Report No: AUS0000519

India

Incentivizing Sanitation Uptake and Sustainable Usage through Micro Finance

Impact Evaluation Endline Report

November 15, 2018

WATER Global Practice

Incentivizing Sanitation Uptake and Sustainable Usage through Microfinance - Endline Report

October 24, 2018

Orazio Attanasio[§], Britta Augsburg[§], Bet Caeyers[§], Sara Giunti[§], Bansi Malde[§†]

[§]Institute for Fiscal Studies, London, UK
[†]Univeristy of Kent, UK

Written by

The Institute for Fiscal Studies

7 Ridgmount Street
London WC1E 7AE

Tel: +44 (0) 20-7291 4800
Fax: +44 (0) 20-7323 4780
Email: mailbox@ifs.org.uk
Website: http://www.ifs.org.uk

Preface

This report discusses the results of the impact evaluation titled "Incentivizing Sanitation Uptake and Sustainable Usage through Microfinance", funded through the Strategic Impact Evaluation Fund (SIEF), conducted by the Institute for Fiscal Studies, London, UK and supported by the Water Global Practice of the World Bank. Additional funding from the Economic and Social Research Council (ESRC) Centre for Microeconomic Analysis of Public Policy (CPP) is also gratefully acknowledged. The views expressed in this report are, however, those of the authors and do not necessarily reflect the views of the funders or of the other individuals or institutions mentioned here, including the Institute for Fiscal Studies (IFS), which has no corporate view. Data were collected in collaboration with Nielsen India Pvt.Ltd., based in Gurgaon, India. Nielsen bears no responsibility for the interpretation of the data in this report. All respondents agreed to participate in the surveys, and were assured of the confidentiality of any identifying information gathered. This research was approved by the ethics board of the University College London, UK, Project ID: 2168/008; as well as by the IRB of The Institute of Sustainable Development, Chennai, India. The authors would like to thank WB staff Bertha Briceno, Manish Kumar, Sonali Andrea David, Juan Costain, Jane Bevan, Luis Alberto Andres, Julieta Trias, Alaka Holla, and Susanna Smets for support at various stages of this evaluation; and Felipe Brugues and Borja Perez-Viana for excellent research assistance at the time of the baseline survey. Finally, the authors would like to thank the implementing agencies for their cooperation and endless patience while working on the implementation of their interventions and their help in the development of this impact evaluation. Any errors and all views expressed are those of the authors.

Contents

Executive summary

This report discusses the results of the impact evaluation titled "Incentivizing Sanitation Uptake and Sustainable Usage through Microfinance", funded through the Strategic Impact Evaluation Fund (SIEF), conducted by the Institute for Fiscal Studies, London, UK and supported by the Water Global Practice of the World Bank. The overall purpose of this project is to shed light on the role of informational and credit constraints in sanitation uptake. It does so by evaluating the effectiveness of two randomized interventions: (i) improving access to sanitation credit, where collateral-free micro-credit loans are made available to existing clients of a microfinance institution (MFI); and (ii) sanitation credit combined with a package of awareness creation activities. The evaluation design is a cluster randomized controlled trial. Out of 120 communities - Gram Panchayats (GPs) - in rural Maharashtra, India, 40 GPs were randomly assigned to receive the microfinance (MF) sanitation loan program (referred to as 'SL only'), 39 GPs were randomly selected to receive the MF sanitation loan program along with sanitation awareness creation activities (referred to as 'SL+A'), and 41 GPs were selected to receive neither one of these programs (referred to as 'Control'). The implementing MFI was already actively lending MF loans other than sanitation loans in these GPs prior to the evaluation.

The MFI rolled out sanitation loans to the study areas from February 2015, with existing clients eligible to take up collateral free loans for sanitation of around Rs 15,000, provided at an interest rate of 18-22% per annum[1], to be repaid weekly over a 2-year period. Repayment terms for the sanitation loan were less stringent than for other, particularly productive, loan products offered by the MFI, with a slightly lower interest rate and a longer repayment period. The awareness creation activities, implemented by an NGO associated to the MFI, started in February 2015 and were completed in July 2015, and included street plays, wall paintings, group meetings, leaflets and engagement and training of local officials on sanitation related issues. In addition to these GP level activities, the implementing MFI organized block level awareness workshops, targeted at their clients, around sanitation and hygiene.

The implementing agencies adhered well to the random allocation of these interventions: Detailed administrative data from the implementing MFI indicate that fewer than four percent of sanitation loans provided in the study areas, were disbursed in control GPs during the almost three years of the trial. Establishing non-contamination of awareness creation activities is more difficult since other agencies - particularly the government's SBM scheme - conducted similar activities throughout the experiment. We are nevertheless confident that the implementing agency we worked with adhered to the random allocation. This is supported by two pieces of evidence. First, the implementing agency only had sufficient budget to cover the 39 GPs selected for this treatment arm in these districts. Second, we find strong and consistent evidence that respondents - MF client households and officials alike - are significantly more likely to be aware of awareness creation activities if they reside in the selected SL+A communities.

The experimental set-up of the intervention implementation, combined with the adherence to the design, allows us to rigorously address questions around effectiveness and complementarities of the interventions. Specifically, the five overarching research questions this report sets out to answer are as follows:

1. Are micro-credit-based approaches to improving sanitation coverage effective in terms of *uptake*, *usage* and *quality* among micro-credit eligible households? If effective, who is being reached? And, importantly, who is not reached/left behind?

2. Are they more effective when combined with awareness creation activities?

3. What are the mechanisms underlying intervention impact(s)?

[1] The average annual interest rate on the loans is 20%. At the start of the experiment, the interest charged by the implementing MFI was 22% and it was subsequently reduced to 20% and further to 18%. In our study, 35% of loans taken were at a rate of 22%, 49% at a rate of 20% and 16% at a rate of 22%.

4. Are there any direct or spillover program effects on non-eligible households?

5. Is there any room for complementarities in the provision of micro-credit for sanitation and the financial incentives provided by SBM(G)?

In addition to the exhaustive administrative data from the implementing MFI, we rely on rich survey data collected from (credit-eligible and non-eligible) households in the study areas, clients of the MFI, masons and local community officials. The surveys collected information on a wide range of outcomes including toilet uptake, open defecation practice and toilet usage, toilet quality, household business and education investments, intervention awareness and participation, perceptions of the costs and benefits of sanitation, mason training, toilet construction costs and SBM (G) activities. Baseline data were collected from a sub-sample of households in late 2014, before the rollout of the interventions. Endline data were collected in two phases, with surveys of credit-eligible households and clients conducted in late summer of 2017, and surveys of non-client households, community SBM(G) official and masons conducted at the end of 2017. Our household sample includes 4,222 MF client households and 6,775 non-client households. The cluster randomized controlled trial (RCT) approach allows us to shed light on the research questions by comparing average outcomes between treated and control GPs, and between the two treatment arms.

Our key findings with respect to the five research questions are as follows:

1. Are credit-based approaches to improving sanitation coverage effective in terms of *uptake*, *usage* and *quality* among credit eligible households? If effective, who is being reached? And, importantly, who is not reached/left behind?

Our impact evaluation study reveals that the provision of micro-credit for sanitation investments is a viable strategy to increase sanitation coverage and usage in our study setting. The introduction of sanitation loans on their own led to a nine percentage points increase in households owning a toilet two and a half years down the line. Our analysis reveals that these are new toilets, rather than toilets saved from collapse. We also find that toilet ownership and reported toilet usage are highly correlated in this setting. As a result, we find that the toilet uptake is accompanied by an increase in toilet usage and decrease in open defecation (OD) practices of about ten percentage points among credit eligible households in the sanitation loans only arm. Importantly, we observe reductions in OD among all age groups and both genders, with the reduction highest among girls aged 6-15 years. We find no differences in the average quality of constructed toilets (underground structure, overground structure or cleanliness) in treated and control communities. This is despite the fact that households in the SL only arm report to have installed higher cost toilets.

The positive impact on toilet ownership, usage and drop in open defecation behavior is over and above a significant increasing trend in toilet ownership and significant downward trend of open defecation behavior observed more generally in control areas over the course of the study period. However, to date in our study GPs in Nanded and Latur, the majority of households in control villages report to continue OD practice. Most of these households have not yet constructed a toilet.

We conduct a descriptive analysis as to whom has been reached to date and who is left behind. Focusing on clients, this analysis reveals that on average, the introduction of sanitation loans has been picked up by demographic and socio-economic groups that in the absence of the intervention would also have shown a relatively higher desire and/or ability to construct a toilet. In particular, MF clients that took a sanitation loan and who ended up constructing a toilet live in households that at endline are on average slightly better off, better educated, more likely to be buddhist, more likely to belong to the general caste and less likely to belong to a scheduled caste or tribe. It is very well possible that we are currently only able to pick up prime mover effects, and that loans will reach other groups in the longer term. But at least in the first two and a half years after the loans were introduced, some

groups of households seem to have benefited more than others from the intervention, both in terms of sanitation loan uptake and in terms of toilet coverage.

2. Are credit-based approaches more effective when combined with awareness creation activities?

Interestingly, in our setting, combining the sanitation loans with awareness creation activities hampers the positive impact of providing sanitation loans only. Our analysis reveals a significant impact on toilet uptake during the period when the sanitation awareness creation activities took place (about six months), uptake however subsequently stagnated, leading to a smaller, statistically insignificant effect (around 4 percentage points) of the SL+A intervention at the endline. The reason for this counter-intuitive finding is not obvious, especially considering that sanitation loan uptake is at least as high in SL+A areas as it is in SL only areas. In fact, conducting a back of the envelope calculation for the conversion rate of loans to toilets indicates that in SL only areas, on average, every second loan taken translates into an additional toilet whereas in SL+A areas, only every fifth loan translates into an additional toilet.

We discuss a number of potential explanations for the relatively low loan conversion rates, including investment into existing toilets, a shift away from other lending sources towards the newly introduced sanitation loans, as well as misuse of loans. While this analysis provides interesting insight into the low conversion rate in general, it does, unfortunately, not provide a clear answer as to why the conversion rate would be lower in the SL+A treatment arm. However, we find evidence that MF staff were more likely to monitor how loans were used in the SL only areas compared to the SL+A areas, where they were primarily monitored through discussions in lending group meetings. It is possible that MF staff may have expected the awareness creation NGO staff to monitor that loans were used for toilet construction in the SL+A areas, and hence have altered their monitoring behavior. Consistent with the differences in how monitoring was done, we find suggestive evidence that the loans may have been used for other investments in SL+A areas. Households in SL+A areas are more likely to own agricultural land.

3. What are the mechanisms underlying intervention impact?

We analyze a number of mechanisms that might be underlying the positive impacts in the SL only treatment arm and the stagnated impacts in the SL+A treatment arm. Specifically, we look at (i) intervention participation, (ii) credit uptake, (iii) other investments made, (iv) financial well-being, and (v) sanitation beliefs. We discuss briefly our key findings on each of these in turn:

(i) Intervention participation: Although sanitation awareness creation activities also happened in control and SL only sites (mainly organized by the government), we find that they reached a significantly higher proportion of MF client households in SL+A study communities, suggesting that the sanitation awareness component of the intervention reached not only more GP officials but also more MF client households with its activities than the government. As discussed above, it is not clear why these activities might have led to a hampered intervention impact. In terms of sanitation loan uptake we find, using both administrative as well as survey data, that sanitation credit is taken up, demonstrating the demand for this newly introduced loan product. The average impact on loan uptake is between 15 and 22 percentage points, depending on data source used and treatment arm considered. We do not find that uptake differs by treatment arm. This significant impact of the loan provision on loan uptake combined with the main results, that the intervention increased toilet ownership in the study areas, allows us to conclude that households were lacking financing for the construction of toilets before sanitation loans were introduced.

(ii) Overall credit uptake: The main rationale for considering intervention impacts on overall credit uptake is that there is a cap on the number of loans and amounts clients can borrow both in general, due to regulations from the Reserve Bank of India, but also imposed by the implementing MFI, based on risk considerations. Given this cap and the fact that clients take up sanitation loans, it is interesting to consider what happened to borrowing in client households more generally during the time of the intervention. Doing so, we find evidence that households do

not react to the interventions by changing the composition of their borrowing with respect to formal and informal sources. We also find that households do not seem to switch between loan products offered by the implementing MFI, at least not on average over the course of the three year experiment. We interpret this as suggestive evidence that the introduction of sanitation loans does not lead to a crowding-out of (potentially productive) investments.

(iii) Other investments made: To gain a deeper understanding of potential crowding out of other investments, we study the impacts of the interventions on outcomes related to other investment purposes, particularly business investments and profits, education and consumption. We find no impacts on business investment and profits in the SL only arm. Interestingly, there is suggestive evidence that households in SL+A communities increase investment into agricultural (business) assets, though we do not have sufficient power to estimate this effect precisely. In terms of education, we do not see significant impacts on education loan uptake.Finally, we do not find any impacts on consumption expenditures, suggesting that the introduction of sanitation loans does not lead households to cut back on their consumption expenditures two and a half years after the introduction of sanitation loans.

(iv) Financial well-being: The provision of loans that can be considered unproductive, especially in the short-term, might be considered risky in that repayment might be more difficult. We analyze whether clients in the SL only and SL+A arms report having more repayment difficulties on loans since the introduction of the sanitation loan product. While we do not find any evidence that repayment of other loan products of the implementing MFI suffered (in fact, rather the opposite for SL+A treatment arm), constructing a proxy indicator for repayment difficulties of overall household borrowing suggests that, in both treatment arms, households are significantly more likely to have 'problematic' loans relative to the control group. While in control areas the percentage of households having at least one loan that was taken in 2015, i.e. two years before the endline survey, that was not fully repaid at endline is 14%, the intervention increases this statistic by 6-7 percentage points. Under the assumption that the treatments did not affect the loan duration of loans taken during the intervention and reported on in the household survey, this finding is hence suggestive that repayment of loans from other providers than the implementing MFI experience delays due to the introduction of sanitation loans.

(v) Sanitation beliefs: One channel through which the interventions under consideration could have affected sanitation outcomes is through the provision of information on the actual costs and benefits of safe sanitation. Using novel data on expected (monetary and non-monetary) costs and (non-monetary) benefits, we analyze this possible channel in detail. However, we find little impact of either intervention on beliefs on costs and benefits.

The report also conducts heterogeneity analysis on four dimensions - households that owned a toilet at baseline or not, whether the household is headed by a female or a male, Below Poverty Line (BPL) status of the household and the caste of the household - that could also shed light on possible mechanisms. Equally, this analysis sheds light on whether the effects are concentrated among specific sub-groups. We find three key patterns: (1) With the exception of caste, sanitation loan uptake is not driven by any of the specific sub-groups considered: Households belonging to a general caste are significantly more likely to take up sanitation loans than households belonging to one of the SC/ST/OBC categories in both treatment arms; (2) Impacts on toilet uptake/usage is driven by those without a toilet at baseline, other dimensions considered do not reveal differential impacts; (3) The lack of overall impact on toilet quality hides some interesting heterogeneity, by caste and BPL status in particular.

4. Are there any direct or spillover program effects on non-eligible households?

The study was designed to assess whether the interventions impacted sanitation choices of non-client households who were ineligible for both the sanitation loans and other loan products provided by the implementing MFI. A direct channel through which sanitation choices would have been influenced is through the awareness creation activities in the treatment arm that were targeted at the community as a whole, e.g. street plays and wall paintings. An indirect channel that could have been at play in both treatment arms is that of spillovers from client households, who were the primary targets of the two interventions. We find no compelling evidence of direct or spillover effects

on non-eligible households.

5. Is there any room for complementarities in the provision of micro-credit for sanitation and the financial incentives provided by SBM(G)?

In October 2014, the Government of India embarked on a mission to achieve an Open Defecation Free India by 2019 (GoI, 2014) and launched the ambitious Swachh Bharat Mission (SBM) - called SBM Gramin (G) in rural areas - a nationwide sanitation campaign that boosts the efforts of earlier such programs. The launch of SBM(G) in October 2014 happened to coincide with the start of the intervention. In this report we analyze whether there might be complementarities between the credit provision (with and without awareness creation activities) and SBM(G).

Our analysis reveals that there might be an important role to play for sanitation micro-credit in the context of SBM(G) subsidy scheme. We find that the introduction of sanitation loans in areas where SBM(G) was clearly very active, led to a significant additional impact on toilet coverage. High impacts are observed not just for SBM(G) ineligible households, but also for households in principle eligible for SBM(G) subsidies. This observation, combined with descriptive evidence of the fact that average toilet costs are double the amount of the subsidy and of reports of there being significant delays in subsidy disbursements, suggest that micro-credit might have been used by households as a means to cover funding gaps.

This report also includes a calculation of the costs incurred to run the intervention activities. Using the MFI's estimates for their operational costs, head office costs and cost of capital (as a fraction of sanitation loan amounts), we estimate a total cost for the running of sanitation activities of Rs. 3,000 (USD 45) per sanitation loan disbursed during the experiment, yielding in the SL only study arm a total cost of Rs. 1,095,000 (USD 16,425) or Rs. 27,375 (USD 411) per SL only community. Translating the percentage points impacts on toilet uptake in the SL only arm that we estimated above into number of new toilets, we estimate that 171 new toilets were built in the SL only treatment arm as a result of the introduction of sanitation loans. Combining this with the estimate of sanitation loan costs in that area, we obtain Rs. 6,404 (USD 96) of intervention cost per new toilet in the SL only treatment group, or 24% of the average toilet construction costs reported by client respondents in the control sites. Considering a loan amount of Rs 15,000 with a weekly repayment over a two year period, the break-even interest rate at a declining balance is 20%, which is the average interest rate charged by the MFI over the study period. The implementation costs incurred in the 39 SL+A treatment communities add up to a total of Rs. 2,103,417 (USD 31,551), or Rs. 53,934 (USD 809) per community. These expenses did not lead to any significant improvements in toilet uptake compared to the control group.

