

*Health Policy and Planning*, 31, 2016, 1193–1199

doi: 10.1093/heapol/czw051

Advance Access Publication Date: 19 May 2016

Original Article

OXFORD

# Using microfinance to facilitate household investment in sanitation in rural Cambodia

**Kimberley H Geissler,<sup>1,\*</sup> Jeffrey Goldberg<sup>2</sup> and Sheila Leatherman<sup>3</sup>**

<sup>1</sup>University of Massachusetts School of Public Health and Health Sciences, Amherst, MA 01003, USA, <sup>2</sup>Office of Water, Bureau for Economic Growth, Education, and Environment, US Agency for International Development, Washington, DC, USA and <sup>3</sup>Gillings School of Global Public Health, University of North Carolina, Chapel Hill, NC, USA

\*Corresponding author. 715 North Pleasant Street, Amherst, MA 01003, USA. E-mail: [kgeissler@umass.edu](mailto:kgeissler@umass.edu)

Accepted on 7 April 2016

## Abstract

Improved sanitation access is extremely low in rural Cambodia. Non-governmental organizations have helped build local supply side latrine markets to promote household latrine purchase and use, but households cite inability to pay as a key barrier to purchase. To examine the extent to which microfinance can be used to facilitate household investment in sanitation, we applied a two-pronged assessment: (1) to address the gap between interest in and use of microfinance, we conducted a pilot study to assess microfinance demand and feasibility of integration with a sanitation marketing program and (2) using a household survey ( $n=935$ ) at latrine sales events in two rural provinces, we assessed attitudes about microfinance and financing for sanitation. We found substantial stated intent to use a microfinance institution (MFI) loan to purchase a latrine (27%). Five percent of current owners used an MFI loan for latrine purchase. Credit officers attended 159 events, with 4761 individuals attending. Actual loan applications were low, with 4% of sales events attendees applying for a loan immediately following the event (mean = 1.7 loans per event). Ongoing coordination was challenging, requiring management commitment from the sanitation marketing program and commitment to social responsibility from the MFI. Given the importance of improving sanitation coverage and concomitant health impacts, linking functional sanitation markets to already operational finance markets has the potential to give individuals and households more financial flexibility. Further product research and better integration of private vendors and financing modalities are necessary to create a scalable microfinance option for sanitation markets.

**Key words:** Cambodia, financing, sanitation

## Key Messages

- Linking functional sanitation markets to already operational finance markets has the potential to give individuals and households more financial flexibility to purchase latrines, improving sanitation coverage in rural areas.
- In an integrated program of sanitation marketing and microfinance lending in rural Cambodia, there was substantial stated interest in the use of microfinance for latrine purchase, but low uptake of offered loans.
- Coordinating sanitation marketing and microfinance through a low-cost, easily replicable program was challenging, requiring management commitment from the sanitation marketing program and commitment to social responsibility from the microfinance institution.

## Introduction

In 2015, 2.4 billion people—32% of the world population—do not have access to improved sanitation (UNICEF and World Health Organization 2015). More than 946 million people worldwide and 25% of rural populations practice open defecation (UNICEF and World Health Organization 2015). Lack of access to sanitation contributes significantly to child morbidity and mortality (Chopra *et al.* 2013; Humphrey 2009; Korpe and Petri 2012). Rural Cambodia has one of the lowest rates of sanitation coverage in the world; only 30% of rural households have access to any form of improved sanitation (WHO/UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation 2015). Numerous strategies have been attempted by national and international aid organizations to promote access to household latrines, including community led total sanitation, subsidies for latrines and/or installation and the development of functioning markets for low-cost latrines (Mehta and Knapp 2004). In Cambodia, several ongoing efforts in ‘sanitation marketing’—programs to build supply side markets and promote consumer purchase and use of latrines—have led to the purchase of latrines by tens of thousands of households (Pedi *et al.* 2011; 2012; WaterSHED 2013b). These programs have been successful in several countries (Baskovich 2011; Frias and Mukherjee 2005; Pedi *et al.* 2011; 2013), as they encourage household investment and potentially increase long-term use of sanitation infrastructure (Water and Sanitation Program 2004). Although the success of these markets depends, in part, on the low cost of latrines, the most frequently cited household constraint to latrine adoption in Cambodia remains the inability to pay (Harris 2005; Jenkins 2010; Pedi and Aun 2012; Pedi and Touch 2010). For this reason, linking sanitation marketing with microfinance has been proposed to allow payments over time.

