Microfinance increases latrine uptake in rural Cambodia

*Results from a randomized controlled trial*

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OU WaTER Conference
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1. Background on iDE Cambodia WASH program
2. Study motivation and design
3. Impact of financing on latrine sales – RCT results
4. Implications and recommendations
Background on WASH Program

- Sanitation Marketing Pilot Project in Cambodia: 2009-2011
- Sanitation Marketing Scale-Up (SMSU): 2011-2014
- Designed a latrine that is:
  - Affordable – Costs between 35 and 50 USD
  - Accessible – Packaged latrine set is home-delivered
  - Aspirational – Off-set pour-flush latrine, the most desired design
- Began in two provinces, has since expanded to eight provinces across Cambodia
Main Components of Sanitation Marketing Model:

- Identify and recruit small to medium-sized concrete manufacturers, called Latrine Business Owners (LBOs)
- Train these LBOs to make sanitary latrines
- Help LBOs recruit and train a sales force
- Provide follow-up support as sales increase and LBO expands

Above-ground portion of the sanitary latrine. Latrine is enclosed in a bamboo shelter.
There are two types of sales pitches: group and individual.

Both pitches focus on the aspirational aspects of the latrine, including convenience and pride.

Sales messages are based on user insights research.

Group sales first, then follow-ups with individual households.
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Motivation for financing study

Main Finding from July-Aug 2012 study
• ~20% of HHs willing to buy at market price

Unanswered questions
1. Is low WTP at market price due to cash constraint or low demand?
2. Can financing be a cost-effective intervention to increase sales?
3. How does financing fit into larger strategy to reach open defecation free status?

Randomized Controlled Trial on impact of financing on sales
• Run in northern scale-up province to compare to July study
• Use “gold standard” study design to accurately capture effect of financing on latrine uptake
Objective
Compare willingness to pay for latrines using cash on delivery model versus MFI loan.

Methodology
• Randomized controlled trial methodology. Randomization done at the village level.
• Used experimental Becker-deGroot-Marschak (BDM) game to determine each respondent’s exact willingness to pay for a latrine. The BDM game requires winners to buy the latrine, which ensures respondents give us accurate responses.
• Study done in 30 villages: 15 cash on delivery, 15 MFI loan in Kampong Thom province.
• VisionFund Cambodia was the MFI partner.

Analysis
Compare willingness to pay for latrines for cash on delivery model versus MFI loan.
Appendix 1: BDM Captures Willingness To Pay for a Product

Typical BDM interaction

1. Respondent is asked her maximum WTP for a product.
2. Respondent draws a random price.
3. If price drawn greater than stated WTP → Respondent CANNOT buy product.
   If price drawn less than stated WTP → respondent MUST BUY at price drawn.

Prices for Latrines in US Dollars: $20, $30, $40, $50
Study protocol in each village

1. Village census
2. Baseline survey
3. Group sales pitch
4. Individual sales (using BDM Game)

- Training by iDE’s sales consultants
- Sales follow iDE approach
- Financing info at steps 3 & 4
# Sales Pitch and Latrine Ordering Process

## Control Group (Cash on Delivery)
1. Give standard iDE sales pitch
2. Enumerators play BDM game with respondents
3. Winning respondents **order a latrine**
4. Pay for latrine **on delivery**

## Treatment Group (MFI Loan)
1. Give standard iDE sales pitch, **with slight modification explaining VF loan**
2. Enumerators play BDM game with respondents
3. Winning respondents **apply for VF loan**
4. Respondents approved for loan order a latrine
5. Pay for latrine **over 12 months**
Sampling strategy
Maximizing internal and external validity subject to VisionFund constraints

Sampling strategy:

1. Restrict to 1 province due to operational constraints
2. Randomly select 30 villages in Kampong Thom (similar to other provinces in northern Cambodia)
3. Randomly choose 15 villages to receive financing and 15 to be non-financing
4. Randomly select 50 non-latrine owners per village, stratified by ID Poor status:
   • 35 non-ID Poor HHs
   • 15 ID Poor HHs
Treatment and control groups are balanced at baseline

<table>
<thead>
<tr>
<th></th>
<th>Non-Financing Villages</th>
<th>Financing Villages</th>
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<tbody>
<tr>
<td>% ID Poor*1</td>
<td>25.5%</td>
<td>23.1%</td>
</tr>
<tr>
<td>Median baseline latrine coverage*</td>
<td>30.0%</td>
<td>22.4%</td>
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<tr>
<td>Average market price*</td>
<td>48.00 USD</td>
<td>47.25 USD</td>
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<tr>
<td>Market price variation*</td>
<td>(42.50 USD, 57.5 USD)</td>
<td>(40.00 USD, 53.75 USD)</td>
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<tr>
<td>SM exposure</td>
<td>1st time (Sweep 1)</td>
<td>1st time (Sweep 1)</td>
</tr>
<tr>
<td>Payment</td>
<td>At delivery</td>
<td>12-month MFI loan</td>
</tr>
<tr>
<td># of Villages</td>
<td>15</td>
<td>15</td>
</tr>
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</table>

