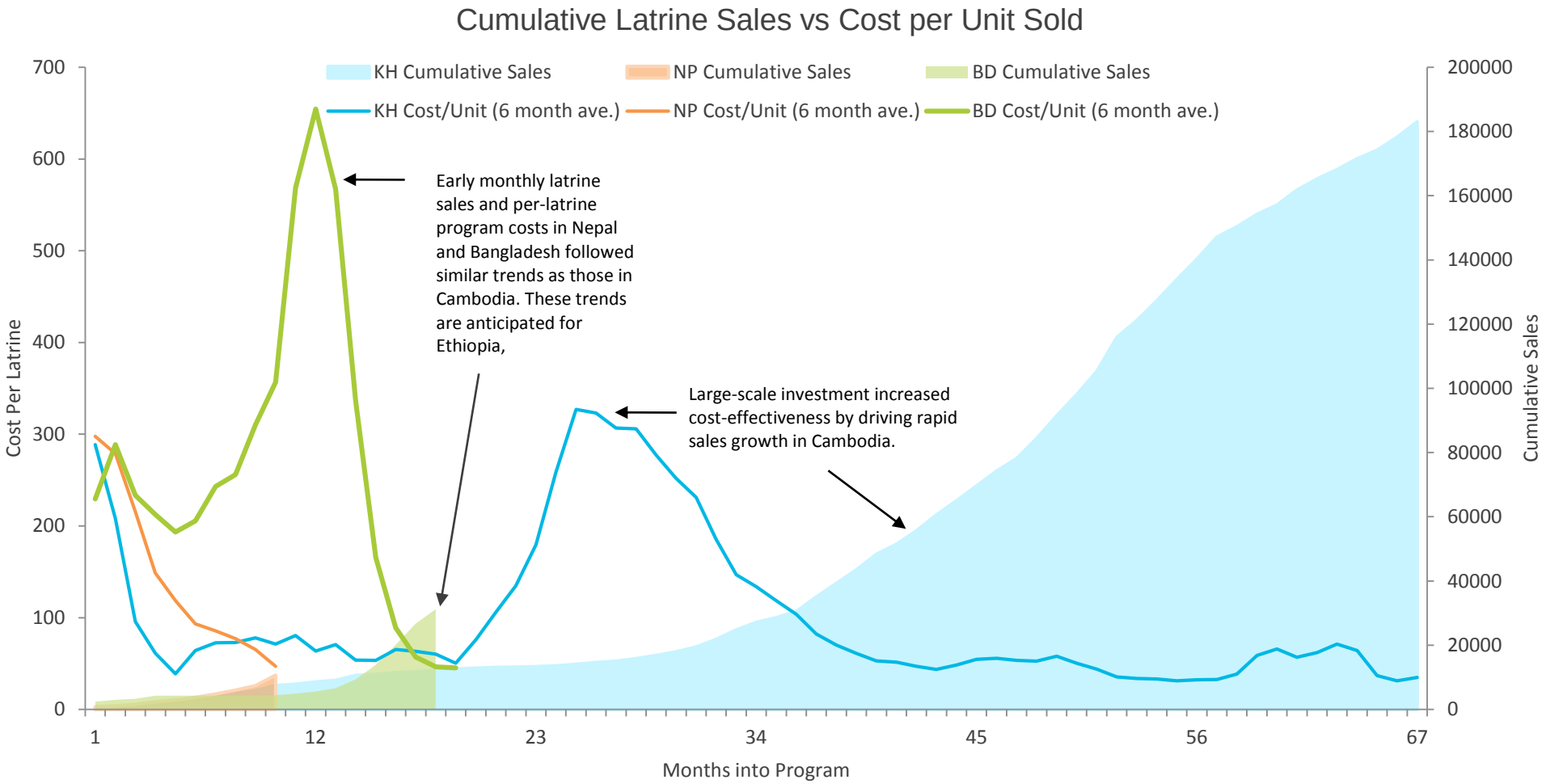
The project should continue to support and monitor the activities of the businesses in each woreda. Support should include further business management and sales training, testing of financing options for businesses, customer satisfaction surveys, and further experimentation and monitoring of sales activities. The project should identify other potential businesses in other woredas, using the recommended identification and engagement strategies.

Technical and business training

Training curricula should be further modified, and linkages to external training providers explored. This includes general sanitation and hygiene knowledge and product functions, features, and maintenance training so that businesses and sales agents are well prepared to answer questions from customers and negotiate a sale.

Stakeholder Learning and Engagement

Government agencies and officials should be engaged to discuss and agree on institutional arrangements for full-scale project implementation. In particular, efforts should be made to engage government officials and their technical counterparts to participate in further business model development. Moreover, further research should be conducted to better understand the intricacies of government structure and capacity in order to identify appropriate ways for government to support market development efforts.