Microfinance is defined as financial services for low-income clients, including but not limited to loans and savings. Microfinance has evolved substantially over the past few decades, from credit to groups of women using social pressure as collateral to its current definition as a broad set of financial services tailored to fit the needs of poor individuals, both men and women (Consultative Group to Assist the Poor 2015; Ledgerwood *et al.* 2013). The two microfinance institutions (MFIs) we collaborated with in this study have high proportions of women clients (~80%). Integrating microfinance with health products and services has been successful in a number of contexts worldwide (Geissler and Leatherman 2015; Leatherman and Dunford 2010; Leatherman *et al.* 2012; Strasser-Weippl *et al.* 2015). Integration of end-user water, sanitation and hygiene (WASH) products with microfinance has been tested in a variety of settings (Baskovich 2011; Trémolet and Muruka 2011; Trémolet and Ravi Kumar 2012), and results suggest that integration can and does work if conditions are right.

As the success of programs linking microfinance and WASH vary substantially depending on the model of integration used, we tested a relatively ‘low-touch’ method of integration that relied on existing operations to determine whether such an integrated model was feasible to improve sanitation coverage, with potential for scalability due to its low external costs and minimal staffing needs. We conducted a pilot study linking a sanitation marketing program implemented by Water, Sanitation and Hygiene Enterprise Development (WaterSHED) with two of the largest MFIs in Cambodia to test the viability of integration and demand for loans for latrines among households. We combined the intervention with a household survey to better understand the experience of

borrowing from sources outside the household and acceptability of microfinance for the use in the purchase of sanitation facilities.

## Methods

### Setting

WaterSHED is a non-governmental organization that promotes increased access to WASH products and services through commercial channels. WaterSHED’s sanitation marketing campaign consisted of group sales events conducted in rural villages. A sales event involved the presence of a sales agent—employed by a latrine supplier—and/or WaterSHED staff. The sales event served to promote the desirability and benefits of owning and using a latrine, introduce or ‘pitch’ the latrine products, and then record orders and schedule direct delivery by the latrine supplier. The latrines sold at prices between \$35 and \$45 for a pour flush latrine without a shelter.

The study area was 139 specific communes (an administrative unit similar to a county in the USA) in two rural provinces: Kampong Speu and Kampong Cham (Table 1) (Cambodia National Committee for Sub-National Democratic Development 2011). These communes were selected as they had ongoing sales events with WaterSHED’s sanitation marketing campaign and at least one MFI had existing operations as of September 2011. The first wave of the pilot intervention was conducted between October 2011 and March 2012 with MFIs both Mist participating (MFI A and MFI B)<sup>1</sup>; the second wave was conducted between October 2012 and December 2012 with MFI A participating.