1 Introduction

According to the most recent Joint Monitoring Program report for Water and Sanitation [18], sanitation coverage and usage has significantly progressed globally. The use of basic sanitation services has increased steadily between 2000 and 2015. By 2015, 154 countries had achieved over 75 percent coverage with basic sanitation services, and 39 percent of the global population (2.9 billion people) used safely managed sanitation facilities. Behind these average numbers, however, lie staggering disparities across countries. India topped the world ranking in terms of the number of people still practicing open defecation, with almost 40 percent of the population having no access to sanitation facilities. Sanitation coverage was particularly low in rural areas, where 56 percent of the people still practiced open defecation [18].

Lack of improved sanitation can have disastrous consequences. Recent studies by Spears (2012) [15] and Kumar and Vollmer (2013) [10] suggest that improved sanitation decreases the risk of contracting diarrhea and associated infant mortality. Open defecation has also been associated with stunting among children and impaired cognitive development [6][3, 13] [16]. Similarly, evidence of a positive effect of early life exposure to one of India's sanitation policies on childhood cognitive skills has been proven [14]. Moreover, the lack of safe sanitation is acknowledged to affect broader outcomes such as productivity and investment, which ultimately constrain economic growth. The Water and Sanitation program (WSP, 2010) of the World Bank (WB) estimates that poor sanitation costs India US$48 per person per year, the equivalent of 6.4 percent of the country's gross domestic product (GDP) annually. Nonetheless, despite the investments in improving sanitation infrastructure in poor countries, the sanitation target established by the Millennium Development Goals (MDGs) has been missed by almost 700 million people [18]. Therefore, progress in sanitation uptake needs to accelerate in developing countries to achieve Sustainable Development Goal (SDG) target 1.4, universal access to basic services by 2030.

The Government of India (GoI) has shown strong commitment to improving sanitation, starting with the establishment of the Total Sanitation Campaign in 1999. Described once as the largest sanitation initiative in the world, the TSC included community awareness campaigns, provision of sanitation funds to communities to build sanitation infrastructure in public places such as schools and hospitals, and provision of small subsidies to individual below-poverty-line (BPL) households after they could demonstrate having constructed their own toilets. The campaign was revamped in 2012 as the Nirmal Bharat Abhiyan (NBA) policy or 'clean village' award scheme. This scheme offered, among other features, rewards to local governments that achieved 100 percent open defecation free status and ensured total sanitation. Most recently in October 2014 the sanitation campaign was re-designed as the Swachh Bharat Mission - Urban in urban areas, and Swachh Bharat Mission - Gramin (SBM(G)) in rural areas. This policy aims at attaining 100% Open Defecation Free India by 2019, with particular emphasis on sustaining behavioral change by local communities (GoI, 2014). In essence, each of these policies consider alleviation of financial constraints to sanitation uptake as a core component, addressed through the provision of subsidies. Each reform implied an expansion of range rather than a paradigm change, including for example increases in the subsidy amounts.

Studies analyzing the effectiveness of financial incentives for the adoption of preventive health behaviors, report varying success. Specific to sanitation, Guiteras et al. (2015) [5] find that subsidies reduced open defecation by 14 percentage points in rural Bangladesh. In line, Ben Yishay et al (2017) report from an RCT in Cambodia, that micro-credit is effective in raising willingness to pay for improved latrines. Effects on latrine installation are positive but, despite direct installation by the implementing agency, muted by several factors, including a negative peer effect. In the context of India, Clasen et al. (2014) [1] find no evidence of post-hoc subsidy effect in reducing exposure to fecal contamination or prevented diarrhea, soil-transmitted helminth infection, or child malnutrition in rural Orissa. Conversely, Spears (2012) [15] shows that the NGP prize (a financial reward introduced by the GoI in 2003 for communities that meet a number of criteria, including open defecation free status) has been successful in driving sanitation uptake.

Turning from toilet uptake to toilet usage, little is known about the effectiveness of financial incentives in promoting sustained changes on this dimension. The limited available evidence suggests for example that the NGP prize is not effective in sustaining long term sanitation usage [17]. Figures from the Indian Ministry of Drinking Water and Sanitation 2012 baseline survey show that 39% of households reported to own toilets, but that two out of ten of those toilets are reported to be out of use. Critics argue that the government programs yield poorly constructed toilets and that they do not sufficiently address the population's insufficient desire to construct, maintain and use toilets. Moreover, in other contexts some have argued that government subsidies are not optimally targeted, not always reaching the needy poor [8, 7].

A number of studies speak to the effectiveness of addressing other, non-financial constraints in improving sanitation practices. For instance, Gertler et al. (2015) [4] demonstrate that health promotion focusing on eliminating the open defecation, works through a number of mechanisms, including the provision of information on the return to better behavior, nudging better behavior, and encouraging households to invest in sanitation products that lower the marginal cost of good behavior. In line, Pattanayak et al. (2009) [12] provides evidence that the lack of information is an important constraint hampering sanitation uptake in the Indian context: latrine ownership in a rural Indian setting increased by 30 percent on the provision of information. However, Guiteras et al. (2015) [5] demonstrate that information campaigns, community motivation and a market access intervention linking villagers with suppliers does not increase hygienic latrine ownership as standalone interventions in the context of rural Bangladesh.

This study proposes to shed light on innovative ways of increasing the uptake and usage of safe sanitation practices through a cluster randomized controlled trial designed and implemented in 120 Gram Panchayats (GPs) in rural Maharashtra, India. It does so by evaluating the effectiveness of two variants of an intervention. The first intervention seeks to relax credit constraints by offering sanitation loans to members of pre-existing MF loan groups which can be used to construct toilets or water connections; while the second intervention rolled out a package of awareness creating activities - e.g. street plays, wall banners, sanitation and hygiene workshops, etc in selected communities. The latter intervention thus sought to improve awareness about the usefulness and cost-effectiveness of low cost safe sanitation. Forty of 120 randomly selected Gram Panchayats (GPs) received the sanitation loans only, a further 39 GPs were randomly selected to receive both the sanitation loan and the awareness creation activities, while 41 GPs received neither of these interventions, but continued to received other MF services from the implementing MFI.

In this report we evaluate the relative impact of these two interventions over a two and a half-year period. To support the evaluation, household listing and baseline surveys were conducted in late 2014, before the start of the interventions in early 2015. Sanitation loans were made available to clients in the micro-credit arms from February 2015, while awareness creation activities began in February 2015. They were concentrated in a few months from the start of the intervention period, and were all completed by July 2015. The endline data was collected around two and a half years after the start of the interventions. This report provides details of the endline data collection process and presents results on the impact of the intervention on our primary outcomes uptake and usage of safe sanitation. We also describe the impact of the intervention on several additional outcomes (e.g total household credit, sanitation credit, business investments and profits, education investments, perceptions of costs and benefits of toilets and uptake of the government subsidies) to shed light on the mechanisms through which the reported impacts are achieved and on possible unintended consequences of the interventions. In addition to looking at average and heterogeneous impacts on these outcomes, we provide a descriptive analysis of the profile of households reached by the intervention and we consider their interactions with the GoI's SBM(G) scheme.

The report is structured as follows. We begin by providing details on the context, and a detailed description of the interventions in Section 2. Section 3 outlines the research questions that the evaluation addresses, while Section 4 provides details on the evaluation design, including the power calculations and details on the study sample and data. Thereafter, we present the results in Section 5, starting with the main outcomes – toilet uptake, toilet

quality and toilet usage, followed by a discussion of observed mechanisms and concluding by targeting results and interactions with SBM(G). Section 6 provides a discussion of the findings and concludes.

2 Context and Intervention

2.1 Background

The impact evaluation is designed to gain a deeper understanding of innovative ways of increasing the uptake and usage of safe sanitation practices, relaxing two constraints mentioned earlier. In particular, it does so by providing information on the benefits of safe sanitation and available low cost sanitation technologies and making available micro-loans for sanitation construction (see intervention description in Section 2.3). The first component of our intervention, i.e. the provision of sanitation loans, has been delivered by a microfinance institution engaged in the MF sector in Karnataka, Maharashtra and Tamil Nadu states for almost 20 years. It provides financial and non-financial services to groups of women aged 19 to 55 years in rural and semi-urban low income households.[2] A wide range of loans are offered by the MFI to its clients, including emergency loans, festival loans, medical loans, income generating activity loans, etc. Since 2009, they started providing microcredit for the construction of sanitation systems. Understanding that providing finance only is not sufficient to reach high sanitation density, and that hygiene promotion also plays an essential role, the MFI further created an NGO, which makes clients aware of the benefits of safe sanitation and available toilet technology and infrastructure, the materials needed, and procedures for procuring parts, labor, and government approvals. In the intervention subject to evaluation in our study, this NGO has been in charge of delivering the sanitation awareness creation component.

2.2 Geographical focus

Our study concentrates on the south-eastern area of the Maharashtra state, districts Latur and Nanded (see Figure 1), where the implementing MFI has branch offices. Maharashtra, with its capital Mumbai, is one of the largest Indian states, counting approximately 100 million people living in almost 44,000 villages (Census, 2011). While this is the second richest state in the country in terms of per capita income, incidence of poverty remains close to the national average, implying severe inequalities within the state. According to the last human development report of Maharashtra (Government of Maharashtra, 2012) the HDI for Maharashtra has shown an improvement from 0.666 to 0.752 over the period 2001-11, reflecting advancements in the literacy rate, school enrollments, infant mortality and income. Although the HDI for all districts has shown progress, significant inequalities in development patterns are reported at local levels.

The study districts Latur and Nanded belong to those areas that have only moderately benefited from the growth. According to the latest District Level Household and Facility Survey (DLHS-4) collected in 2012-13, these districts face incidences of poverty of on average 35 percent, only 17% of the households use some type of toilet facilities and 40% (77%) of (female) household heads have not attended any school. Access to health services is also very poor, with only 13 percent of villages having a primary health center available in their village and the nearest government hospital being on average 63 km away.

[2] As of February 2017, the MFI reported a gross loan portfolio of Rs 3,025.62 Crore. As of March 31, 2017, they had 1,450,298 total borrowers compared to 1,205,974 in the previous year.

Figure 1: Geographical focus of the study

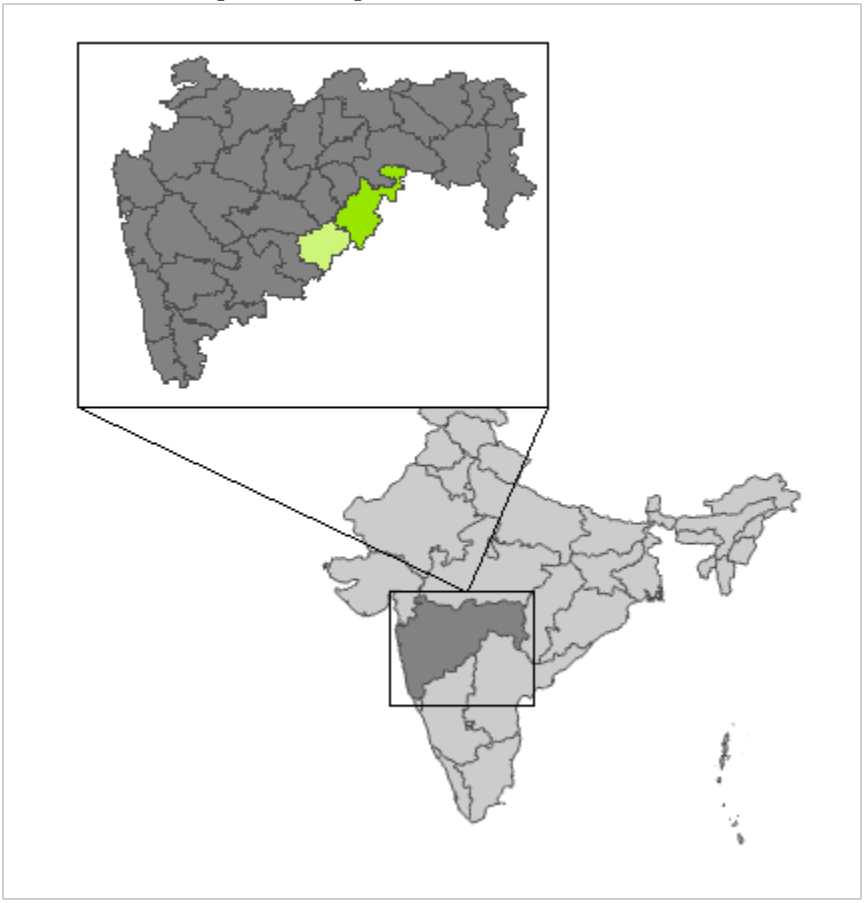
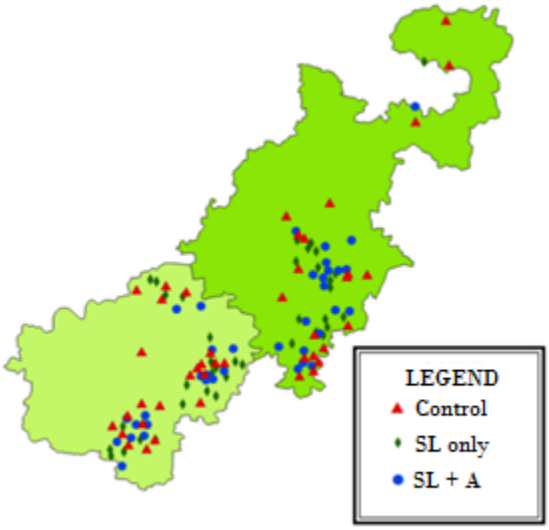


Figure 2: Location of the 120 study GPs



Within these two districts, our study covers 120 GPs, a complete list of which is provided in Table 98 Appendix A. Figure 2 shows the location of each of the study GPs, with an indication of their 'treatment' status in the study.

The selection of study GPs is described in detail in Section 4.4.1. To briefly summarize, study GPs were randomly selected from the list of all rural GPs serviced by the implementing MFI where no sanitation activities had taken place,. The selected GPs lie in administrative blocks Degloor, Udgir, Ahmadpur, Naigaon and Nilanga. According to the 2012 baseline survey conducted by the Indian Ministry of Drinking Water and Sanitation (Baseline survey, 2012), on average 27.4% of households in our study GPs reported to have a toilet in 2012. Note that this number hides information on actual usage of the toilet, which is an additional indicator we will consider in our study. Note also that the set of GPs in which the MFI is operational is a result of a careful selection exercise by MFI head quarters (e.g. has to be politically stable, certain number of women, etc) and can therefore not be considered representative for the state of Maharashtra, nor for districts Nanded and Latur.

2.3 Intervention description

The sanitation intervention we are evaluating in this report combines two different components:

1. The first component is the provision of sanitation loans up to Rs 15,000 to MFI clients, against an interest rate of 18-22% per annum over a 2-year weekly repayment period. These loans are only meant to be used for the construction of a new toilet or for repair of an old toilet.

2. The second component is a package of sanitation awareness creation activities run by the NGO. Education and awareness creation on sanitation issues are targeted to MFI staff, MFI members and the broader community. This is done through community-level activities such as theater plays, wall banners and information sessions for MFI clients at their weekly joint liability group meetings (see below) and MFI branch level workshops. Furthermore, both the MFI and the NGO engage with the community leader, called sarpanch, to gain support for their activities and to strengthen sanitation and hygiene awareness. This is important because the GP plays a pivotal role in the implementation of the GoI sanitation program, the SBM(G). Lastly, the NGO organizes mason trainings. Sub-section 2.3.2 provides more details about the specific package of awareness creation activities run in our study area.

2.3.1 Sanitation loans

Sanitation loan eligibility criteria

Any MFI client who have been client for at least one year, all of whom are female, is eligible to apply for a sanitation loan. There is no collateral requirement and the only constraint introduced in February 2015 is that a client needs to have been with the MFI for more than one year to be eligible for this loan product. To become a client, women must be between the ages of 19 and 55 years and form into groups of 5-10 members. Multiple such women groups in a GP are then grouped together to form a so-called kendra. The purpose of the kendra is mainly for the management of weekly loan repayments which take place at the GP level (more details below). Each kendra has on average around 30 members. In order to track loan repayments and loan utilization, each client is required to hold a passbook, in which all loan repayments are registered and the results of loan utilization checks are kept. Sanitation loans are provided for the construction of a new toilet or for repair of an old one. The MFI does not put any restrictions on the type of toilet the beneficiary decides to build, except that they advise against single pit technologies. MFI and NGO staff are trained to provide advice on different models, but the ultimate choice is left to the client. Kendra managers, who are in charge of providing funds and collecting repayments on a weekly basis, are instructed to provide a sanitation loan only after the client has clearly demonstrated her intention to build a toilet, e.g. by having provided space and having digged a pit. The kendra managers are in charge of conducting a series of loan utilization checks and to note the results of these checks in the kendra member's passbook. However,

at present no sanctions are imposed in case loans are used for any other purposes. This lack of reinforcement seems to have had implications for actual loan usage and is taken into consideration in the analysis of our study.

Sanitation loan caps and costs

As of today, sanitation loans cover a maximum amount of Rs 15,000, charging 18% interest rate per annum at a declining balance over a 2-year repayment period. At the onset of the experiment, the interest rate was set at 22%, but was subsequently reduced to 20 and then 18%, while the amount has remained constant through the intervention period.[3] The loan amount should cover most, but all construction costs for a quality toilet. This makes sanitation loans relatively attractive, as the amount received is higher than any other non-productive loan products provided by the MFI and the interest rate is lower than those charged for productive (business) loans (typically 25%). In addition to the interest, loan costs include a processing fee of 1.1% of total amount and Rs 306 life insurance premium. Each client can obtain one sanitation loan only, but clients can take an additional water connection loan of Rs 5,000. The overall loan cap on total loans taken from the implementing MFI is Rs 35,000 for new clients and Rs 40,000 for women who have been client for longer than three years. The overall loan cap on total loans from any MFI in India currently stands at Rs 100,000.