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ANNEX 1: SUPPLEMENTARY INFORMATION ON LATRINE SALES

Consumer preferences and slabs sold

Product Preferences	Slab sales by type: • original slab (349) • split slab (36) • ceramic pan slab (10) • oval slab (5) Most people prefer the bigger slabs because they cover the pit fully and do not require any supporting structure. They are easy to install, use and re-use when households dig new pits. The ceramic pan slab is usually preferred in kebeles close to woreda towns, which have better access to water. This is most preferred in the Tigray region. The split slab is presented for households that live in kebeles that are distant from the woreda towns, as it is easier to transport than a full slab. The oval slab is sold in Oromia region, as incomes tend to be lower, and people are looking for a more affordable option.
Previous latrine status	From our deep dive study and small assessments after that, it can be inferred that almost every household has an unimproved latrine. Because of the government's CLTSH approach, every household is forced to build one from locally available materials. The people who decide to purchase slabs are those who desire an improved latrine as well as those who have filled pits and are preparing themselves to dig new ones.
No. of sales by region	Regional breakdown of the 400 slabs sold: • 186 in SNNP • 163 in Tigray • 28 in Amhara • 23 in Oromia From this it can be seen that sales agents in SNNP and Tigray are more active than the other regions. In fact, the sales in the other regions started a little late; however, the wide difference can explain that their active engagement has a big influence on sales.
Demand across sales territories	The following are some of the factors that affect differences in demand within and between the regions: • Source of income: in areas where farmers grow cash crops (especially in SNNP and Oromia), farmers have more stable year-round income sources • Cultural differences: in some cultures, there are more "early adopters," where in other cultures some people are hesitant to adopt a new technology until they see others using it first • Geography: population density and remoteness of the kebele from the woreda have an effect on the size of the market in a given area

Sales agent performance and attrition

WASH PROMOTER: East Badewacho Woreda	June															
	1-5				8-12				15-19				22-26			
	1				2				3				4			
	# of Days Worked	Present-ations	Sales	Deliv-eries	# of Days Worked	Present-ations	Sales	Deliv-eries	# of Days Worked	Present-ations	Sales	Deliv-eries	# of Days Worked	Present-ations	Sales	Deliv-eries
Kebele 1 W.Lalo																
SA1 **Muluken**	3	13	1	0	3	28	5	1	3	37	7	2	3	31	5	0
SA2 **Wondimu**	2	0	0	0	2	12	2	0	2	28	5	2	2	12	2	1
SA3 **Medhanit**	2	2	0	0	2	22	2	0	2	35	1	0	2	23	3	0
Weekly Totals		15	1	0		62	9	1		100	13	4		66	10	1

Table 1: Sample sales agent record book

This is an example of record book from June 2015, just when sales started in one woreda in SNNP region. The number of presentations each sales agent makes depends on how many days they are willing to work. As the weeks went by, not only did the number of presentations increase, but so did sales. This could have resulted from: 1) sales agents gaining experience with closing sales and benefitting from more coaching support; 2) As sales increase, the incomes of sales agents increase, which creates more motivation; 3) More households want to make orders because their family members or neighbors have bought the product; and/or 4) Marketing of the product through promotional materials such as posters and banners, health extension workers, and market day promotions.

Sales are divided among the various sales agents based on their kebeles. There are 3-4 sales agents in one kebele. After completing their sales training, these sales agents are asked to consult with each other and divide up the village to define their territories. (Normally there is a government structure at the village level that geographically divides up the village).

Obviously, though, there are high performers and low performers among the sales agents. Coaching support is usually focused on the low performers; however, we also team up the low performers with high performers to share experiences. Overall, our experience in the four regions showed that latrine purchases resulted from very active sales agents and close collaboration of sales agents and manufacturers.

Attrition of sales agents

Out of the 80 sales agents trained, 62 are still functional. As of the final report, however, we are replacing some of the dropouts in the south through a small scale-up project we are doing.

Sales is a very challenging job, especially as marketing of sanitation products is new in Ethiopia. Because of this, sales agents have to deal with a lot of rejections, which discourages them from continuing. In addition, sometimes agents have to travel long distances, spend a lot of time with households, repeatedly visit the same household, and the like. Some might not find the incentive is sufficient compared to their effort.

ANNEX 2: RESEARCH GUIDE FOR PROTOTYPING

Part I

Household information

i. Name ----------
ii. Gender ----------
iii. Age ----------
iv. Household size ----------
v. Kebele ----------
vi. Income source ----------
vii. Size of land ----------
viii. Livestock ----------

Part II

What we are testing

i. How to transport it
ii. Installation ease
iii. Convenience of the hole for children
iv. Convenience of the hole for women to urinate
v. Appropriate position of the foot pad
vi. From where people want to buy the slab
vii. Weight, material and appearance of the hole cover
viii. Ventilation pipe
ix. Estimated price

Part III

Questions we ask

i. What do you think about this slab

- Likes and dislikes
- Why do you like/dislike it?
- How would you clean it?
- Is it comfortable to transport and install? Why?
- Features to add or reduce from the slab
- Can it be made better?

ii. What do you think about the hole shape?
- Size
- Ease of use, for kids to squat on, for women to urinate

iii. What do you think about the hole cover?
- Weight
- Strength
- Ergonomic shape and height convenience of the handle
- Is it easy for kids to play with? If so, how we can prevent them playing with it?

iv. Foot pads
- Ask households to squat on foot pads (especially kids and women)
- Is it comfortable? (height of the pad, angle, size and position of the slab relative to the hole)
- How we can make it better?

v. Ventilation
- Is ventilation important?
- If using the pipe for ventilation, how would you install it in the shelter, address leakage issues, and how tall should it be?
- Is it convenient to reuse/install pipe when building new toilet?

vi. Price and Place

- How much are you willing to pay for slab? (If too low, ask about mobile phone price and lifespan vs. slab, communication vs. health, how much is their health worth?)
- From whom/where do you prefer to buy the slab?

ANNEX 3: SANITATION ADVISOR MARKETING MATERIALS

POLO SHIRT

BAG

UMBRELLA