### Intervention and data collection

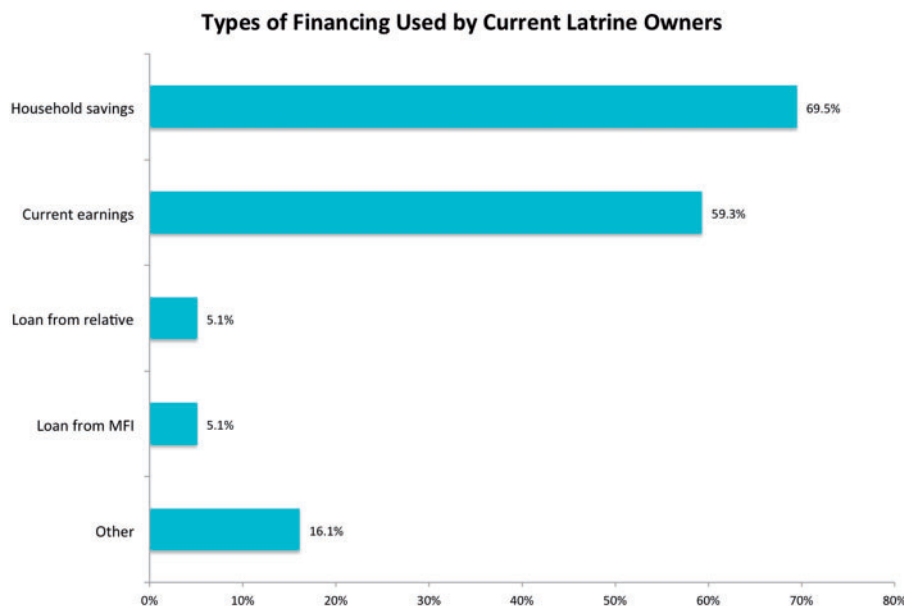
We used a cluster randomized design to assign each of the communes as a treatment (37 communes) or control (102 communes) area, clustering communes based on baseline statistics of sanitation penetration, household poverty measured by percentage of households with a leaf roof and previous exposure to the WaterSHED sanitation marketing campaign. In treatment areas, the goal was to have an MFI credit officer attend and promote loan products at each sanitation sales event in the commune. The credit officer provided information about credit offerings that could be used for the purchase of a latrine—individual or group credit—and accepted applications after the meeting. Two loan products were offered by each MFI—group and individual loans—with variation between the two MFIs in minimums and maximums: MFI A offered group loans with a maximum of \$250 (total for group) and individual loans with a minimum of \$100 and MFI B offered group loans with a maximum of \$250 per person (no group maximum) and individual loans with a minimum of \$75. Neither MFI offered loan products specific to sanitation. Loan applications were measured by reports from credit officers completed immediately after the sales event and included information about loan applications for any purpose, including but not limited to those for latrines. In the control areas, the sanitation marketing program continued normally. The control areas allowed us to conduct household surveys with individuals who had not just heard a presentation from an MFI credit officer to ensure our results regarding attitudes towards microfinance were not influenced by credit officer presence. Attendance data were obtained from WaterSHED monitoring data. We analyzed bivariate comparisons of loan applications and attendance using  $\chi^2$  tests for categorical variables and *t* tests for continuous variables.

### Household survey

We designed a household survey to measure sanitation ownership, previous exposure to lending and interest in microfinance for

**Table 1.** Characteristics of study communes in Kampong Cham and Kampong Speu provinces

Mean (SD) or %	Overall (n = 139)	Kampong Cham		Kampong Speu	
		Control (n = 41)	Treatment (n = 19)	Control (n = 61)	Treatment (n = 18)
Total population	9563.1 (3456.8)	11049.6 (3656.2)	8888.8 (3673.5)	8561.7 (2834.7)	10282.6 (3594.0)
Percent of Households with Access to Latrine (2008)	19.8 (2.8)	20.3 (4.6)	20.1 (1.8)	19.5 (1.2)	19.6 (1.5)
Percent of Households with Leaf or Thatch Roof	19.2 (10.9)	19.3 (9.5)	21.5 (10.6)	18.3 (10.5)	19.7 (15.5)
Percent of Adults with Agricultural Occupation	36.7 (6.1)	36.0 (4.4)	38.1 (5.1)	36.5 (7.0)	37.4 (6.8)
Distance from Village Center to Nearest Market (km)	9.4 (9.1)	6.1 (3.8)	7.5 (4.8)	12.0 (11.4)	10.0 (9.8)



**Figure 1.** Types of financing used for purchase by current latrine owners. Calculations based on households who have a pour-flush latrine (n = 134). Respondents could choose more than one reason, so totals may add to > 100%.

sanitation (Table 3). Questions about loan applications were included for respondents in treatment areas only. Two to three sales event attendees were randomly selected from the roster of sales event attendees completed by the village chief to be surveyed at the end of each sales event between October 2011 and March 2012. Individuals were approached immediately after the sales event and surveyed either at the event site or in their home. If an individual left the site prior to being surveyed, the field staff member tracked the individual to their home or work. We used  $\chi^2$  for binary variables and *t*-statistics for continuous variables to compare responses between households with and without latrines.

We used three linear regressions to examine relationships between latrine ownership and lending exposure, separately analyzing the influence of each measure of microfinance and loan experience. The dependent variable was a binary indicator of latrine ownership; the primary independent variable in each regression was an indicator of the respondent's previous exposure to lending, with controls for household size and asset ownership. Three separate regressions were estimated, with the independent variables of (1) current MFI client, (2) has been an MFI client and (3) has an outstanding loan from any source.

An  $\alpha$  level of 0.05 was used to determine statistical significance. The study was approved by the University of North Carolina Institutional Review Board.