Sanitation loan disbursement and repayment process

The process from sanitation loan application to money disbursement can take any time up to four weeks. Like for most of the other loans provided by the implementing MFI, the client is required to physically go to the branch office for sanitation loan disbursement.[4] Clients repay the loan on a weekly (Rs 179) basis during their weekly meetings in the village with a kendra manager. Loan groups are held jointly liable for repayment of a loan. The rule is that if one group member defaults on any loan, no one else in the loan group can take out a new loan.

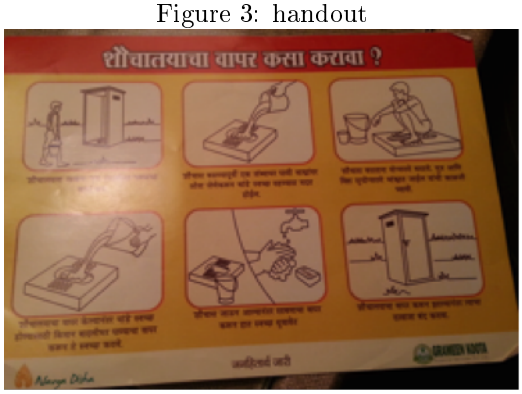
2.3.2 Sanitation awareness creation activities

Whereas sanitation loans are targeted at and available only to clients, the NGO targets education and awareness creation activities more widely, i.e. to MFI members and staff, GP officials and any other residents of the GP community. First of all, the NGO organizes one-off branch office trainings (one for each branch), through which branch managers and kendra managers (i) receive information about NGO's activities, (ii) get trained about the details of the sanitation loan procedures, (iii) get an awareness training on the importance of hygiene and sanitation (by use of IEC material), (iv) obtain information about the government's SBM(G) scheme, (v) receive a brief introduction to different available sanitation technologies and (vi) receive awareness creation handouts for distribution in the GP (see Figure 3 for an example of an IEC handout).

[3] This was a general policy change by the implementing MFI, not just for our study areas. In our sample, 35% of loans taken were at a rate of 22%, 49% at a rate of 20% and 16% at a rate of 22%.

[4] Exceptions where loans can be disbursed in the village include emergency loans (Rs 1,000), festival loans (Rs 1,000) and medical loans (Rs 2,000).

Figure 3: handout



The NGO sets up separate one-off trainings but of similar content for clients at their weekly kendra meetings in the GP (one for each kendra). Similarly, they organize mason trainings (one for all masons of 2-3 GPs combined) where again similar material is covered, but in addition the masons receive an in-door technical training on the different sanitation technologies (using demonstration material such as a pan and a pin trap and display of demonstration videos). Through an interactive toilet costing session, the NGO also creates awareness about the actual costs of different sanitation technologies with the aim of convincing the audience that Rs 15,000 should be sufficient to cover a substantial part of the construction costs for a good quality and sustainable toilet. Furthermore, street plays of about 30-45 minutes (one per GP) performed by a group of six Maharathi actors are organized. The objective of the play is to convey serious sanitation and hygiene messages in a fun and creative way. Street plays are organized in central, open public places, are announced through speakers and attended by various demographic groups in the community (men, women and children). Figure 4 shows the actors in action in one of our treatment GPs. In addition to the various trainings and street plays, the NGO hangs awareness banners in public places (see Figure 5 for an example) and conducts water quality tests of which the results are presented and discussed with the GP officials as a means of creating awareness about the hygiene issues in their communities.

Figure 4: Street plays

Finally, for each branch in our study area the NGO runs a half-day awareness workshop together for all MFI members and GP officials who are living in GPs in which the branch provides sanitation loans. The purpose of those workshops is to re-emphasize the messages covered in the individual sessions described above by going through similar IEC materials and procedures (including another performance of the street play theatre group). In addition, external speakers are invited to the workshop, such as government extension officers and local doctors, to come and

share their views about the importance of sanitation. Figure 6 gives an idea of how a typical audience in our study areas of such a branch level awareness meeting looks like.

Figure 5: Wall banner

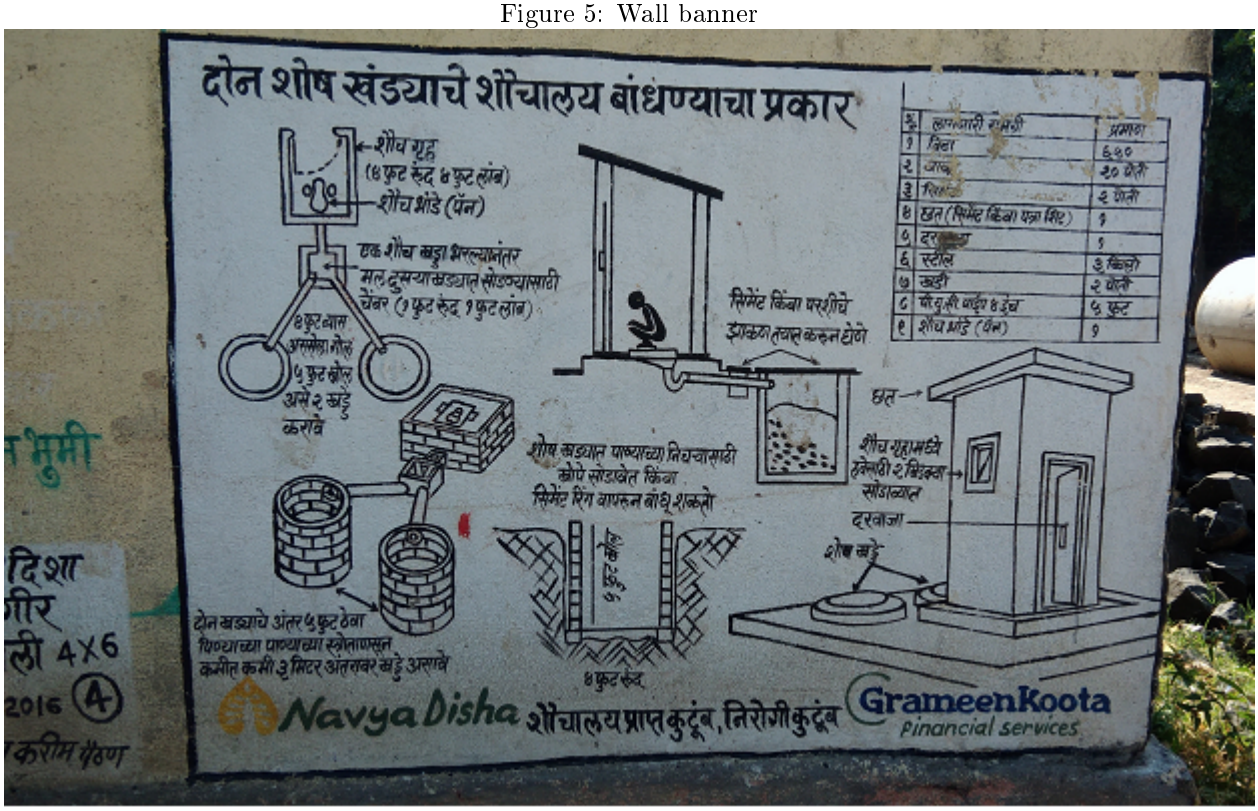
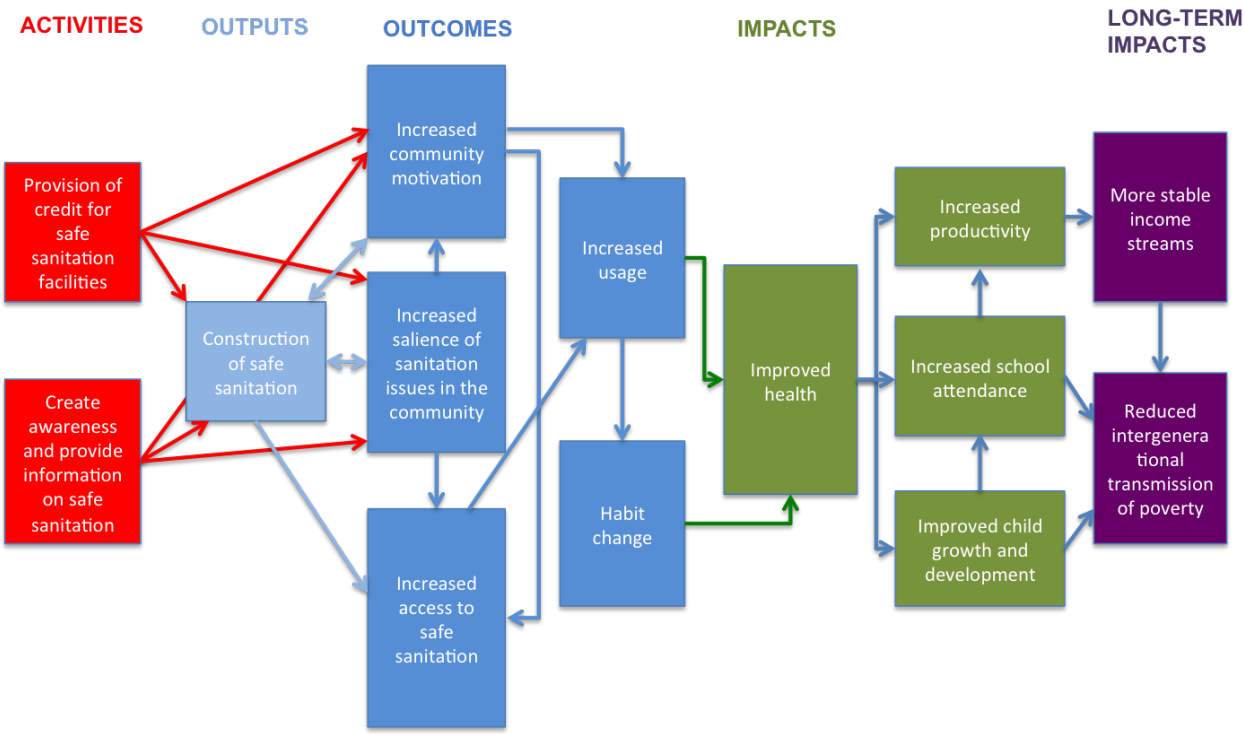


Figure 6: Branch level awareness workshop

3 Research Questions

As described in Section 1, the GoI has strengthened its sanitation efforts with the aim of attaining a 100% Open Defecation Free India by 2019 (GoI, 2015). The government's large-scale sanitation programs are active throughout India, including in our study area. The purpose of the intervention subject to evaluation in this report is to complement rather than substitute government's efforts and should be considered in that light. Just like the GoI, the key objectives of the MFI and NGO are, in the first instance, to improve awareness about safe sanitation and boost toilet construction and usage. Increased access to safe sanitation, in turn, is expected to positively impact on health through reduced parasitic/gut infections and reduced illness symptoms such as diarrhea. Some studies suggest that health impacts can only be observed if the entire village becomes open defecation free (Pearson, 2013). However, so far this evidence is suggestive rather than conclusive. In the longer term, better health of young infants is expected to yield improved child growth and development, increased school attendance and increased productivity. Ultimately, improved sanitation practice is expected to yield more stable income streams and to reduce intergenerational transmission of poverty. Figure 7 summarizes the project's short-term and longer-term objectives.

Figure 7: Project objectives



The two interventions are hypothesized to play a role in assisting government's accelerating efforts to boost access to sanitation throughout India, through the following channels:

- NGO activities include the provision of information about the existence of the SBM(G) program to villagers and what actions eligible households can take to get access to the government subsidies;
- The government subsidies target specific types of households, primarily those living below the poverty line and other marginalized groups. Other demographic groups in need of financial support may reach out to sanitation loans to pay for toilet construction.
- Government subsidies are disbursed, at least partially, only after the household can demonstrate having built

a toilet. Households in need of money up-front may not be able to construct a toilet without first acquiring a sanitation loan.

- The government subsidy currently stands at Rs 12,000 - Rs 15,000. Any additional expenses need to be covered by the households themselves and might be financed through microcredit.
- Moreover, an eligible household can receive a government subsidy only once. In case a household received a subsidy in the past, when the magnitude of the subsidies were much lower, it may still require a loan, for instance to upgrade its old toilet.
- The magnitude of the scale of India, and the speed at which the SBM(G) program is being rolled out, naturally poses a challenge to the efficiency of the program and the accuracy of the monitoring process. WSP (2011) points out the various challenges involved with an exponential increase in the number of applicants for NGP awards and makes a set of valuable recommendations. In general, we expect there to be some delays in the distribution of government sanitation subsidies to some eligible households. Although the government subsidies may be free whereas loans come at a cost in the form of interest payments, the subsidies may be relatively more difficult to come by whereas the loans are more readily available.
- WSP (2011) notes that experience has shown that there is an inverse relationship between government program scaling up and quality. Awareness creating activities include an emphasis on the importance of high quality and safe toilets and hence may complement the government's program in terms of improving the quality of the toilets that are being built either through government subsidies or through sanitation loans.

On the backdrop of the above points, this report sets out to answering the following research questions:

1. Are micro-credit-based approaches to improving sanitation coverage effective in terms of *uptake*, *usage* and *quality* among micro-credit eligible households? If effective, who is being reached? And, importantly, who is not reached/left behind?
2. Are they more effective when combined with awareness creation activities?
3. What are the mechanisms underlying intervention impact(s)?
4. Are there any direct or spillover program effects on non-eligible households?
5. Is there any room for complementarities in the provision of micro-credit for sanitation and the financial incentives provided by SBM(G)?

4 Evaluation Design

This evaluation is based on a 'cluster randomized controlled trial'. In what follows, we provide details on the evaluation design, highlighting how it enables us to evaluate the relative impact of the sanitation loan provision on its own and in combination with awareness creation activities. We will re-visit the specific research questions driving our evaluation analysis and outline empirical strategy adopted to answer each of them. Finally we will discuss attrition issues and present some randomization check we did to ensure sample balance across treatment branches.

4.1 Randomization design

While the implementing MFI was already operating in our study area prior to the start of the project, neither sanitation loans, nor awareness creation activities by the NGO were available to their clients nor to the communities their clients are living in. The interventions have been introduced during the course of the project in a manner that both facilitates implementation and allows us to rigorously assess the impact of the interventions. Specifically, the interventions have been introduced in a randomly selected subset of the 120 GPs only. Randomly providing the interventions to some ('treatment group') and not to others ('control group') helps the impact evaluation process as it ensures that prior to the intervention the treatment and control groups are, on average, statistically the same in terms of observable and unobservable characteristics. In other words, randomization removes 'selection bias' (i.e. pre-existing differences between the treatment and control groups, such as different levels of education, that might make one household more likely to follow hygiene practices than another). In theory, this should ensure that when we compare the outcomes of treatment and control groups at the end of the intervention, the only difference is due to exposure to intervention activities and not due to any (un)observed differences between them. It allows one to obtain unbiased estimate of impacts of the treatment on outcomes of interest.

While the need for randomization is clear from a methodological point of view, one should also take its ethical implications into consideration.[5] In particular, during the period of the experiment (approximately two and a half years), some GPs were excluded from all sanitation services by the implementation institution although they would qualify to be covered in principle. Here it should be noted that implementing agencies would not have been able to roll-out the program across all areas of operation within the time of the evaluation. In practice, implementing agencies work in phases covering one area, and then extending to another and so forth. We simply exploited the existing capacity constraints during the expansion phase of the program to define the control groups.[6]

The interventions were randomized at the GP level (rather than at the household or individual level) for three key reasons: First, GPs play a key role in implementing government and state policies related to sanitation; second, because of intra-community spillovers and feedback effects associated with sanitation adoption; and finally because the intervention involves activities open to all GP members (e.g. street plays, engagement with the sarpanch, etc). Randomizing at the individual or household level would therefore lead to the contamination of the control group, thereby leading to biased estimates. Specifically, the 120 GPs in our study area were allocated to three evaluation groups:

1. those that only receive sanitation loans only (SL only);
2. those that receive both awareness activities and sanitation loans (SL+A); and
3. a control group that receives neither sanitation loans nor awareness creation activities (Control).

[5] This research was approved by the ethics board of the University College London, UK, Project ID: 2168/008; as well as by the IRB of The Institute of Sustainable Development, Chennai, India.

[6] While the MFI is theoretically able to roll-out a new loan product in all branches at the same time, experience shows that these are typically not marketed until loan officers were trained on the product which, in the case of sanitation loans, is done by the NGO staff. NGO's resource capacity hence basically implies a phased-in approach. However, in the context of this study, the phase-in of loan products was made more explicit and was, in fact, held back more than originally envisioned, due to delays in evaluation activities.

The experimental design is summarized in Table 1. The reason why we do not have an equal number of GPs per study arm lies in the fact that randomization was stratified at the level of the branch and by GP size. This stratification is described in more detail below.

Table 1: Experimental design - number of clusters per treatment arm

Control	SL only	SL+A	Total
41	40	39	120

All 120 GPs, i.e. including control GPs, have continued to receive the standard package of services from the MFI throughout the intervention period, which includes access to income generating micro-loans, and other loans. This is important as it implies that our evaluation assesses the impact of providing sanitation activities over and above microfinance loans for other purposes. The first reason for this choice is operational: the implementing MFI sees sanitation loans to bear greater risks than income generating activities and hence want to know their clients better before they provide this new loan product (the policy change to only provide loans to clients that were with them for at least a year reflects this concern). The second reason is more important from our evaluation perspective and is that we would not want our evaluation design to introduce a possibility for sanitation loans to crowd out other investment opportunities (which could also affect outcomes of interest).