* Differences are not statistically significantly different

1 ID Poor is the official poverty line in Cambodia
Agenda

1. Background on iDE Cambodia WASH program

2. Study motivation and design

3. Impact of financing on latrine sales – RCT results

4. Implications and recommendations
Financing dramatically increases sales at most prices

Effect of MFI Loan on Demand Curve for Latrines
Based on 1377 observations from 30 villages taken in February and March, 2013

The x-axis indicates the price of the latrine in USD. The y-axis indicates the fraction of households willing to buy. Gray bars indicate 95% confidence intervals, computed using clustered standard errors. 28 treatment observations above 100 USD not shown. Treatment data include only principal loan amount.
Financing causes a FOUR FOLD increase in sales at market price.

Difference is statistically significant at the 1% level.

Dotted bars indicate 95% confidence intervals.
Financing effectively targets BPL households at market price

Uptake of Latrines at Market Price With and Without an MFI Loan
Broken down by ID Poor status

Fraction of Households Willing to Buy at Market Price

Without MFI Loan (Cash on Delivery)
- ID Poor
- Non-ID Poor

With MFI Loan (Principal Amount Only)
- ID Poor
- Non-ID Poor
Financing dramatically increases sales for BPL households

Effect of MFI Loan on Demand Curve for Latrines: ID Poor Households
Based on data from 374 observations taken in February and March, 2013

The x-axis indicates the price of the latrine in USD. The y-axis indicates the fraction of households willing to buy. The gray area indicates the 95% confidence interval, computed using clustered standard errors. Observations in the MFI Loan group include only principal loan amount. 7 observations above 100 USD are not shown. ID Poor is the official poverty line in Cambodia.
Financing reduces sales and marketing cost per latrine sold by 70%*

* Reflects some assumptions about component costs.
Agenda

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Financing has tremendous potential to increase latrine uptake **without** subsidies:

- Financing creates a **FOUR FOLD** increase (12% → 50%) in latrine sales **at market price**
- Financing decreases marketing and sales cost-per-latrine sold by as much as **70%**
# Key components of study results

## Key Components of Cambodian Context

1. **Rural supply chains** — pre-existing rural supply chains allow LBOs to make and manufacture latrines inexpensively

2. **Strong MFI presence** — Cambodians are already comfortable with MFIs and willing to take out a loan

## Key Components of Operational Model

1. **Dedicated MFI staff** — allows easy coordination between sales and MFI teams on the ground

2. **On-site credit approval** — allows quick turnaround of loans and coordination with LBO

3. **Full-time sales team** — well-managed, salaried sales team ensures consistent penetration into rural markets
Next Steps

- Work with MFI partners to scale-up sanitation financing across SMSU project areas
- Use responsive impact evaluations to address other questions in iDE Cambodia WASH program, e.g. impact of offering shelter product, optimal bundling of WASH products, or testing different sales models
- Look for other areas (e.g. other countries in south or southeast Asia) with key characteristics that make sanitation financing work
The SMSU program is funded by the Bill and Melinda Gates Foundation and the Stone Family Foundation with technical support from the Water and Sanitation Program of the World Bank (WSP).

Special thanks to VisionFund for serving as the MFI partner in this study.

The latrine financing model described here builds on previous work by PATH and iDE in Cambodia.

Witten and Roy Partnerships (WRP) developed the sales strategy and tools in the SMSU program, with support from Triggers.
Thank you.
Appendix 2: Financing terms and BDM structure

**Financing Terms**

1. VisionFund social loan package – 2.8% interest per month
2. Declining or balloon balance with monthly payments over a 12 month period
3. Group liability

**BDM Structure w/ Financing – goal to mimic direct sales approach**

1. Client educated on financing package during group and individual sales pitch
2. Client states desired maximum monthly installment payment (as per terms above)
3. Client randomly draws a monthly payment from envelope. If drawn price is lower than bid price, must buy; if drawn price higher than bid, cannot buy
## Appendix 3: WTP Estimation Using BDM

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<th>Benefits:</th>
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<tr>
<td>▪ BDM incentivizes respondent to exactly state their maximum willingness to pay (Davis &amp; Holt, 1993)</td>
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<td>▪ Test screening effects – how usage varies by WTP, conditional on price paid</td>
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<tr>
<td>▪ Test sunk cost effect – how usage varies with price paid, conditional on WTP (e.g., do subsidies decrease usage, all else being equal?)</td>
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<td>▪ Smaller sample size compared to other methods (e.g. take it or leave it)</td>
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<td>▪ Test whether getting a latrine impacts episodes of diarrhea, conditional on WTP</td>
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<th>Drawbacks:</th>
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<td>▪ Explaining mechanism to population with/little formal education</td>
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<td>▪ May cause respondents to systematically underbid relative to TIOLI (Berry, Fischer, Guiteras, 2011)</td>
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<tr>
<td>▪ Rules of BDM game must be binding, i.e. winning respondents <em>must</em> purchase the product</td>
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