## Results

The results from the survey and pilot intervention showed low ownership of latrines, high motivation to purchase a latrine and significant willingness to consider using a microfinance loan for latrine purchase.

### Intervention results

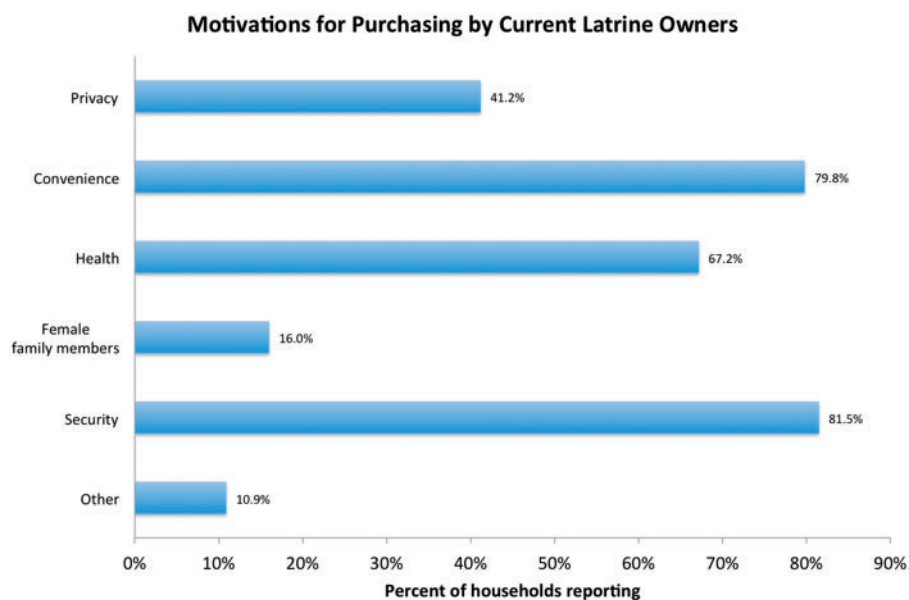
During the 9 months of the intervention, 159 sales events were attended by credit officers in 33 of the 37 treatment communes. A total of 4761 individuals attended these sales events. An average of 1.27 loan applications (SD = 3.98) were submitted per sales event, as recorded by the credit officer immediately after the sales event.<sup>2</sup> This was 4.2% of sales event attendees with credit officers; 67.3% were group loan applications, with 32.7% percent individual loan applications. Sixty-seven percent (67%) of attendees heard presentations from the first MFI partner (MFI A) and 33% of attendees heard presentations from the second MFI partner (MFI B). MFI A continued on with the pilot during the second phase, whereas MFI B terminated their involvement with the pilot due to a period of transition from MFI to commercial bank status.

### Household survey results

Survey respondents were mostly men, with an average household size of 5.6 members, and a mean ownership of 3.8 of 6 selected

**Table 2.** Descriptive statistics of survey responses

	Mean (SD) or %			
	Overall ( <i>n</i> = 935)	Household currently owns pour-flush latrine		
		No ( <i>n</i> = 801)	Yes ( <i>n</i> = 134)	<i>p</i> values
Female respondent	31.7	31.5	32.8	0.75
Number of household members	5.6 (2.1)	5.6 (2.0)	6.1 (2.4)	0.003*
Proportion of household members who are female	0.5 (0.2)	0.5 (0.2)	0.5 (0.2)	0.43
Proportion of household members who are children	0.2 (0.2)	0.2 (0.2)	0.2 (0.2)	0.5
Household owns television	65.9	62.9	83.6	<0.001*
Household owns mobile phone	75.6	73	91	<0.001*
Household owns bicycle	78.9	78.2	83.6	0.15
Household owns motorcycle	53.8	48.8	83.6	<0.001*
Household owns wardrobe or cabinet	38	33.7	63.4	<0.001*
Household owns bed set	63.3	60.2	82.1	<0.001*
Total selected items household owns	3.8 (1.5)	3.6 (1.5)	4.9 (1.1)	<0.001*
Currently MFI client ( <i>n</i> = 921)	28.3	30	18.3	0.006*
Outstanding loan from any source ( <i>n</i> = 917)	38.3	39.5	30.8	0.06
Current or former client of MFI ( <i>n</i> = 911)	39.7	40.2	36.9	0.48