This experimental design allows us to assess (i) the impact of the provision of sanitation micro-loans, by comparing the outcomes of the 'SL only' treatment arm with the outcomes of the 'Control' group; and (ii) the impact of the provision of sanitation micro-loans combined with awareness activities by comparing the outcomes of the households in the 'SL+A' treatment arm with the outcomes of the households living in the 'Control' group . Finally, note that a large part of our analysis will be conducted at the individual or household level, and so all estimates will be identified through an intention-to-treat analysis, based on the initial GP-level randomization, regardless of whether or not an individual or household actually takes up, or is exposed to, the intervention. Though conservative, this ensures that estimates are not subject to bias arising from selection, i.e. those that choose to take up a loan may be different from other households in the community. Moreover, all households in treated GPs will receive some aspect of the intervention (information for all, and credit for some), making the intention-to-treat analysis best suited for our purposes.

4.2 Empirical strategy

In this section, we provide a detailed overview of how we use the experimental design and collected data to shed light on the research questions listed in Section 3. For simplicity, we reproduce the research questions, before outlining our methodology.

1. Are micro-credit-based approaches to improving sanitation coverage effective in terms of *uptake*, *usage* and *quality* among micro-credit eligible households? If effective, who is being reached? And, importantly, who is not reached/left behind?

2. Are they more effective when combined with awareness creation activities?

To answer this first set of questions, we use information collected in the endline household surveys on toilet uptake, usage and quality. Specifically, we compare the average values of these variables in the arms where sanitation loans were introduced, adjusting for whether they also received the awareness creation intervention, with those in the control arm, accounting for the fact that the GPs in our study arms were randomly allocated into one of the three study arms within strata defined according to the branch the GP was covered by, and the size of the GP (described in more detail in Section 4.4.1). In regression terms, we estimate specifications of the following form[7]:

[7] Following guidelines in [11], we choose the ANCOVA specification over the diff-in-diff approach. [11] shows that when analyzing an

$$Y_{iv} = \alpha_0 + \alpha_1 SanitationLoan_v + \alpha_2 Awareness_v + \beta X_{iv} + \theta_v + \varepsilon_{iv} \quad (1)$$

where Y_{iv} is the outcome for household i in GP v, $SanitationLoan_v$ takes value of 1 if sanitation microloans were introduced in GP v (without additional awareness creation activities) and 0 otherwise; $Awareness_v$ takes a value of 1 if sanitation micro-loans were introduced in GP v and awareness creation activities were provided alongside the introduction, X_{iv} are household-level controls that will help increase power and precision and θ_v are strata dummies for GP v. The control variables X_{iv} are chosen according to those that most explain the variation in toilet ownership among control households. In particular we control for toilet ownership at the baseline and for baseline presence of a child aged less than 2 years in the household[8]. This is because at baseline we stratified the sample such that households with children aged < 2 years were over-sampled.[9] For inference, we use standard errors clustered at the GP level.

The coefficient α_1 provides us with an estimate of the impact of the sanitation micro-loans, while α_2 provides an estimate of the impact of the sanitation loan provision combined with awareness creation activities. These estimates are intention-to-treat estimates. To answer the first two research questions, we estimate this specification for client households .

We also consider who the interventions reached by investigating descriptively who took sanitation (loans) and toilets and how they compare to the average household in the village/client/non-client sample, making use of the endline client and non-client datasets.

3. What are the mechanisms underlying intervention impact(s)?

We then explore the mechanisms underlying the impacts we find, regardless of whether or not the interventions worked. In particular, we study the effects on intermediate outcomes that we expect the interventions to influence. To study the mechanisms, we use specifications similar to Equation 1, where Y_{iv} is defined as one of the intermediate outcomes. Specifically, we look at (i) intervention participation, (ii) credit uptake, (iii) other investments made, (iv) financial well-being, and (v) sanitation beliefs. The specific intermediate outcomes we consider are outlined in Table 2, along with some description on the specific mechanism that might be at play:

RCT experiment with two survey rounds, ANCOVA provides greater improvements in power than a Diff-in-Diff specification. This is particularly true when autocorrelation is low as is common with outcomes like business profits, expenditure, and income, but also when auticorrlation is less than perfect.

[8] Baseline toilet ownership for the full client sample (a subtantial sub-set of which we do not have any baseline data for) is constructed using date of toilet construction reported at endline.

[9] This was done to have increased power to detect possible health impacts. Indeed, an evaluation of long run implications of the interventions were originally supposed to be part of the study. Thus the impact of the intervention on children 's health conditions and health insurance claims. However, at a later stage we decided to focus on short term impact only.

Table 2: Mechanisms determining intervention effects

Intermediate outcome	**Mechanism it tests**
Intervention participation	Did households receive the awareness creation activities? Did control households receive similar information from other sources?
	Did households borrowing specifically for sanitation increase? Did households who took sanitation loans actually use them to build or upgrade a toilet? Was the sanitation loan usage monitored by the implementating MFI?
Credit uptake	Do households lack financing for sanitation? Did the interventions changed overall household borrowing? Did the interventions change clients' loan uptake from the implementing MFI? Did the interventions affect clients' financial well-being?
Other investments made	Did households have to cut back on investments in their business in order to take up a non-income generating loan? What happened to profits overall? Did households have to reduce consumption?
	Did households change schooling investments when sanitation loans were made available by, for example, not taking education loans?
Financial well-being	Did households experience difficulties in repayment of other loans taken?
Sanitation beliefs	Did the awareness creation activities change households' perceptions of the benefits and costs of toilets?

A further approach taken to gain a deeper understanding of how the intervention works, is by considering whether the effects of the intervention differ across different groups (e.g. households that owned a toilet at baseline or not, female-headed households, SC/ST/OBC vs General Caste households, BPL vs non-BPL households) by estimating heterogeneous treatment effects. This involves estimating regressions of the following form:

$$Y_{iv} = \gamma_0 + \gamma_1 SL * Z_{iv} + \gamma_2 SL * (1 - Z_{iv}) + \gamma_3 SLA_v * Z_{iv} + \gamma_4 * SLA * (1 - Z_{iv}) + +\gamma_5 Z_{iv} + \mu X_{iv} + \theta_v + \varepsilon_i \quad (2)$$

where SL stands for SL only treatment, SLA for SL+A treatment, and Z_{iv} is the binary variable along which we want to test for heterogeneity in the treatment effect. All else is defined as in Equation 1. Take the example of our first dimension of heterogeneity considered, toilet ownership at baseline. Here, $Z_{iv} = 1$ if household i in village (GP) v had a toilet at the time of the baseline survey; coefficient γ_1 provides then the impact estimate of the SL only intervention for households that had a toilet at baseline and γ_2 provides then the impact estimate of the SL only intervention for households that did not have a toilet when the baseline survey was conducted. γ_3 and γ_4 are to be interpreted similarly, just for the SL+A intervention impacts.

4. Are there any direct or spillover program effects on non-eligible households?

To gain an understanding of spillover effects of the two interventions we estimated Equation 1 on non-eligible households in the study communities.

5. Is there any room for complementarities in the provision of micro-credit for sanitation and the financial incentives provided by SBM(G)?

To answer this question, our analysis focuses on the subsidies provided by the government's SBM(G) scheme. Specifically, we test whether study households are more likely to have applied for the subsidy and to have received

it if they were in the GPs that received sanitation loans only, using specifications similar to Equation 1. We further add a descriptive analysis to gain a deeper understanding of the mechanisms at work. For example, we compare across the different treatment arms amount of subsidy received and timing of subsidy payments.

4.3 Power calculations

At the time of writing the proposal, we conducted a power analysis to determine our sample size and to understand the minimum detectable effects we can achieve, making a number of assumptions. The analysis focused on our key outcome: safe sanitation ownership.[10] In this way we could determine the minimum possible effect size that can be detected with a given degree of confidence with our design, i.e. given the sample size in terms of numbers of clusters, and observations in a cluster, the intra-cluster correlation (degree of correlation of the outcome within the cluster), and proportion of clusters that received the treatment. We computed the minimum detectable effect size for a 80% probability of finding an effect that was actually there (referred to as power = 0.8), and a significance level (probability of finding an effect that was not there) of 0.05, assuming two-sided tests.[11]

Using baseline data, we were able to update our initial assumptions on the intra-cluster correlation and control means of sanitation ownership with respect to what was done at the time of writing the proposal. We also considered ICCs for clients and non-clients separately. The baseline report provides a detailed description of this exercise. Based on this revised power analysis we increased our endline sample, aiming to add up to 30 additional clients per GP. Combined with the panel sample we obtain on average35 clients per cluster.

The number of clusters per arm remained 40.[12][13]

Table 3 shows in the first two columns the minimum detectable effects (MDEs) among clients with a sample of 15, 35 and 45 clients respectively, and the MDE for our panel sample (i.e. including here non-clients). For clients, focusing on the sample size of 35 per cluster, we get a minimum detectable effect of 0.096. That is, our design allows us to detect increases in sanitation ownership of at least 9.6 percentage points using the full client sample. This impact was considered a reasonable one to expect for the following reason: At the time of revisiting the endline sample size, administrative data from the MFI indicated that around 15% of clients had taken a sanitation loan by January 2016. Assuming that no sanitation loans were to be provided subsequently, this would allow to detect an increase in sanitation coverage amongst clients if 64% of loans have been invested into toilets and if these toilets would not have been built without the availability of the credit. Moreover, if the interventions had multiplier effects on SBM(G) subsidy update we could expect the impact to be higher than the impact driven by sanitation loan uptake alone.

The impact we can detect using the full set of interviewed households, i.e. including non-clients, is 6.8 percentage points (7.3 percentage points when using the panel sample only).[14] While it is not inconceivable for the intervention (particularly information and credit combined) to have such an overall effect, the probability is smaller. In particular, the intervention might not be as effective in increasing uptake among non-client households. However, within this sample, we can focus on questions of heterogeneity and mechanisms, and impacts in sub-samples could be of this size. We conducted an exercise allowing for multiple hypotheses testing in this setting (not shown, but available on request),[15] in which case the MDE increases from 6.8 percentage points to 7.6 percentage points for the full sample;

[10] We note that ownership and usage are highly correlated in our setting, which allow us to address both of these outcomes without the need of much additional power.

[11] Our power calculations were done using a methodology and accompanying spreadsheet recently developed by McConnell and Vera Hernández (2015). This spreadsheet is publicly available at http://www.ifs.org.uk/publications/7844.

[12] When considering the effectiveness of credit we can pool the two treatment arms, increasing the number of clusters to 80. While this will certainly increase our power, we do not present the analysis here, partly since we do not know what impact differing variances in the two groups will have on the minimum detectable effect, and to remain conservative in our estimate.

[13] We will compare outcomes between each treatment group (40 clusters) and the control (41 clusters). Thus we consider power in settings where half of the clusters are treated (proportion treated = 0.5).

[14] Note that this analysis does not account for possible different variances between client and non-client groups.

[15] The conservative way of allowing for multiple hypotheses testing in a power analysis is to follow Bonferroni and divide the significance level by the number of hypotheses to be tested. In our case, this implies 0.5/4=0.0125

and from 0.096 to 0.107 for the clients only sample when four hypotheses are tested.

Table 3: Power Analysis

	Clients only			**Full sample**		
Numbers of individuals per cluster (m)	15	35	45	30	50	60
Minimum detectable effect (δ=p1-p0):	**0.106**	**0.096**	**0.089**	**0.073**	**0.0684**	**0.0635**
Control Group Success Rate (p0):	0.245	0.245	0.245	0.28	0.28	0.28
Proportion treated (π):	0.5	0.5	0.5	0.5	0.5	0.5
Alpha:	0.05	0.05	0.05	0.05	0.05	0.05
Power:	0.8	0.8	0.8	0.8	0.8	0.8
ICC (ρ)	0.079	0.079	0.079	0.032	0.032	0.032
Number of Clusters per Control Arm (k0)	40	40	40	40	40	40
Number of Clusters per Treatment Arm (k1)	40	40	40	40	40	40
Total Sample Size per Control Arm (n0)	607	1400	1807	1215	2000	2401
Total Sample Size per Treatment Am (n1)	607	1400	1807	1215	2000	2401
Total Sample Size (N = n0+n1)	1214	2800	3614	2430	4000	4802

4.4 Sampling

4.4.1 Sampling design

The study started off by determining the set of 120 GPs to consider as part of the evaluation and then to randomly allocate each of these to the three different evaluation arms. The first step was to identify the set of feasible study GPs. A feasible study GP was defined as one where (i) the MFI had operations (i.e. active kendra groups) and (ii) where sanitation activities had not been undertaken in the past. Through interactions with MFI staff, we identified areas where no sanitation were ongoing (and did not have them in the past), but where they were planned (and/or considered feasible) in the near future. Then we matched the list of kendra groups that were active in the selected area to the GPs they were located in.[16] During the process, kendras located in urban areas were excluded (as they would by definition not be in a GP and hence not be eligible to become part of the study). At the end of the listing process 120 GPs in five blocks (corresponding to MFI branches) within two districts in Maharashtra, namely Nanded (Degloor, Naigaon) and Latur (Ahmedpur, Nilanga, Udgir) were identified as our study area.

The second step was the randomization of the 120 GPs to one of three evaluation arms (see Section 4.1): Control, SL only, SL+A. Randomization was stratified by branch and by size of the GP (size in terms of number of households). Table 4 summarizes the results of the randomization to the three evaluation arms, stratified by branch office and GP size.

We stratified not only at the GP-level randomization, but also when selecting the sample of survey respondents. Study households were stratified by (i) whether a client lived in the household and (ii) whether a child under the age of two years lived in the household. In order to stratify the population on the basis of MFI membership, households of clients first had to be identified. To avoid survey contaminating the study design, the identification of households was to be achieved through ex-post listing, by matching the names of the (only female) clients in the clients database to the names of household members provided during the listing survey. Therefore the final design included a baseline household survey of a sample of 30 households in each of the 120 study GPs (3,600 households in total), stratified by (i) whether a client lives in the household and (ii) whether a child under the age of two years old lives in the household. Further details on this selection and randomization process are described in the baseline report. The total baseline sample size achieved for the household survey dataset, including clients and non-clients

[16] As the MFI did not keep information on the GP (our unit of randomization) that the kendra members lived in (which corresponds to where the kendra is registered), kendras were manually matched to the GPs they were located in. Approximately 80% of all kendras were matched to GPs based on their names using 2001 census information, and Google (i.e. searching for the Kendra name to see if it was associated with a village with a different name to the GP name) where possible. The remaining kendras needed to be matched to their GPs with the input from branch staff. For further details on the matching methodology see the baseline report.

Table 4: Random allocation of study GPs to evaluation arms, by branch and size

		Total
Ahmadpur	Large	5
	Small	7
Degloor	Large	13
	Small	14
Naigaon	Large	15
	Small	15
Nilanga	Large	14
	Small	12
Udgir	Large	15
	Small	10
	Total	**120**

was 3,595. Table 5 summarizes the sample size by stratum (by client/non-client and by kids/no kids) and by treatment arm.

Table 5: Sample composition baseline household survey

		Control	**SL only**	**SL+A**	**Total**
Non clients	Kids < 2 years old	330	318	314	962
		(53%)	(53%)	(54%)	(53%)
	Kids 2-5 years old	48	34	57	139
		(8%)	(6%)	(10%)	(8%)
	No kids < 6 years old	239	248	213	700
		(39%)	(41%)	(36%)	(39%)
	Total	617	600	584	1801
Clients	Kids < 2 years old	230	182	203	615
		(37%)	(31%)	(35%)	(34%)
	Kids 2-5 years old	120	120	97	337
		(19%)	(20%)	(17%)	(19%)
	No kids < 6 years old	271	285	286	842
		(44%)	(48%)	(49%)	(47%)
	Total	621	587	586	1794
Total		**1238**	**1187**	**1170**	**3595**

We now present the procedure used to obtain the sample for the endline data collection. For the sake of clarity, procedures are described separately for client households and non-client households.

Endline sampling - Client Households

All client households interviewed at the baseline (around 1,800) were included in the endline sample of client survey, referred to as the 'panel client households'[17]. To limit sample loss due to attrition, we tracked households if they moved (i) within the GP where they lived at baseline, and (ii) to another GP in our study area. 2,400 additional households were selected among clients already active at baseline and belonging to those lending groups (kendra) where at least one client household was interviewed for the baseline survey. Overall, this means that we sampled around 75% of all 5,350 active at the time of the baseline survey. As we are interested in collecting information on joint liability loan groups and interactions within these, we targeted clients from the same kendra. Thus, the following sampling procedure was applied:

- Step 1: in the 72 GPs where only one kendra is present, we sampled all clients in that kendra, including both panel and 'new'client households.

[17] To be precise, 1,787 clients were interviewed at the baseline. At the endline we were able to reach 1,688 of them. See Section 4.4.2 for details on response rates.

- Step 2: in the 48 GPs where more than one kendra is present, kendras with at least one client sampled at the baseline were sorted randomly within the GP, and all client households from the top kendra of each GP were picked.
- Step 3: As more clients were needed to reach the desired sample size, a third step was conducted following this strategy: kendras not fully sampled (but with at least one client sampled at baseline) were randomly sorted, and the top 'x' kendras were picked until we reached the desired sample size of 2,400 additional households. Note that at this stage, no sorting at the GP level was done.

Table 100 in Appendix B compares the average endline characteristics of panel client households to the average characteristics of the 2,400 additional client households, focusing on those characteristics that are unlikely to have changed over time such as caste and religion. When drawing the panel client sample at baseline, more than proportional weight was given to households with children under two years of age. When drawing the additional non-panel client households, no such weighing was done. We therefore do not expect panel client households to be similar as non-panel clients. Indeed, Table 100 suggests that panel client households were on average larger in size, had more children and more elderly members, were more likely to be of the Scheduled castes or tribes, and more likely to be hindu or buddhist rather than muslim. Importantly, however, in Section B we will show that the total sample of clients we obtained at endline was balanced across treatment arms.