\**p* < 0.05.**Figure 2.** Motivations for purchasing a latrine given by current latrine owners. Calculations based on households who have a pour-flush latrine (*n* = 134). Respondents could choose more than one reason, so totals may add to > 100%.

assets (Table 2). Households with a latrine (14.3%) were larger and had higher ownership of the selected assets. Households with a latrine were less likely to be current MFI clients; they were also less likely to have an outstanding loan from any source or have ever been an MFI client although these differences were not statistically significant. The most common financing cited for current latrine owners was household savings (Figure 1). Approximately 5% of respondents with a latrine had used a loan from an MFI to purchase the latrine. The most commonly cited reasons for purchasing a latrine were convenience and security (Figure 2). Using regression analysis controlling for asset ownership and household size, current MFI clients were 7.2 percentage points (pp) less likely to own a latrine (95% confidence interval, -11.9 to -2.4 pp). We found no significant difference in latrine ownership between those who had

ever been an MFI client and those who had not when controlling for asset ownership and household size. Likewise, there was no significant relationship between owning a latrine and having an outstanding loan from any source when controlling for asset ownership and household size.

Among those who did not own a latrine but intended to purchase in the future (91.3% of those without a latrine), 13.5% of respondents in control and treatment areas had ever thought about using a loan from an MFI to purchase a latrine. For those who had considered taking a loan from an MFI, the most commonly cited reasons for not having taken a loan were having an existing loan, inability to repay, and high interest rates. Of those who saw the presentation from an MFI credit officer, 27.4% reported either applying for a loan to pay for the latrine or intending to take a loan

**Table 3.** Concepts measured in household survey regarding attitudes about microfinance and financing for latrines

Concept	Binary Measure	Survey Question(s)
<i>Sanitation Ownership</i>	Latrine ownership (Yes if Q1=Yes and Q2=Pour Flush Latrine and Q3=Immediately Adjacent and Q4=Your Household)	Q1: Do you and your household members currently have regular access to any type of latrine? Q2: What kind of latrine is it? Q3: How closely located is the latrine to your house? Q4: Who does it belong to?
<i>Previous Exposure to Lending</i>	Current MFI Client (Yes if Q5=Yes) Has Been an MFI Client (Yes if Q5=Yes or Q6=Yes) Has an Outstanding Loan From Any Source (Yes if Q7=Yes)	Q5: Are you currently a client of a microfinance institution? Q6: Have you ever been a client of a microfinance institution or taken a loan from a microfinance institution? Q7: Do you currently have an outstanding loan from any source?
<i>Interest in Microfinance for Sanitation</i>	Intent to Take a Loan for a Latrine (Yes if Q8=Yes and (Q9=Yes or Q10=Yes))	Q8: Did you hear the presentation from the microfinance credit agent about using a loan to finance a latrine? Q9: Did you take a loan to purchase a latrine? Q10: Are you considering taking a loan to purchase a latrine?

in the future. We were not able to match survey responses with loan applications. Among those who did not have a latrine and did not plan to purchase one in the future ( $n=39$ ), 13% reported they would consider buying a latrine if they knew they could get a loan from an MFI to pay for it.

## Discussion

We evaluated whether a ‘low-touch’ integration of consumer microfinance into functioning sanitation markets is a feasible and potentially scalable way to decrease barriers to latrine purchase in rural Cambodia. Using a household survey, we found that interest in microfinance was high, both generally and specifically for the purchase of household latrines. However, in our pilot study of MFI credit officer attendance at sanitation sales events, stated intentions to purchase a latrine coupled with significant interest in an option for a microfinance loan did not result in the immediate level of loan applications anticipated. Several factors—on the part of consumers and MFIs—might explain this and be important to address as barriers to successful integration.

Although a large proportion of households (27.4%) indicated intent to take a loan for a latrine in the household survey, immediate loan applications were much lower than this, with 4.2% of attendees immediately applying for a group or individual loan when available. This may be, in part, due to the timing of household decision making, as we did not capture loans originated beyond the conclusion of the sales event; in effect, the decision to apply for a loan may require more than a single encounter with a credit officer. Closely linking the size of the loans with the cost of the latrines and the timing of loan disbursement and payment for the latrines may improve uptake of both.