Endline sampling - Non-client Households

As was the case with client households interviewed at baseline, we also revisited all non-client households interviewed at the baseline (around 1,800) for the endline survey[18]. We supplemented the original non-client households with a sample of households living close to a random sample of client households (which we refer to as the index households). We surveyed around 8 - 9 index households per GPs according to the size of the client population in that GP, for a total of 1,000 index households and 5,000 neighbor households from the same 120 GPs. We fielded a short survey that aimed at gaining an insight into sanitation behavior at neighborhood levels. The neighbor households were selected in the following manner:

1. Interviewers stood at the main door of the sampled index household and noted down (i) all neighbor households that could see the entrance of the index household, and (ii) how clearly they could see it.
2. Interviewers then constructed the possible list of neighbor households to interview in the following manner:
   (a) They listed all households that could see the client household entrance clearly, or with some obstruction.
   (b) If more than five such households were listed, then they proceeded selecting 5 neighbor households to interview according to the rule below. If less than 5 such households were listed, they noted down whether there were any households adjacent to the client household that might not be able to observe the client household, but might be able to hear the client household (e.g. because they lived directly above/below them).
   (c) If at least 3 households that could observe/hear the index client household were present, then the surveys of the index household and neighbors proceeded. If there were 5 neighbor households, all are interviewed. If there were more than 5 neighbor households, 5 neighbor households were selected for interview using the rule below.
3. Interviewers numbered the neighbor households starting from the household with the clearest direct observation to the household with the most obstructed/view or largest distance, followed by clearest hearing without view to the poorest hearing without view. The first 5 households in the list were selected for interview.

[18] More specifically, 1,770 out of 1808 non-client households in the baseline sample were interviewed again at the endline. See Section 4.4.2 for details on response rates.

4.4.2 Attrition, replacements and sample size

As mentioned above, panel households were tracked within the GP and in other GPs within the study area to limit attrition. The attrition rate for the whole panel sample was on average 4% (2% and 6% among non-clients and clients respectively), which is relatively low given the almost three year lag between the baseline and endline surveys. Tables 101- 103 in Appendix B compare baseline characteristics of baseline sampled households that we were not able to re-survey at endline ('attritors') to baseline sampled households that we were able to re-visit at endline ('stayers'), separately for the whole sample, for MF clients and for non-MF clients. Overall, attritors are on average smaller in household size, they have a younger household head and are less likely to have any elderly members, they are more likely to belong to the Scheduled castes or tribes relative to the other castes, they are more likely to be buddhist, less likely to own any agricultural land and are on average less wealthy (which is reflected in either their BPL status and/or the value of their assets). This is the case for both client and non-client households.

Apart from a reduction in statistical power (which is not a big concern here given the small attrition rate), attrition could be problematic if it yields a significant imbalance across study arms, either because of significantly differential attrition rates and/or because of significantly differential attrition correlates with household characteristics. As shown in Table, the attrition rate is balanced across the three study arms for the sample as a whole and for the sub-sample of non-clients. For the MF client sample, we observed a slightly higher attrition in the SL only treatment relative to the control sites (6% relative to 2% in control), a difference that is significant only at the 10% level. To confirm balance across study arms in terms of attrition correlates, Table 7 shows estimation results of a regression of attrition (i.e. a dummy equal to 1 if the panel observation was dropped from the study by the time of endline) on a set of baseline household characteristics and their interactions with the treatment indicators. For the whole sample, attrition was only significantly correlated with household size. The interaction of household size with both the treatment indicators is not significant, however. This finding suggests that this correlate was balanced across study arms and therefore not expected to yield any estimation bias. The same holds for the client sample, except that here in addition attrition was significantly more correlated with religion (being hindu) and BPL card ownership in the SL+A treatment arm than in the control group. Similarly, in the non-clients sample we find some imbalances in attrition correlates across study arms, particularly in terms of proxies of economic status. In Section 4.4.3, we show that our endline client sample is balanced across study arms, which suggests that the slight imbalance in attrition rate and its correlates was not sufficiently large to yield any significant differences across study samples. Moreover, in the impact analysis that follows, we do not find any heterogeneity of impacts in BPL status (see Section 5.3) or in terms of religion (results not reported). We are therefore confident that this slight imbalance in attrition rate and its correlates across treatment arms is unlikely to greatly influence the main results.

Table 6: Attrition: balance across study arms

	Whole sample	Control	SL only	SL+A
Whole sample	3.81%	3.31%	4.38%	3.76%
Clients	5.52%	4.19%	6.30%*	6.14%
Non-clients	2.11%	2.43 %	2.50%	1.37 %

Note: * p <0.10, ** p <0.05, *** p <0.01

For new clients we attained a response rate of 94%, meaning that a replacement list of 300 additional clients was needed to reach the target of 4,200 clients interviewed at the endline. Replacements were selected from the list of kendras obtained after Step 3 of the previously described sampling procedure (see Section 4.4.1), taking care of selecting as many clients from the same kendra as possible.[19] Regarding non-client households sampled for the supplementary non-client survey , in some GPs the survey team faced issues in achieving the targeted sample size,

[19] The most frequent reason for replacement was households moving permanently to other places, mostly Nanded and Pune to work. Note that the list of additional clients was sampled from the clients already active at baseline.

Table 7: Determinants of attrition

	Whole sample	Clients	Non-clients
Control:			
Baseline toilet ownership	-0.0057 (0.0098)	-0.0219 (0.0147)	0.0106 (0.0139)
Ln(household size)	-0.0325** (0.0160)	-0.0532** (0.0244)	-0.0114 (0.0176)
Male household head	0.0202 (0.0189)	0.0317 (0.0310)	0.0086 (0.0283)
Head able to read	-0.0267 (0.0271)	-0.0343 (0.0368)	-0.0111 (0.0395)
Head able to write	0.0163 (0.0309)	0.0142 (0.0407)	0.0060 (0.0420)
Scheduled caste	-0.0054 (0.0106)	-0.0118 (0.0170)	-0.0015 (0.0171)
Hindu	-0.0136 (0.0131)	-0.0137 (0.0179)	-0.0144 (0.0212)
Primary activity is agriculture	0.0113 (0.0147)	0.0169 (0.0186)	0.0053 (0.0208)
BPL card	-0.0079 (0.0105)	0.0186 (0.0169)	-0.0199 (0.0121)
Household owns agricultural land	-0.0128 (0.0118)	-0.0183 (0.0196)	0.0045 (0.0157)
Ln(annual consumption)	0.0046 (0.0066)	0.0065 (0.0131)	0.0051 (0.0059)
Ln(value assets)	0.0001 (0.0011)	0.0006 (0.0008)	-0.0038 (0.0071)
Pucca house	-0.0148 (0.0111)	0.0094 (0.0285)	-0.0266** (0.0112)
Treatments:			
SL only	-0.0205 (0.1020)	0.0969 (0.1930)	-0.2201 (0.1530)
SL+A	-0.0852 (0.1376)	-0.1519 (0.2646)	-0.1149 (0.1467)
Interactions with SL only treatment:			
Baseline toilet ownership	0.0020 (0.0162)	0.0053 (0.0275)	0.0059 (0.0199)
Ln(household size)	0.0107 (0.0216)	0.0077 (0.0382)	-0.0066 (0.0250)
Male household head	-0.0541 (0.0323)	-0.0691 (0.0461)	-0.0410 (0.0428)
Head able to read	0.0526 (0.0337)	0.0540 (0.0495)	0.0360 (0.0405)
Head able to write	-0.0089 (0.0382)	0.0075 (0.0529)	-0.0122 (0.0444)
Scheduled caste	-0.0112 (0.0153)	-0.0372 (0.0276)	0.0099 (0.0226)
Hindu	0.0053 (0.01834)	0.0265 (0.0284)	-0.0071 (0.0259)
Primary activity is agriculture	-0.0115 (0.0205)	-0.0193 (0.0272)	0.0000 (0.0265)
BPL card	0.0162 (0.0174)	-0.0057 (0.0282)	0.0441** (0.0173)
Household owns agricultural land	-0.0142 (0.0198)	0.0327 (0.0309)	-0.0498* (0.0282)
Ln(annual consumption)	-0.0042 (0.0067)	-0.0071 (0.0131)	0.0055 (0.0128)
Ln(value assets)	0.0071 (0.0049)	0.0009 (0.0077)	0.0158* (0.0091)
Pucca house	0.0100 (0.0188)	0.0343 (0.0455)	-0.0021 (0.0172)
Interactions with SL+A treatment:			
Baseline toilet ownership	-0.0097 (0.0167)	-0.0125 (0.0298)	-0.0080 (0.0206)
Ln(household size)	-0.0102 (0.0224)	0.0024 (0.0333)	-0.0224 (0.0305)
Male household head	-0.0225 (0.0302)	-0.0293 (0.0518)	-0.0071 (0.0344)
Head able to read	-0.0178 (0.0438)	-0.0483 (0.0732)	0.0212 (0.0400)
Head able to write	0.0367 (0.0442)	0.0863 (0.0715)	-0.0161 (0.0430)
Scheduled caste	0.0107 (0.0177)	0.0054 (0.0307)	0.0054 (0.0215)
Hindu	0.0189 (0.0209)	0.0557** (0.0244)	-0.0224 (0.0362)
Primary activity is agriculture	-0.0144 (0.0217)	0.0036 (0.0319)	-0.0277 (0.0291)
BPL card	-0.0121 (0.0143)	-0.0451* (0.0230)	0.0283* (0.0155)
Household owns agricultural land	-0.0198 (0.0193)	-0.0410 (0.0331)	-0.0017 (0.0204)
Ln(annual consumption)	0.0130 (0.0121)	0.0160 (0.0213)	0.0111 (0.0150)
Ln(value assets)	-0.0022 (0.0039)	-0.0018 (0.0073)	0.0035 (0.0080)
Pucca house	0.0057 (0.0171)	-0.0320 (0.0359)	0.0272 (0.0206)
N	3,580	1,794	1,786

Note: All regressors are baseline characteristics;
Missing observations are replaced by sample median:
Scheduled caste (2%), agricultural land (0.001%), assets (7%)
All regressions control for strata fixed effects;
Standard Errors in parenthesis, clustered at the GP;
p <0.10, ** p <0.05, *** p <0.01

as more than one index household were located too close to each other. Indeed, reaching the required number of eligible neighbors for two adjacent index households was quite challenging, because of almost complete overlap between neighboring households. In a few cases the sample was not achieved, even after fully using the back-up list provided. In such cases, we compensated by selecting replacement index household in another GP, either from the same block, wherever possible, or from an adjacent block. Specifically, there were four GPs where the sample of index households could not be achieved and the shortfall was adjusted across 3 other GPs.

Table 8 gives an overview of the final sample used in the endline data analysis. We note that for additional non-client sample (neighbors) we do not have response rate because of the replacements that occurred as a result of overlapping or insufficient number of neighbors.

Table 8: Final sample size

	Sample per GP	**Total sample size (targeted)**	**Response rates**	**Final sample size (achieved)**
Panel sample				
Clients	15	1787	94%	1688
Non - clients	15	1808	98%	1770
Additional sample				
Clients	45	4200	94%	4222
Non - clients	40/45	5000		5005

4.4.3 Sample balance and descriptives

As described in Section 4.4.1, our evaluation methodology is based on comparing the outcomes between the different study groups, i.e. Control, SL only (sanitation loans only) and SL+A (sanitation loans + awareness creation). In order to be able to attribute any effects to the sanitation interventions, it is imperative that the three groups being compared are similar in all respects at the outset of the intervention. Therefore, baseline data were used to formally test whether the different study groups display any systematic differences prior to the intervention starting. We compared variables such as consumption, enterprise, assets and savings, as well as background characteristics that cannot be changed by the program such as age, sex, adult education.

The standard way to check that the randomization was successful and that the two sets of data are not significantly different is the Student's t-test. This t-test compares the means of the treatment and control populations and returns a value known as a p-value, which is a measure of the probability that an outcome as the one observed is the result of randomly generating samples under the assumption that both means are identical. A p-value corresponds to a significance level and we will present in our tables asterixes, indicating significant differences between the treatment groups and the control group at the 10, 5 and 1 percent significance level, following standard procedures and adding one, two or three stars respectively. Our key balance test is also based on the statistical joint 'F-test' to test whether overall there are any differences between any of the three evaluation groups. The advantage of this test is that it controls for the fact that we are making multiple comparisons, which a normal t-test fails to do. For that reason, if we find that a difference in characteristics passes that test, we conclude that the study groups are balanced. The disadvantage of this test is that if we reject the balance test, i.e. if the test suggests at least one difference, we do not know which study groups can be said to be significantly different from each other. This can be inferred from the results of two-way comparisons between control and each of the treatment groups.

We discuss randomization checks conducted on the baseline sample in detail in the baseline report. Rather than repeating this analysis here, we move to conducting similar tests with our enlarged endline sample.

We show in Table 9 the results of sample balance tests conducted on a range of variables at the individual and household level, focusing on the client sample. Our typical study household is Hindu (66%) and consists of five household members of which, for almost one in two households, one member is a child under the age of two years. The vast majority of households (93%) are headed by a male, married (92%) with an average age of 46 years and 6

years of education. 42 percent of household heads belong to Scheduled castes/tribes, while general caste and other backward castes represent 26 and 32 percent of the sample respectively. Around 60% of the MF client sample holds a Below Poverty Line (BPL) card, while 26% has an Above Poverty Line (APL) card. Therefore, most of the MF client households in our sample are eligible for government support for toilet construction. Indeed, the sanitation subsidy scheme of the SBM government program primarily targets BPL and more vulnerable APL households (see Section 5.7). Using toilet construction date, we create an indicator of toilet uptake status at the time of baseline (November 2014 - January 2015). We observe that only 27% of households owned a toilet at baseline. This is balanced across treatment groups, confirming that our study groups were similar also in terms of sanitation infrastructure endowments before the intervention started. However, we note one imbalance for households belonging to the SL+A arm. Specifically, the F-test suggests a slight imbalance (significant at the 10% level) for APL card ownership[20].

Table 9: Randomization tests Client Household characteristics

	Treatment Status						
	Whole Sample	Control	SL only	SL + A	F-stat (t(SL + A) = t(SL only) = 0)	F-stat (T(SL + A) - t(SL only) = 0)	N
Nr of HH members	5.03	5.01	5.06	5.03	0.076	0.059	4222
	(0.030)	(0.083)	(0.073)	(0.068)			
Nr of children <2 years	0.10	0.11	0.095	0.10	0.41	0.54	4222
	(0.0050)	(0.010)	(0.0087)	(0.011)			
Nr of children 6-14 years	0.86	0.85	0.88	0.86	0.21	0.23	4222
	(0.017)	(0.039)	(0.040)	(0.027)			
Nr of elderly (>64 years)	0.20	0.19	0.23	0.19	1.75	2.21	4222
	(0.0072)	(0.020)	(0.016)	(0.020)			
Gender HH head (fraction male)	0.91	0.90	0.91	0.91	0.84	0.021	4221
	(0.0045)	(0.010)	(0.0092)	(0.0096)			
Years of education HH head	5.76	5.86	6.00	5.44	1.58	3.06*	4222
	(0.073)	(0.20)	(0.20)	(0.25)			
Age HH head	45.6	45.4	45.5	45.9	0.35	0.39	4222
	(0.16)	(0.48)	(0.35)	(0.40)			
HH head is married	0.92	0.91	0.92	0.92	0.55	0.13	4222
	(0.0042)	(0.0098)	(0.0079)	(0.0085)			
HH head's caste: Backward (other b., special b., DTs, NTs)	0.32	0.34	0.32	0.29	0.66	0.53	4222
	(0.0072)	(0.040)	(0.035)	(0.028)			
HH head's caste: Scheduled castes/tribes	0.42	0.42	0.40	0.44	0.21	0.41	4222
	(0.0076)	(0.041)	(0.044)	(0.043)			
HH head's caste: General caste	0.26	0.24	0.27	0.27	0.19	0.000026	4222
	(0.0068)	(0.040)	(0.042)	(0.048)			
HH head's religion: Hindu	0.66	0.68	0.66	0.66	0.11	0.0028	4222
	(0.0073)	(0.035)	(0.039)	(0.045)			
HH head's religion: Islam	0.21	0.19	0.22	0.23	0.36	0.038	4222
	(0.0063)	(0.039)	(0.040)	(0.049)			
HH head's religion: Buddhism	0.12	0.13	0.12	0.11	0.28	0.16	4222
	(0.0050)	(0.024)	(0.023)	(0.017)			
HH owns BPL card	0.60	0.59	0.58	0.63	0.95	1.68	4222
	(0.0075)	(0.021)	(0.026)	(0.026)			
Card was shown confirming BPL status	0.44	0.42	0.44	0.46	0.52	0.41	4222
	(0.0076)	(0.024)	(0.025)	(0.034)			
HH owns APL card	0.26	0.28	0.27	0.23*	1.50	1.34	4222
	(0.0067)	(0.019)	(0.024)	(0.024)			
Card was shown confirming APL status	0.18	0.20	0.19	0.15*	1.82	1.47	4222
	(0.0059)	(0.021)	(0.024)	(0.017)			
HH owned toilet at BL	0.27	0.25	0.29	0.28	0.83	0.00345	4222
	(0.0068)	(0.021)	(0.022)	(0.028)			

Note: Standard Errors in parenthesis, clustered at the gram panchayat, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Source: Household survey.

Table 99 in Appendix shows similar balance tests conducted on the sample of non-clients. Most of the reported descriptives are balanced across study groups, suggesting that the experimental design was again successful in randomly allocating households of varying backgrounds also for households non-eligible for credit. The few imbalances observed are marital status, religion and caste of the household head. Non client households in the SL+A branch are further more likely to own a BPL card and less likely to own an APL compared to other study arms. More importantly, we observe an imbalance in toilet uptake at baseline, with households in SL only sample reporting a significantly higher rate for toilet uptake with respect to SL+A households. We conduct robustness checks to

[20] We decided not to show balancedness at baseline for toilet usage in Table 9, since we did not have this information for the additional 2,400 households surveyed at endline only.

our findings for non-client households, accounting for these imbalanced covariates in the analysis. Findings are not affected.

4.5 Survey data

4.5.1 Instruments

The endline survey covered six different types of surveys (household questionnaire, client questionnaire, community price questionnaire, community SBM(G) official survey, non-client survey and mason survey), which were organized and implemented by an external survey firm.[21] The instruments were developed by the research team and refined in conjunction with the survey firm. Data collection occurred in two separate stages. Firstly, data from client households and clients themselves, and community price data were collected in the period between August, 2nd - September 3rd 2017. Then data from non-client households, community SBM(G) official and mason survey were collected in the period December 1-24 2017. Household, client and non-client survey were collected by Computer Aided Personal Interview (CAPI) on tablets, while Community price, Community SBM(G) Official and Mason survey were collected on paper. The data collection instruments were piloted in two stages: First, the paper versions were tested in the field, while the second piloting focused on CAPI pre-testing only. Both the tests were conducted in several villages in rural Maharashtra, outside our study area. We refer to the Implementation Report, for details about the overall field work and quality control procedures, and to the various field training manuals for more information about the instructions provided to the enumerators. Table 10 below presents a summary description of each of the survey instruments.

Three visits were made to conduct interview with the head of households and only if the head of household was not available for interview during revisits, other adult members who had similar knowledge about household affairs, were contacted for interview. Since all clients are female, these client interviews were administered by a female interviewer.

[21] For a detailed description of the data collection instruments used at baseline see the baseline report.

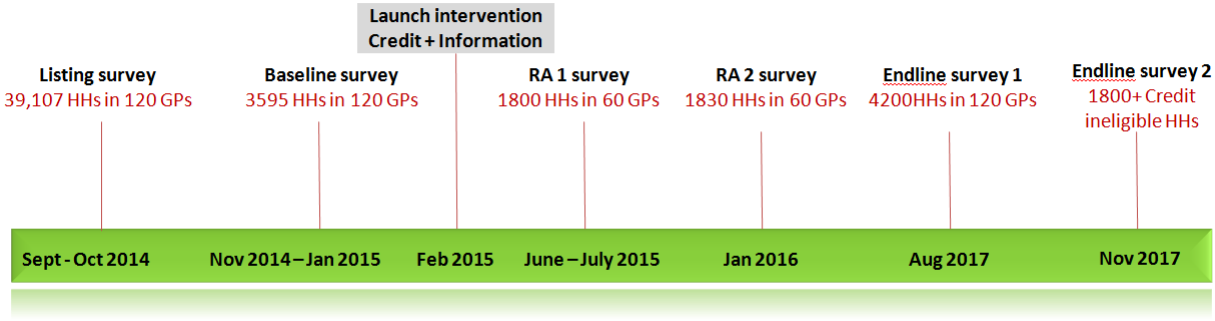
Table 10: Data collection instruments

Questionnaire	Brief Description	Respondents	Average duration
Household	This collected information on household demographics, sanitation uptake and usage, household business investments and outcomes, education outcomes, and overall credit sources and position. In addition, surveyors made observations on the toilets along a number of dimensions, which we will use to create measures of toilet quality.	Household head or other adult member who had similar knowledge about household affairs (only in case household head is absent after three visits)	1 - 1.5hrs
Client	This collected information from client on their borrowing activities, their joint liability loan groups and interactions within these and perceived costs and benefits of safe sanitation.	Clients	45 – 60 mins
Community price	This collected prices of raw materials to construct a safe toilet at the GP level. Data were also collected on prices of foods, and other commonly consumed goods.	Few knowledgeable persons at the Gram Panchayat/village level	30 min
Community SBM(G) Official	This collected information on SBM(G) support and activities between the baseline and endline periods.	GP-level officials with the responsibility for sanitation and the implementation of SBM(G).	30 min
Non-client survey	This collected information on neighbourhood sanitation behavior, which will help us shed light on questions related to spillovers and toilet usage.	Household head or other adult member who had similar knowledge about household affairs	45 – 60 mins (10 - 15 min per questionnaire)
Mason survey	This collected collect data on masons' skills and knowledge, and prices for constructing different types of safe toilets.	1 mason per GP who masons who construct toilets as a primary job or a secondary job (and who has constructed at least 1 toilet in the past 3 years) in the GP.	45 – 60 mins

4.5.2 Timeline

As Figure 8 shows, the data collection and intervention implementation period of the project took a good three years. Data collection started with a listing exercise, carried out between September and October 2014. The purpose of this exercise was to collect some brief information on the whole population in our study area and serves as a sampling frame. The second data collection exercise was the baseline survey, which was conducted between November 2014 and January 2015 . After baseline data collection completion, the intervention was launched in February 2015. Awareness creation activities took place at different times for the different study GPs, partly due to a staggered implementation approach as well as planned spread of activities and partly due to delays in implementation. They lasted for around one year (until January 2016). First sanitation loans were disbursed in February 2015 and they were available to clients during the whole intervention period (and beyond). To monitor on-going progress and processes of the sanitation intervention, two rapid assessments (RAs) were conducted roughly 6 and 12 months after implementation started. These rapid assessments were conducted in a similar manner as done by the GoI when checking OD(F) status of villages. Specifically, for the first RA we selected half of the 120 study GPs and within each of these, interviewed about 30 respondents. These respondents were chosen to be different to the evaluation study respondents, to avoid survey fatigue. The second RA concentrated on the remaining 60 GPs. Finally, endline survey started in August 2017. As described in Section 4.5.1, data collection occurred in two phases and ended in January 2018.

Figure 8: Project timeline



4.5.3 MFI administrative data

The implementing MFI provided us with exhaustive information on any loan disbursements, sanitation or otherwise, that took place in the study branches since the start of this impact evaluation. Specifically, these administrative data contains details on loan product, loan amount, disbursement date, maturity date, interest rate, repayment details for each loan taken by clients in our study area. These data hence provided us with the opportunity to monitor the credit activity of clients in our sample throughout the duration of the intervention and further allows for a detailed picture of the clients' credit history with the implementing MFI.

5 Results

This section presents our findings with respect to our research questions 4.2. Sections 5.1 to 5.3 focus on client households, Section 5.4 on non-eligible households. Section 5.6 addresses the question on targeting of the intervention and Section 5.7 addresses our research question around complementarities in the provision of micro-credit for sanitation and the financial incentives provided by SBM(G).

5.1 Impacts on eligible households

We start by describing the impact of the interventions on primary (toilet uptake) and secondary outcomes (toilet quality and usage) for credit-eligible households. We then explore the mechanisms underlying the impacts we find, studying the effects of interventions on intermediate outcomes that we expect the interventions to influence. We also consider whether the effects of the interventions on sanitation loan uptake and our primary and secondary outcomes differ across different groups. In particular we will assess whether impacts are different for (1) households that owned a toilet at baseline or not, (2) whether the household is headed by a female or a male, (3) BPL status of the household and (4) the caste of the household.

5.1.1 Toilet uptake

Summary of key results

- Safe toilet coverage almost doubled among MF client households in control in the last three years (45% at endline compared to 24% at baseline).
- The introduction of sanitation loans in SL only significantly increased toilet uptake of MF client households (by 9 percentage points), over and above the upward trend observed in control.
- Sanitation awareness creation activities combined with the introduction of sanitation loans in SL+A led to an increase in toilet uptake of MF clients during the first year of the intervention (when these activities took place), but impacts stagnated so that they were not statistically significant at endline.

We consider two measures of toilet uptake: i) toilet ownership reported by household heads during household survey[22]; and ii) toilet ownership as confirmed through interviewer observation.[23]

Ultimately, we are interested in safe toilet uptake, not just any type of latrine ownership. Following the guidelines provided in WHO-UNICEF (2017) we define a safe toilet by an improved facility for which excreta is safely disposed of in situ or off-site. Based on this definition, in our data we consider the following types of toilets safe: Flush/pour flush to piped sewer system, septic tank, pit latrine, VIP, pit latrine with slab, composting toilet, biogas system, urine diversion dehydration. We find that 99.6% of all reported toilets in our study area belong to one of these categories. Therefore, we consider our measure of toilet ownership (as reported by head of household and by interviewer observation) equivalent to safe toilet ownership in our study context.

Table 11 shows summary statistics on toilet uptake (as reported by the respondent) at baseline (Nov 2014-Jan 2015) and at endline (Aug - Sept 2017) for the client sample, in total and by treatment arm. At baseline, the

[22] When asking the respondent whether his/her household has a toilet, it was emphasized that toilets that are not frequently used should also be reported.

[23] Note that the interviewer could only confirm toilet ownership for households that reported to have a toilet. If respondents failed to report a toilet that was in fact constructed, then both our measures of toilet uptake and usage are downward biased.

Table 11: Toilet uptake - Descriptive statistics

	N	mean	sd
Baseline:			
Total	4,222	0.264	0.441
Control	1,598	0.237	0.425
SL only	1,258	0.278	0.448
SL+A	1,366	0.283	0.450
Endline:			
Total	4,222	0.506	0.500
Control	1,598	0.451	0.498
SL only	1,258	0.568	0.496
SL+A	1,366	0.513	0.500

Table 12: Impacts on toilet uptake

	(1) Own (respondent)	(2) Own (respondent)	(3) Own (interviewer observation)	(4) Own (interviewer observation)
SL only	0.111***	0.0895***	0.116***	0.0940***
	(0.0360)	(0.0275)	(0.0353)	(0.0260)
SL+A	0.0706*	0.0438	0.0706*	0.0442
	(0.0403)	(0.0284)	(0.0404)	(0.0275)
Strata FE	Yes	Yes	Yes	Yes
Household covariates	No	Yes	No	Yes
F_stat	0.301	0.103	0.268	0.0725
control_mean	0.451	0.451	0.412	0.412
N	4222	4222	4222	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

proportion of client households in our sample that had a toilet stood on average at 26%[24], and in Section 4.4.3 this statistic was shown to be balanced across treatment arms. Three years later, at endline, toilet coverage is significantly higher among MF clients in all of our study communities, including the control group. As we will show below in Section 5.2.1, our control areas remained almost completely uncontaminated by the implemented intervention. The almost doubled toilet coverage among MF client households in control sites at endline (45% compared to 24% at baseline) suggests, therefore, that other actors in the area, possibly the government in the context of its ambitious SBM(G) program (see Section 5.7), might have successfully contributed to a boost in toilet construction. And yet, this finding indicates at the same time that more than half of the population in control communities is still left without a toilet to date. Hence, even though it seems likely that the launch of SBM(G) and/or other factors might have triggered a spurt in sanitation activity in the area, there is still scope for complementary interventions, such as the provision of sanitation loans and awareness creation activities, to make a difference.

Indeed, Table 11 suggests that toilet uptake at endline is higher in the treatment arms relative to control. In the SL only arm, on average 57% of client households have constructed a toilet to date (an increase of 29 percentage points since baseline). In the SL+A arm, average toilet uptake currently stands at 51% (an increase of 23 percentage points since baseline). To know whether these improvements over time are significantly different than the spurt observed in control communities (an increase of on average 21 percentage points), we revert to regression results in Table 12, where we control for baseline differences in toilet uptake and other covariates.

The results in Table 12 constitute the core results of this report. Column 1 and column 3 show results using toilet uptake reports from household heads during endline survey as a measure of toilet uptake, without and with baseline controls, respectively. Column 2 and Column 4 measure toilet ownership status derived from interviewer

[24] We re-construct the baseline statistic of toilet ownership for the total sample of MFI clients using endline reports on date of toilet construction. When comparing actual baseline reports on toilet uptake to this construct based on endline recall, we obtain consistency of almost 80% and overall we obtain a similar statistic of 27% of clients reporting to own a toilet at baseline.

observation, again showing results both without and with baseline controls.[25] Given the slight imbalance (albeit not statistically significant) in baseline levels of toilet ownership between control and treatment (see Table 11) in the remainder of this report we will focus on and present the results controlling for baseline toilet ownership. Given the over-sampling of households with children at baseline (see Section 4.4), we will also control for whether or not the household had a child aged less than 2 at baseline. The complete set of regression results without any baseline controls can be found in Appendix E.

The findings for both self-report and interviewer observations are consistent with each other: The introduction of sanitation loans in the SL only arm significantly increased toilet uptake by 9 percentage points, over and above the improvements already observed in control communities. This finding is significant at the 1% significance level. However, in contrast to what was hypothesized at the outset of this study, the impact in the SL+A treatment arm is positive and smaller in magnitude but not statistically significantly different from the reported and observed toilet coverage in control areas, when controlling for baseline toilet ownership imbalances[26].

To interpret these results, it is useful to consider Figure 9 which plots client households' trend in toilet uptake over time by treatment status. The horizontal axis reflects the date at which the toilet was constructed (as reported by the head of the client household during endline survey). The red vertical line denotes January 2015, just before the start of the intervention which happened to coincide more or less with the launch of the government's SBM(G) program in October 2014. The y-axis shows the proportion of client households that owned a toilet at a particular point in time.

Consistent with our balance checks in Section 4.4.3, prior to the start of the intervention toilet uptake was very similar across treatment arms. Shortly after the introduction of the intervention (and the launch of SBM(G)), toilet uptake got a boost in all study villages. Initially, however, the increase was steepest in the SL+A study arm and toilet uptake remained highest there for most of the first half of the intervention. This is the period when most of the awareness creation activities took place (see Section 4.5.2). However, after the initial jump, toilet uptake improvements in the SL+A arm started to slow down. In contrast, a couple of months into the intervention, toilet uptake in the SL only arm started to gradually increase, at a rate higher than the control GPs and the SL+A GPs. Six months into the intervention, when almost all awareness creation activities were completed, the SL only arm had caught up with the SL+A arm. Interestingly, the gradient at which toilets were constructed continued to become steeper in the SL only arm whereas it remained stagnant in the other two study arms.

Table 110 shows this pattern more rigorously by means of regression analysis. One year after the start of the intervention, the impact of SL and SL+A was very similar and significant (relative to the control group at that point in time). From that point onward, however, the impact of SL+A stagnated whilst the impact of SL only continued going upward. Based on these results alone, it is not clear why toilet uptake stopped accelerating in the SL+A group whereas it continued going upward in the SL only villages. In the sections that follow we discuss possible reasons for this somewhat puzzling result.

[25] Both measures include toilets under construction. Note that interviewer observations were only made in case the respondent reported to have a toilet, not if no toilet was reported. This means that toilet coverage would be under-estimated if any toilet owners failed to report their toilets. However, we do not have any reason to believe that these misreportings would be different across treatment arms.

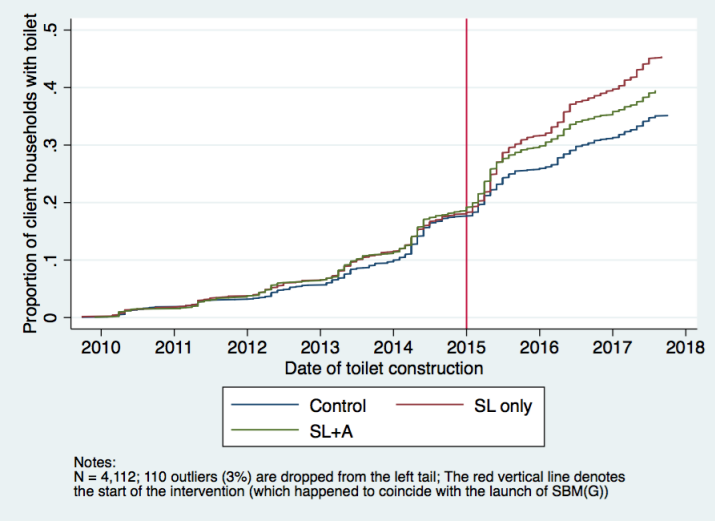
[26] Results remain very similar when restricting the sample to panel households.

Table 13: Impacts on toilet uptake over time

	(1) Own Jan 2016	(2) Own Jan 2017	(3) Own Jan 2018
treat==SL	0.0426***	0.0707***	0.0895***
	(0.0154)	(0.0207)	(0.0275)
treat==SL+A	0.0375**	0.0432*	0.0438
	(0.0168)	(0.0237)	(0.0284)
Strata FE	Yes	Yes	Yes
Household covariates	Yes	Yes	Yes
F_stat	0.773	0.258	0.103
control_mean	0.354	0.412	0.451
N	4222	4222	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

Figure 9: Toilet uptake over time by treatment status



The statistics in this section are informative about the extent to which the provision of sanitation loans and sanitation awareness creation activities was able to increase coverage, on average, but they hide information about the profile of households reached by each of the intervention components compared to those reached in control. These targeting questions will be addressed in Section 5.6. Section 5.3 will consider heterogeneity in impacts along a set of observable characteristics.

5.1.2 Toilet quality

Summary of key results

- We combine a range of indicators using polychoric principal components analysis to construct measures of the quality of the underground structure, overground structure, toilet maintenance and cleanliness.
- We do not find any significant impacts, on average, of either intervention on any of these dimensions of quality.
- MF client households living in SL only sites paid significantly (around Rs 4,095) more for their toilets than households in control areas. The bulk of this effect comes from higher expenditures on materials, and other expenses. We find no statistically significant effects on labor costs.
- We find no statistically significant effects of SL+A on toilet costs.

The findings on toilet uptake are very encouraging. A next important step is to study impacts on toilet quality since, first, good quality toilets are more likely to be used; second, because they are likely to last longer, thereby ensuring sustained changes in behavior; and third, because good quality toilets are better able to safely contain fecal matter, thereby being more effective in reducing the contamination of food, and water sources of illness causing germs.