The fact that 5% of current latrine owners financed their purchase in whole or in part with a loan from an MFI indicates that expanding the visible presence, availability and ease of access to microfinance may increase the number of latrines purchased by those who cite an inability to pay as a reason to delay or forego purchase. For those who do not intend to purchase a latrine, knowing that receiving a loan from an MFI is an option may impact the decision for a minority of these households. Our results were similar to some previous studies examining integration of microfinance and sanitation for the end user, which have had varying uptake and success rates depending on the context. In household surveys in India, up to 68% of households stated that they were interested in using

microfinance for toilets and water/sewer connections (Davis *et al.* 2008). Vietnamese government microfinance loans with highly subsidized interest rates for latrines, and water supply had participation rates in 2008 of 12–18%. (Reis and Mollinga 2012)

The integration between MFIs and an existing sanitation marketing campaign required significant and continuous coordination and cooperation on behalf of both parties. MFI A coordinated activities through their department of social responsibility, which sent information through MFI management to credit officers; this coordination had substantially higher credit officer attendance rates. MFI B required direct coordination for sales event attendance between WaterSHED staff and credit officers; this was not as successful in complying with the agreement to have an MFI credit officer at each sales event, as individual credit officers did not want to attend due to perceived low loan uptake. When sales events were scheduled through the managers of these credit officers, attendance was much higher.

The partnership with MFIs did not include any financial incentives or technical assistance beyond initial and ongoing training of credit officers regarding their presence and presentations at sales events: a full day training for initial training and on-site or telephone follow-up as needed. As such, this type of integration may easily scale in a number of settings. However, from discussions with MFIs, the effort required—combined with low loan uptake—was not justified strictly from the conventional bottom line perspective. Commitment was more compelled by the sense of social responsibility to the poor that some, but not all, MFIs demonstrate. This dedication to the double bottom line—both financial returns and gains in social development—may best determine those organizations that will have a sustained commitment to this type of integration of financial services with health-related programs.

Another unrelated pilot of combined microfinance with sanitation marketing of low-cost latrines in Cambodia began shortly after our pilot study and found higher uptake of credit as a proportion of latrine purchases. In this study, the authors were using a model in which the NGO provided substantial capacity building for the socially focused MFIs and financial risk sharing and/or grants; additionally, the loans were paid directly to the latrine supplier upon delivery instead of being given to the end user to purchase a latrine. The study found the program was financially viable for these MFIs although it took substantial coordination and dedicated sanitation loan officers (Newman *et al.* 2014). A separate pilot project involving WaterSHED links the sanitation marketing program with specially tailored latrine loans disbursed directly to latrine suppliers,



rather than to individuals; early indications show that this may be a successful alternative model in lowering operational barriers and increasing the ability to track latrine specific loans, but further analysis is required (WaterSHED 2013a). These types of intervention require substantially more capacity building for the MFI, which increases costs borne by an external source. Further research is needed to optimize models for microfinance and sanitation integration incorporating information about costs and funding sources, successes in increasing latrine ownership rates and scalability in low-resource settings.

Other factors complicating integration in the pilot study were unanticipated natural and political events not uncommon in areas where poverty co-exists with environmental and climatic risk. Between initiation of the pilot (October 2011) and conclusion of the second phase (December 2012), two significant disruptions to sanitation marketing occurred. Major flooding in parts of Kampong Cham province in the fall of 2011 severely impacted the ability of field staff to reach these household, the appropriateness of sanitation marketing and attention by consumers. The second disruption was a restricted ability to hold sales events leading up to commune elections in June 2012; there was a government prohibition on large groups meeting due to concerns about potential electoral interference. These disruptions had a significant impact; when both the sanitation marketing program and the MFIs were fully operational again, field staff in both organizations underwent refresher training due to staff turnover and the elapsed time.