We identify five dimensions of toilet quality to study: (i) quality of the underground structure, (ii) quality of the overground structure; (iii) availability of water and soap nearby; (iv) cleanliness and maintenance of the toilet; and (v) costs of the toilet.

Our surveys collected information on toilet quality through questions posed to the household head (e.g. the materials used to construct the underground chamber), and observations of the toilet and surrounding area by the interviewer. We combine the responses from the household head, and observations by the interviewer to construct measures of the five dimensions of toilet quality we consider. Particularly for dimension (i), (ii) and (iv), we have several variables capturing different aspects of that dimension. Estimating the impact of the interventions on each of the variables would require estimating more than 20 regressions, raising the probability of spuriously rejecting the null hypothesis of no effect.[27] To avoid such false positives, we reduce the number of variables for the first four dimensions using polychoric principal components analysis. This procedure converts a set of observations of possibly correlated variables into a set of linearly uncorrelated variables in a manner such that the largest principal components explain the largest possible variance among the original variables. For each dimension, we retain the components that explain, independently, the highest proportion of variance in the data.[28] Thus, we could have more than one component score associated with each dimension. A drawback of this method is that the components obtained might not have any natural interpretation, since they weight different variables in a manner so as to explain the most variance in the data. Below, we explain the variables collected for each dimension, and study the impacts of the interventions on the five dimensions of quality outlined above. In what follows, we will focus, quite naturally, on the sample of households with a toilet.

Quality of the Underground Structure

To measure a toilet's quality of the underground structure, we use information on the materials used to construct the underground chamber (good quality materials such as cement rings and brick ensure that the underground

[27] For each hypothesis test conducted, there is an α% chance (where α is the statistical significance level), of rejecting the null hypothesis of no effect when it is true. The likelihood of falsely rejecting the null hypothesis (and hence finding that an intervention has an impact) thus increases as one conducts many hypothesis tests.

[28] In practice, this means retaining the components with an associated eigenvalue greater than 1.

chamber will not collapse), and also whether the interviewer observes flies or bad smells. Discussions with experts identified the latter two as indicators of poor quality construction of the underground chamber. We aggregate these variables into one measure using polychoric principal components analysis. Only one factor in the polychoric PCA has an eigenvalue greater than 1. We retain this as the measure of the quality of the underground structure.[29] The variables with the highest loadings are no bad smells and no flies, while the materials used to construct the underground chamber have a much lower explanatory power. This may be because most of the constructed toilets use high quality materials.

Column 1 of Table 14 displays the impacts of the interventions on this measure of toilet quality. It shows no statistically significant impacts of either intervention on the quality of the underground structure. Notably, the coefficients are also very small indicating that this is a precisely estimated zero.

Table 14: Impacts on Toilet Quality - Underground and Overground Structure

Table 15: Impacts on toilet quality

	(1) Underground	(2) Overground 1	(3) Overground 2
SL only	0.00220	0.0575	0.0549
	(0.0264)	(0.0441)	(0.0382)
SL+A	-0.0257	0.0292	0.0298
	(0.0250)	(0.0464)	(0.0396)
Strata FE	Yes	Yes	Yes
Household covariates	Yes	Yes	Yes
F_stat	0.217	0.558	0.512
controlmean	1.178	2.463	0.299
N	1926	1926	1926

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

Quality of the Overground Structure

We next turn to the quality of the overground structure, which is constructed based on observations of the toilet made by the survey interviewers at the time of the endline survey. Interviewers made notes on the quality of the super-structure (whether it is temporary, semi-permanent or permanent), ease of access, lighting in the toilet (at day and at night), availability of a lock and a lockable door, whether there is sufficient distance between the toilet pan and the wall, and whether the toilet has cross-ventilation. The polychoric PCA procedure combining these variables generated two components with eigenvalues greater than 1. We retain both of these.[30] All the variables noted above load positively onto the first component, with the availability of the lockable door having the highest loading. The second component does not have as straightforward an interpretation. It has high associated positive loadings on the distance between the toilet pan and the wall and cross-ventilation variables, followed by the materials in the outside superstructure and availability of lighting at night. The other variables have a negative loading, indicating that this component could be capturing something unrelated to access to the toilet during the day.

Columns 2 and 3 of Table 14 display the intervention impacts on these measures of toilet quality. As with the underground structure, we find no statistically significant impacts of the interventions on the quality of the overground structure.

[29] Table 104 in the Appendix displays the loadings associated with each variable.
[30] Table 105 in Appendix displays the associated loadings for both components.

Toilet Maintenance and Cleanliness

The third dimension of toilet quality we consider relates to maintenance and cleanliness of the toilet. This measure depends on active decisions made by the users of the toilet (e.g. to keep it clean), which could be related to how motivated they are about having the toilet. This can also provide an indication of how likely it to be used in the future, and also how likely it is to last. To construct this measure, we combine interviewer observations on whether there were no flies, whether there was no bad smell, whether there was a clear, trodden path to the toilet, whether there were any anal cleaning and floor cleaning products in the toilet, whether there was a toilet brush and also whether there were any visible feces on the slab/toilet, recoded to whether there were no visible feces.

The polychoric PCA generates two components with eigenvalues greater than 1.[31] The first component has positive factor loadings for every variable other than that associated with no visible feces, while the second component relates highly positively to the variables relating to no visible feces, no flies and no bad smell. Table 16 displays the effects of the interventions on these two components of toilet cleanliness and maintenance. We find no statistically significant effects of the interventions on these measures of toilet quality. Moreover, as with the measures of underground and overground quality, the coefficients are small in magnitude (relative to the mean in the control group) indicating that there are no impacts of the interventions, on average, on toilet maintenance and cleanliness.

Table 16: Impacts on Toilet Cleanliness

Table 17: Impacts on toilet cleanliness

	(1) Cleanliness1	(2) Cleanliness 2
SL only	0.000659	0.00674
	(0.0536)	(0.0260)
SL+A	0.0185	-0.0363
	(0.0554)	(0.0274)
Strata FE	Yes	Yes
Household covariates	Yes	Yes
F_stat	0.743	0.0793
controlmean	1.349	1.287
N	1926	1926

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

Availability of Water and Soap

Next, we consider whether the intervention had any impacts on the availability of water or soap near the toilet. The loan could have allowed households to spend more to get water facilities installed. Table 18 displays impacts of the interventions on the probability of having water or soap near the toilet. We find, again, no statistically significant effects of the interventions on either variable. However, the data also indicates that a very high proportion of households with toilets in control areas have access to water and soap near the toilet (94% and 90% respectively), suggesting that there was little scope for the interventions to affect this margin.

[31] Table 106 in Appendix displays the associated factor loadings for each component.

Table 18: Impacts on Water and Soap availability

	(1) Water	(2) Soap
SL only	0.00410	0.000843
	(0.0158)	(0.0227)
SL+A	0.0150	0.0184
	(0.0169)	(0.0243)
Strata FE	Yes	Yes
Household covariates	Yes	Yes
F_stat	0.504	0.454
controlmean	0.936	0.898
N	1926	1926

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

Toilet costs

Finally, we consider impacts of the interventions on toilet costs. We focus on overall costs, which are comprised of costs of materials, labor and other expenses. Column 1 of Table 5.1.2 indicates that households in SL only GPs paid around Rs 4,095 more for their toilets than households in control areas. The effect is significant at the 1% level. The bulk of this effect comes from higher expenditures on materials, and other expenses. We find no statistically significant effects on labor costs. We also find no statistically significant effects of the SL+A intervention on costs.

The higher costs incurred by households in the SL only GPs could either be a result of expenditures on quality dimensions not captured by our measures above, or of building toilets with larger pits, or by increases in prices as a result of the intervention. Unfortunately, our data doesn't allow us to check the first two of the possible margins. In on-going work, we consider the relevance of the third margin.

Table 19: Impacts on Toilet Costs

	(1) Total costs	(2) Labour costs	(3) Materials costs	(4) Other costs
SL only	4095.0***	616.8	2094.7**	1244.9***
	(1337.3)	(474.3)	(899.2)	(468.7)
SL+A	1678.0	439.3	1507.1	-173.1
	(1320.4)	(500.5)	(993.5)	(382.0)
Strata FE	Yes	Yes	Yes	Yes
Household covariates	Yes	Yes	Yes	Yes
F_stat	0.0622	0.735	0.537	0.00208
controlmean	26936.5	7414.3	14922.2	4480.1
N	1642	1396	1396	1396

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

5.1.3 Toilet usage and open defecation

Summary of key results

- We find that (household reported) toilet usage increases by around 10 percentage points in the SL only treatment arm.
- Reported OD falls by a similar amount in the SL only treatment arm.
- The increase in toilet usage and reductions in OD are similar in magnitude to the increases in toilet uptake, suggesting that toilet non-ownership is an important driver of open defecation in this context.
- Overall, in control villages we find that around 60% of all client households report to practice OD, implying a reduction in OD practice by 17 percentage points since baseline. The introduction of sanitation loans in SL only has led to an additional 11 percentage points decrease compared to the control group. This impact is entirely driven by households that constructed a toilet. Most households that have not yet constructed a toilet report to continue OD practice.
- We observe impacts on OD for all age groups and both genders, but impact is highest for girls aged 6-15.
- Consistent with the toilet uptake findings, we do not find any significant impact on toilet usage or OD practice in SL+A .

We turn to our third main outcome considered, toilet usage. When launching the SBM(G) program in October 2014, the Government of India set the ambitious goal of eradicating open defecation (OD) by 2019 (see Section 1). Less than two years from this deadline, we are curious to know the current status of OD in our study area and the extent to which the sanitation loans and sanitation awareness creation activities have contributed to making any progress to this end.

Table 20: : Toilet usage and Open Defecation (OD) practice: Descriptive statistics

	N	Total	Control	SL only	SL+A
Toilet ownership versus toilet usage:					
Households owning a toilet (including under construction)	4,222	0.5059	0.4512	0.5676	0.5132
		(0.5000)	(0.4978)	(0.4956)	(0.5000)
Households owning a constructed toilet	4,222	0.4583	0.4080	0.5246	0.4561
		(0.4983)	(0.4916)	(0.4996)	(0.4982)
Households owning a toilet in use	4,222	0.4403	0.3886	0.5111	0.4356
		(0.4965)	(0.4876)	(0.5001)	(0.4960)
All members OD:					
All households	4,222	0.5471	0.6033	0.4700	0.5527
		(0.4978)	(0.4894)	(0.4993)	(0.4974)
Households that own a constructed toilet	1,935	0.0444	0.0598	0.0227	0.0514
		(0.2061)	(0.2373)	(0.1492)	(0.2209)
Households that do not own a constructed toilet	2,287	0.9725	0.9778	0.9632	0.9730
		(0.1637)	(0.1474)	(0.1884)	(0.1620)
At least one member OD:					
All households	4,222	0.5564	0.6108	0.4833	0.5600
		(0.4969)	(0.4877)	(0.4999)	(0.4966)
Households that own a constructed toilet	1,935	0.0610	0.0752	0.0455	0.0626
		(0.2394)	(0.2638)	(0.2085)	(0.2424)
Households that do not own a constructed toilet	2,287	0.9755	0.9799	0.9666	0.9771
		(0.1546)	(0.1404)	(0.1800)	(0.1496)

Note: Standard deviations in parentheses

A pre-requisite for eliminating OD is toilet usage. Evidence, particularly in India, has shown that toilet uptake does not necessarily translate into toilet usage [2]. We measure endline toilet usage by asking the head of the household whether the toilet they own is currently in use.[32] Panel 1 of Table 20 presents descriptive statistics on these variables. Considering averages in control areas, we see that 45% of MF client households report either owning a toilet or being in the process of constructing a new toilet at the time of the endline survey. 91% of these households (46% of the total MF client household sample) own a completed toilet. The last row in the first panel tells us that 98% of all (completed) toilets in our study areas are reportedly currently in use (i.e. 44% of all control client households own a toilet in use). We further find that usage patterns in treatment areas are similar to those in control.

Given the finding that (self-reported) toilet usage in this context is more or less equivalent to toilet ownership, it comes as no surprise that impacts of the intervention on whether or not a household owns a toilet that is in use are similar to impacts on toilet uptake observed in Section 5.1.1. Column 1 in Table 111 re-produces results on toilet uptake, while Column 2 shows the impact of the intervention on whether or not a household owns a toilet that is in use. Column 3 zooms in on households that own a toilet at endline.While toilet ownership at endline is endogenous, focusing on this sample allows us to estimate whether the increase in toilets in use is a result of the construction of new toilets, or whether this finding is partially driven by an increase in the likelihood of using existing toilets. The estimates in Column 3 indicate that existing toilets are more likely to be in use in the SL only arm. Column 4 and Column 5 display intervention impacts on OD for the whole sample, regardless of toilet ownership. Comparing these results to Column 1, we can conclude that OD reduction is sligthly higher than toilet uptake. This is in line with the finding that toilet usage, conditional on owning a toilet, increased at endline (see Column 3).

Table 21: Impacts on toilet usage and open defecation

	(1)	(2)	(3)	(4)	(5)
	Toilet uptake	Toilet in use	Toilet in use (cond.)	All OD	Some OD
SL only	0.0895***	0.0991***	0.0256*	-0.110***	-0.106***
	(0.0275)	(0.0253)	(0.0139)	(0.0258)	(0.0258)
SL+A	0.0438	0.0288	0.00348	-0.0326	-0.0342
	(0.0284)	(0.0260)	(0.0143)	(0.0274)	(0.0276)
Strata FE	Yes	Yes	Yes	Yes	Yes
Household covariates	Yes	Yes	Yes	Yes	Yes
F_stat	0.103	0.0135	0.150	0.00850	0.0155
control_mean	0.451	0.389	0.952	0.603	0.611
N	4222	4222	1935	4222	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

Even if a household owns and uses a functioning toilet, some, if not all, household members might continue practicing open defecation. For instance, when they are out to work on the field. Our surveys collected information on where household members belonging to different age and gender groups typically defecate, which allows us to construct measures on the extent of open defecation practice within a household. We focus on two extremes: i) whether all demographic groups in the household practice open defecation; and ii) whether at least one demographic group in the household practices open defecation. Panel 2 and Panel 3 in Table 20 provide descriptive statistics

[32] Past studies indicate that reports on sanitation behavior by household heads might not be accurate, and individuals should be asked about their own behavior directly instead. In a baseline survey to this project, we collected data from both the household head, and specifically identified individuals within the household, and found little difference in responses, which suggests that this issue might not be as severe in this context.

on reported open defecation practice at endline in our study villages, by treatment arm and by whether or not the household owns a toilet. Panel 2 shows the proportion of households where all demographics groups reportedly practice open defecation, whereas Panel 3 reports the proportion of households where there is at least one demographic group that is reported to practice open defecation.

Results in the two panels are very similar, suggesting that for most households, either everyone practices open defecation, or no one does. Overall, in control villages we find that to date around 60% of all client households report to practice OD. At baseline in the panel sample, the prevalence of OD amongst clients in our study sample was 77% (not reported in tables), implying a reduction in OD practice by 17 percentage points in control villages.[33] This is in line with the boost in toilet uptake in control sites we observe in Section 5.1.1. In the treatment arms, OD practice reduced even further, to a level of around 47% in SL only arm and 55% in the SL+A treatment arm. Note that most if not all of this reduction comes from reported changes in behavior amongst those who own a constructed toilet. Almost all households without a toilet continue to practice OD, which is not surprising given that only 15% of 120 GP officials in our study report to have at least one community toilet (not reported in tables).

Regression results in columns 2-3 in Table 111 highlight that for MF clients in the SL only arm a significant 11 percentage points of the total reduction in OD practice since baseline can be attributed to the introduction of sanitation loans without any additional awareness creation activities. This markable result is in line with the significant impacts on toilet uptake that we observe in those areas (see Section 5.1.1).

Furthermore, Table 112 suggests that, although the sanitation loans led to a reduction in reported OD practice for all age categories and both genders, the biggest reduction in OD practice comes from changes in behavior by girls aged 6-15, the age range when school is compulsory in India. Equally consistent with toilet uptake findings is that we do not find any significant impact on OD for the SL+A treatment arm.

In sum, reported OD practice in our control villages has gone down in the last 3 years, by around 17 percentage points in total. This suggests a general trend, in reduction of open defecation practices, possibly even a move towards OD free status. Almost all households that have constructed a toilet also report to use that toilet and to have stopped OD practice. However, the achievement of OD free status by 2019, two years after the endline data was collected, seems still a daunting task. To date, the majority of households in control villages - most of whom have not yet constructed a toilet - report to continue OD practice. This is consistent with reports by GP officials in the SBM survey (results not reported in tables). Eighty-five percent of GP officials in our study report that OD practice is still very common, or common in their communities, and remaining 15% report to have reached OD free status.[34] Just over half of all SBM officials (54%) expect their GPs to be OD by 2019. Our results confirm however that complementary interventions such as the introduction of sanitation loans can make a significant difference. In our study area, sanitation loan uptake has led to a 65% further reduction in OD practice (an additional 11 percentage points decrease compared to the decrease of 17 percentage points observed in control). We observe impacts on OD for all age groups and both genders, but impact is highest for girls aged 6-15. Consistent with our findings on toilet uptake, we do not find any significant impacts on OD in the SL+A treatment arm.

5.2 Mechanisms

Having established the degree to which the interventions under consideration impact the main outcomes, we now turn to analyzing mechanisms that might be underlying the positive impacts in the SL only treatment arm and the

[33] The panel sample of clients was not representative of the full sample of clients given oversampling of households with infants. Results are therefore not exactly comparable.

[34] These reports by SBM officials are consistent with reports by household heads in the household survey data. GPs that are reported to be OD free by SBM officials are less likely to have MF client households reporting to practice OD. In 95% of GPs that report to be OD free, half of the MF client household sample reports not to practice OD. In contrast, in 50% of GPs where officials do not report OD free status, the majority of the MF client household sample report OD practice.