Our study had several limitations. First, the data on loan applications were collected immediately following the sales events, limiting our ability to capture loans that were taken in the days, weeks or months following the initial information provision. This timing may explain some of the discrepancy between stated intent to use microfinance for a latrine purchase and loan application rates; however, it is likely not a full explanation given general awareness of microfinance among study participants and low levels of latrine purchase with microfinance prior to the intervention. Second, the majority of respondents to the survey were men, whereas the majority of loans provided by the MFIs are to women. As the survey was designed to capture information about the household and women often consult with family members before taking a loan, we anticipate that the results are representative. Third, we were not able to determine the income bracket of those who applied for or received a loan for a latrine. Understanding the optimal client—likely one who has the income or potential income to afford payments over time but does not have the lump sum needed for latrine purchase, rather than the very poor—is critical for policy and ensuring ethical expansion of microfinance integration with sanitation. Developing a better understanding of differences in client interest in microfinance by income bracket is an important area for future research. Fourth, due to the timing of data collection, we did not have the ability to detect short- or long-term changes in latrine purchase due to microfinance integration. Fifth, having only two MFI partners limited our ability to generalize broadly about what types of MFIs make reliable partners; however, we found this initial selection crucial to maintaining a long-term partnership. Initial vetting of MFI partners for commitment to integration with the sanitation marketing and their capacity for credit officers attendance at sales events is critical.

## Conclusion

Through the intervention and household survey, we found substantial stated demand for microfinance for sanitation; however,

immediate uptake of loans was relatively low at the time microfinance was offered. Given the importance of improving sanitation coverage and concomitant health impacts, linking functional sanitation markets to already operational finance markets has the potential to give individuals and households more financial flexibility. Future research is needed to test what models linking sanitation and microfinance can most reliably increase latrine sales, as well as the long-term effects of integration of microfinance with sanitation marketing on latrine sales and loan uptake. Further product research and better integration of private vendors and financing modalities is necessary to create a scalable microfinance option for sanitation markets.

## Acknowledgements

We would like to thank Lyn McLennan and Geoff Revell for their assistance with field implementation and helpful comments on earlier drafts; Darapiseh Rath and Daroath Phav for their assistance with field coordination and implementation; and the two participating microfinance institutions.

## Funding

This project was supported by the US Agency for International Development. The authors' views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

## Notes

1. For the first 3 months of the study, the sanitation marketing program was operated in conjunction with Lien AID, an international aid organization.
2. Information on loan applications was available for 130 sales events; the data collection forms for the other 29 events were either not completed by the credit officers or were not provided to the research team by the MFI.

## References

- Anand A, Jenkins M. 2010. *Cambodia Sanitation Consumer Demand Behavior Qualitative Study: A consumer-preference analysis of the defecation practices of Rural Cambodians, their Motivations to build household sanitation facilities, and knowledge of existing latrine technologies*. Phnom Penh: WaterSHED Asia Project. Available at: [http://www.watershedasia.org/wp-content/watershed\\_resources/Research\\_and\\_TA\\_Docs/2010-11-11\\_Cambodia%20Sanitation%20Qualitative%20Study%20Results%20Draft%20Final%20Report%20clean.pdf](http://www.watershedasia.org/wp-content/watershed_resources/Research_and_TA_Docs/2010-11-11_Cambodia%20Sanitation%20Qualitative%20Study%20Results%20Draft%20Final%20Report%20clean.pdf).
- Baskovich M. 2011. *Sanitation Markets at the Bottom of the Pyramid: A Win-Win Scenario for Government, the Private Sector, and Communities*. Washington, DC: Water and Sanitation Program.
- Cambodia National Committee for Sub-National Democratic Development. 2011. *Commune Database Online* [Online]. Phnom Penh, Cambodia. <http://db.ncdd.gov.kh/cdbonline/home/index.castle>, accessed 6 October 2011.
- Chopra M, Mason E, Borrazzo J *et al.* 2013. Ending of preventable deaths from pneumonia and diarrhoea: an achievable goal. *Lancet* 381: 1499–506.
- Consultative Group to Assist the Poor. 2015. *Frequently Asked Questions about Financial Inclusion* [Online]. Washington, DC: Consultative Group to Assist the Poor. <http://www.cgap.org/about/faq>, accessed 1 December 2015.
- Davis J, White G, Damodaron S, Thorsten R. 2008. Improving access to water supply and sanitation in urban India: microfinance for water and sanitation infrastructure development. *Water Science Technology* 58: 887–91.

- Frias J, Mukherjee N. 2005. *Harnessing Market Power for Rural Sanitation*. Washington, DC: Water and Sanitation Program.
- Geissler KH, Leatherman S. 2015. Providing primary health care through integrated microfinance and health services in Latin America. *Social Science Medicine* 132: 30–7.
- Harris J. 2005. *Challenges to the Commercial Viability of Point-of-Use (POU) Water Treatment Systems in Low-Income Settings*. MSc, Oxford University.
- Humphrey JH. 2009. Child undernutrition, tropical enteropathy, toilets, and handwashing. *Lancet* 374: 1032–5.
- Korpe PS, Petri WA Jr. 2012. Environmental enteropathy: critical implications of a poorly understood condition. *Trends in Molecular Medicine* 18: 328–36.
- Leatherman S, Dunford C. 2010. Linking health to microfinance to reduce poverty. *Bulletin World Health Organization* 88: 470–1.
- Leatherman S, Metcalfe M, Geissler K, Dunford C. 2012. Integrating microfinance and health strategies: examining the evidence to inform policy and practice. *Health Policy Plan* 27: 85–101.
- Ledgerwood J, Earne J, Nelson C (eds). 2013. *The New Microfinance Handbook: A Financial Market System Perspective*. Washington, DC: World Bank.
- Mehta M, Knapp A. 2004. *The Challenge of Financing Sanitation For Meeting the Millenium Development Goals*. Washington, DC: WSP: World Bank.
- Newman A, Smets S, Kov P. 2014. *Making Toilets More Affordable for the Poor Through Microfinance*. Washington, DC: World Bank Water and Sanitation Program.
- Pedi D, Aun H. 2012. *Understanding Household Consumers in the Emerging Sanitation Market in Cambodia* [Online]. Phnom Penh. [http://www.watershedasia.org/wp-content/watershed\\_resources/Research\\_and\\_TA\\_Docs/WaterSHED\\_Consumer\\_Study\\_2012\\_09\\_27.PDF](http://www.watershedasia.org/wp-content/watershed_resources/Research_and_TA_Docs/WaterSHED_Consumer_Study_2012_09_27.PDF), accessed 8 December 2013.
- Pedi D, Jenkins M, Aun H, McLennan L, Revell G. 2011. The “hands-off” sanitation marketing model: emerging lessons from rural Cambodia. *35th WEDC International Conference. Loughborough, UK*.
- Pedi D, Kov P, Smets S. 2012. *Sanitation Marketing Lessons from Cambodia: A Market-Based Approach to Delivering Sanitation*. Washington, DC: Water and Sanitation Program.
- Pedi D, Touch P. 2010. *WASH Marketing Project Kampong Speu Baseline Survey*. Phnom Penh
- Reis N, Mollinga P. 2012. Water supply or ‘Beautiful Latrines’? Microcredit for rural water supply and sanitation in the Mekong Delta, Vietnam. *ASEAS–Austrian Journal of South-East Asian Studies* 5: 10–29.
- Strasser-Weippl K, Chavarri-Guerra Y, Villarreal-Garza C *et al.* 2015. Progress and remaining challenges for cancer control in Latin America and the Caribbean. *Lancet Oncology* 16: 1405–38.
- Trémole S, Muruka G. 2011. *Evaluating the potential of microfinance for sanitation: Tanzania*. London: Sanitation and Hygiene Applied Research for Equity.
- Trémole S, Ravi Kumar T. 2012. *Evaluating the Potential of Microfinance for Sanitation: India*. London: Sanitation and Hygiene Applied Research for Equity.
- UNICEF and World Health Organization. 2015. *Progress on Sanitation and Drinking Water – 2015 Update and MDG Assessment*. Geneva, Switzerland: UNICEF and World Health Organization.
- Water and Sanitation Program. 2004. *The Case for Marketing Sanitation*. Washington, DC: Water and Sanitation Program.
- WaterSHED. 2013a. *Microfinance boosts latrine purchases in rural Cambodia* [Online]. Phnom Penh. <http://www.watershedasia.org/microfinance-boosts-latrines/>, accessed 5 November 2013.
- WaterSHED. 2013b. *WaterSHED: Sanitation Marketing* [Online]. Phnom Penh. <http://www.watershedasia.org/sanitation-marketing/>, accessed 20 November 2013
- WHO/UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation. 2015. *Country Files - Cambodia: estimates on the use of water sources and sanitation facilities (1980 - 2015)* [Online]. Geneva, Switzerland. [http://www.wssinfo.org/documents/?tx\\_displaycontroller%5Btype%5D=country\\_files](http://www.wssinfo.org/documents/?tx_displaycontroller%5Btype%5D=country_files), accessed 10 December 2015