Table 22: Impacts on open defecation practice: by age and by gender

	(1) Female > 16	(2) Male > 16	(3) Girls 6-15	(4) Boys 6-15	(5) Kids 3-6
SL only	-0.101**	-0.119***	-0.128***	-0.101***	-0.119***
	(0.0432)	(0.0443)	(0.0339)	(0.0325)	(0.0408)
SL+A	-0.0413	-0.0313	-0.0251	-0.0414	-0.0496
	(0.0408)	(0.0389)	(0.0331)	(0.0338)	(0.0389)
Strata FE	Yes	Yes	Yes	Yes	Yes
Household covariates	Yes	Yes	Yes	Yes	Yes
F_stat	0.140	0.0598	0.00676	0.0808	0.116
controlmean	0.567	0.542	0.643	0.629	0.628
N	868	865	1414	1634	1060

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

stagnated impacts in the SL+A treatment arm. Specifically, we look at (i) intervention participation, (ii) credit uptake, (iii) other investments made, (iv) financial well-being, and (v) sanitation beliefs.

5.2.1 Intervention participation

Sanitation loans

Summary of key results

- Both administrative and survey data sources suggest a significant and positive impact of both interventions on sanitation loan uptake (15 and 18 percentage points in the SL only arm, respectively, and 16 and 22 percentage points in the SL+A arm). We also observe significant impacts when considering the amount of sanitation loans taken.
- The significant impacts of the SL only intervention on loan uptake combined with the main results, that the intervention increased toilet ownership in the study areas, allows us to conclude that households were lacking financing for the construction of toilets before sanitation loans were introduced.

Relaxing financial constraints to uptake was a key component of the strategy to increase sanitation uptake in both our treatment arms. As discussed in Section 2.3.1, clients of the implementing MFI in the selected treated areas were offered the possibility of taking a loan for investment into sanitation. In this Section, we analyze the uptake of this newly introduced loan product.

We have two sources of data we can explore to analyze sanitation loan uptake: administrative data from the MFI as well as our client household survey. As described in Section 4.5.3, the MFI provided us with exhaustive information on any loan disbursements, sanitation or otherwise, that took place in the study branches since the start of this impact evaluation. This data source therefore provides us with an objective measure of sanitation credit uptake as reported by the implementing MFI. We further analyze a variable of self-reported sanitation loan uptake collected in the household survey. While one might argue that the self-reported information is compromised by recall error, we believe that recall error in the uptake of a major loan can be indicative of other interesting and relevant underlying dynamics, such as fungibility of money and actual loan use and is therefore worth reporting on.

Table 23 shows statistics on sanitation loan uptake among our treated study population using the two data sources. We can see that just over 20% of sampled clients took a sanitation loan from the implementing MFI. Our

Table 23: Sanitation loan uptake - descriptive statistics

Data source	N	mean	sd
Admininstrative data	2,624	0.2104	0.4076
Client survey	2,612	0.2090	0.4067

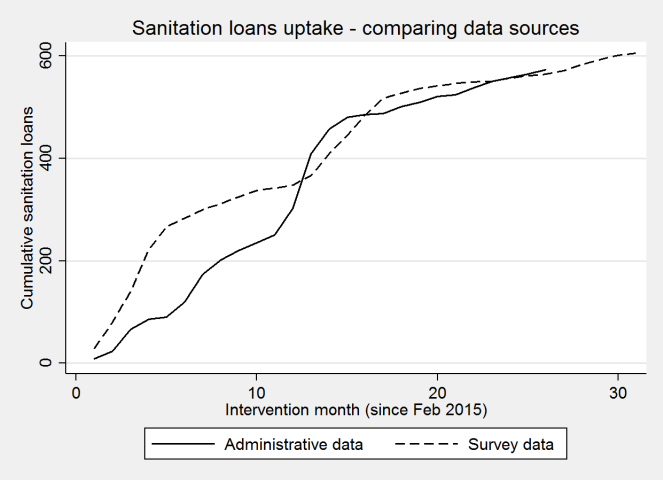
two data sources show only a minimal difference in this overall statistic. The left panel of Table 24 breaks this mean up further, showing (in)consistencies across these two data sources. We can see that 17% (75%) of clients are reported (not) to have taken a sanitation loan in both data sources, implying consistency between data sources for 92% of clients. Table 24 further shows that 4% of clients report themselves to have taken a sanitation loan but these do not appear in the administrative data and, similarly, 4% of clients reported to have taken a sanitation loan in the administrative data do not say they did when asked themselves. The fact that the frequency of inclusion error is exactly the same as the frequency of exclusion error suggests that misreporting either side is likely to be random which gives us confidence in the reliability of both datasets. The right panel of Table 24 shows the same statistics for our control areas. A few important points are to be noted here: For one, sanitation loans - 21 in total - were provided in the control areas. These were given in two branches, primarily in February and March of 2016. We are confident that loan officers did not advertise sanitation loans in control areas. It does happen though that clients approach the implementing MFI loan officers for this loan purpose themselves. Second, 20 out of the 21 sanitation loans disbursed in control areas are also reported by clients themselves. A further 65 clients (4%) in control areas report to have taken sanitation loans that are not reflected in the administrative data. This percentage is in line with the percentage of clients in treatment areas reporting to have taken a sanitation loan that does not appear in the administrative data, indicative of a consistent and reasonable pattern of recall error.

Table 24: Reported Sanitation loan uptake - admin and survey data

		Admininstrative data			
		Treatment		Control	
		No	Yes	No	Yes
Client survey	No	1,958 (75%)	108 (4%)	1,502 (95%)	1 (0%)
	Yes	103 (4%)	443 (17%)	65 (4%)	20 (1%)

Figure 10 shows the evolution of sanitation loan uptake over time for both these data sources. The x-Axis shows the number of months passed since the introduction of the loan product and the y-Axis the number of loans taken - as reported in the administrative data (solid line) and the survey data (dashed line). While the disbursement dates in the admin data are accurate, the corresponding information reported in the survey data is likely to suffer from a degree of recall error. We nevertheless see a very similar uptake pattern over time. The distributions merely suggest a slower uptake initially when considering the administrative data.

Figure 10: Sanitation loan uptake over time



Before diving into the analysis of loan uptake by treatment arm, we briefly provide information on the characteristics of these sanitation loans, displayed in Table 25. The average loan amount is just under Rs 15,000, which corresponds to the most common loan amount disbursed for sanitation (92% of loans are of this size, further 7% are of Rs 10,000 and a handful of loans are reported of between Rs 9,000 and Rs 30,000). The average annual interest rate on the loans is 20%. At the start of the experiment, the interest charged by the implementing MFI was 22% and it was subsequently reduced to 20% and further to 18%. In our study, 35% of loans taken were at a rate of 22%, 49% at a rate of 20% and 16% at a rate of 18%. Loan tenure was 104 weeks.

Table 25: Sanitation loan characteristics

	N	mean	sd	min	max
Administrative data:					
Amount	573	14,585	1,358	10,000	15,000
Interest rate	573	20.4	1.38	18	22
Nr of installments	573	104	0	104	104

We now turn to the impacts of the loan provision of sanitation loan uptake on the extensive and intensive margin. Figure 10 provides a visualization of sanitation loan uptake by treatment arm, for both administrative data (left panel) and survey data (right panel). Independent of the data source considered, the graphs suggest higher loan uptake in the information arm, compared to the SL only arm, and that this difference established itself early on in the intervention. We also show in Figure 11 the evolution of the number of loans taken per client in each treatment arm that took a sanitation loan over time, which accounts for the fact that we have variation in the number of clients per treatment arm. The figure further shows that the evolution is very similar.

Figure 10a: Sanitation loan uptake by treatment and data source

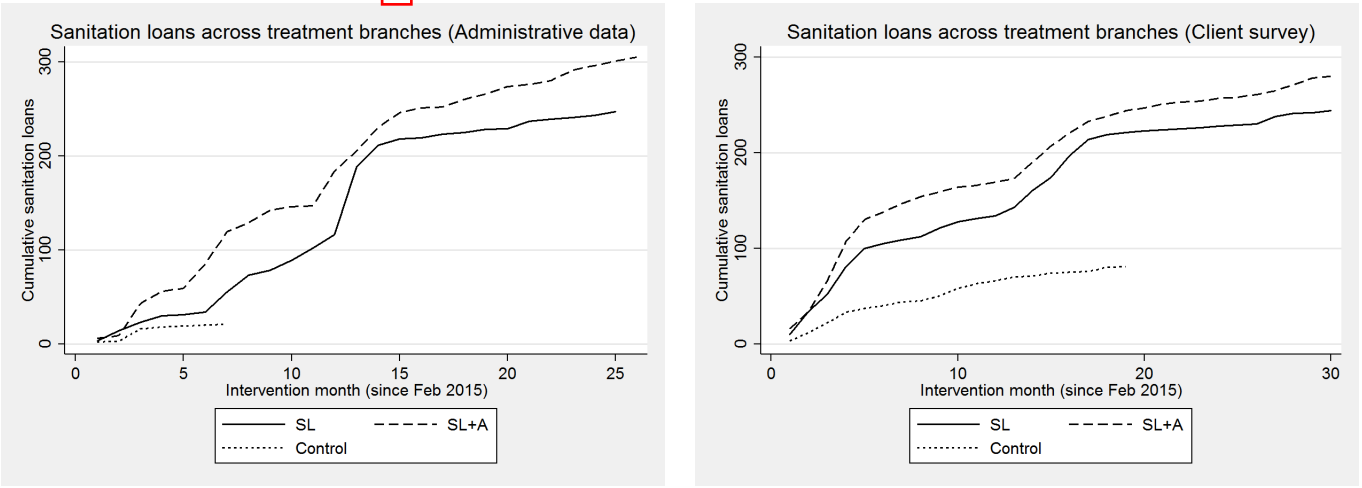
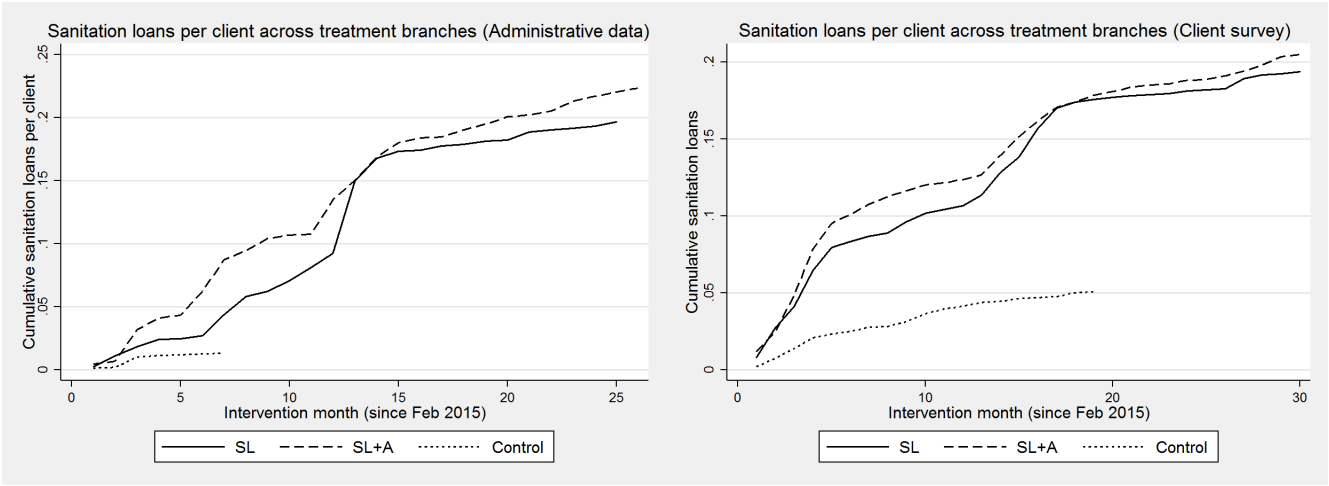


Figure 11: Sanitation loan uptake by treatment and data source (loans per clients)



We consider these impacts more formally, by running regression equation 1, as done in previous sections.

Results are presented in columns 1 and 2 of Table 117. The first column shows impact estimates for the administrative indicator and the second column for the survey data indicator. It can be seen that, both data sources suggest a significant and positive impact on sanitation loan uptake. When considering the administrative data, we find an impact of 18 percentage points in the SL only treatment arm and 21.5 percentage points in the SL+A treatment arm. These observed impacts are higher than the ones estimated using survey data, which are 15 and 16 percentage points, respectively. The difference is primarily driven by the fact that loan uptake in control areas is about five percentage points higher in the survey data as can also be seen in 11. The estimated coefficients do not differ statistically between treatment arms[35].

Columns 3 and 4 of Table 117 consider the impacts on sanitation loan amounts taken. The estimated impact based on administrative data is Rs 2,600 for the SL only treatment arm and 3,100 for SL+A , and just under Rs 800 for both treatment arms based on survey data.

[35] Results remain very similar when restricting the sample to panel households.

Table 26: Impacts on sanitation loan uptake (amounts)

	(1)	(2)	(3)	(4)
	Loan uptake		Loan amount	
	MF SL	Survey SL	MF SL	Survey SL
SL only	0.181***	0.152***	2624.3***	775.9**
	(0.0360)	(0.0343)	(527.2)	(298.0)
SL+A	0.215***	0.163***	3108.5***	760.9***
	(0.0296)	(0.0315)	(426.0)	(221.8)
Strata FE	Yes	Yes	Yes	Yes
Household covariates	Yes	Yes	Yes	Yes
F_stat	0.369	0.747	0.375	0.966
controlmean	0.0131	0.0535	197.1	309.8
N	4222	4200	4222	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

The significant impacts of the intervention on loan uptake combined with the main results, that the intervention increased toilet ownership in the study areas, allows us to conclude that households were lacking financing for the construction of toilets before sanitation loans were introduced.

Awareness Creation

Summary of key results

- Evidence clearly suggests that sanitation awareness creation activities took place in our study area, and significantly more so in the SL+A treatment arm than in control.
- Whereas SL+A villages were substantially more likely than control sites to host street plays and to install wall paintings, only the street plays seem to have left a lasting impression on the MF clients.
- MF clients in SL+A villages were also significantly more likely to have attended MF block level awareness workshops, particularly those about sanitation and hygiene.
- We find no evidence of differential awareness about the distribution of flyers or mason trainings around two years after they occurred.

To explore the mechanisms behind the smaller than expected impacts on toilet uptake in the SL+A treatment arm, in the first instance we start by investigating the extent to which the sanitation awareness creation activities actually happened. Or rather, whether the target population is (still) aware of these activities ever taking place in their communities. Importantly, we also assess whether these activities complemented (as opposed to substituted for) any activities already organized by other actors in our study area. This is important, especially given that the GoI launched its ambitious SBM(G) program towards the end of 2014, more or less at the same time as the launch of this intervention (see Section 4.5.2). One should read this section bearing in mind the caveat that these questions were asked of respondents almost three years after the sanitation awareness creation activities took place. It is possible that respondents do not remember some of the activities taking place, especially less intensive ones (such as the distribution of flyers).

We remind the reader that the awareness creation activities in the 39 SL+A communities included street plays, distribution of flyers, wall paintings/banners, information workshops for GP officials, mason trainings and a cen-

tralized MFI block awareness training for MF clients (see Section 2.3for more details). In addition to advertising the sanitation loans more broadly within the community, the aim of these activities was to strengthen awareness of the risks of open defecation and of the benefits and actual material costs of safe sanitation. The objective was to enhance awareness not just amongst MF clients but of the wider community, including MF clients, none-MF clients, GP officials and masons.

A discussion of impacts on awareness of non-client households is postponed to Section 5.4. Here we focus on awareness among GP officials, MF clients, their household's heads, and masons. The results on household heads are indicative of the extent to which the activities reached not just the MF clients but also the main decision makers in their households.

Table 27: GP officials' awareness of sanitation activities in community

	(1)	(2)	(3)	(4)	(5)
	Any	Street play	Flyers	Wall painting	Wall painting (observed)
treat==SL	-0.0370	0.0744	-0.000727	0.0502	0.0736
	(0.0835)	(0.103)	(0.0624)	(0.0961)	(0.0871)
treat==SL+A	0.0828	0.238**	0.00183	0.364***	0.339***
	(0.0798)	(0.103)	(0.0602)	(0.100)	(0.0963)
Strata FE	Yes	Yes	Yes	Yes	Yes
F_stat	0.109	0.111	0.967	0.00237	0.00655
control_mean	0.805	0.512	0.0732	0.366	0.293
N	120	120	120	120	120

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline. Variable Wall painting includes reports of wall banners; Variables in columns 2-5 are set to zero if the respondent reported not being aware of any sanitation activities.

We started by asking GP officials whether in the last three years any activities about sanitation, such as street plays, film shows, wall paintings, flyers etc. took place in their communities. As expected (given the launch of SBM in 2014), Column 1 in Table 120 shows that around 81 percent of officials in control sites report that such activities were organized in their communities. 76% of those report that these activities were organized by national or local governments and the remainder mainly by NGOs (not reported in tables). Despite the already high incidence of sanitation activities in control communities, GP officials in the SL+A treatment arm were 18 percentage points more likely than those in control to report that such activities took place. This difference is not statistically significant from zero given the small sample size, but looking at specific sanitation awareness activities in columns 2-4 we find that although street plays and wall paintings were also present in control communities (in 52% and 29% of them, respectively), they were significantly more prevalent in SL+A communities: 75% report having hosted street plays and 65% having commissioned wall paintings. The observed impact on the prevalence of wall paintings by GP official report is consistent with the impact measured by interviewer observation, that is, interviewers were 34 percentage points more likely to observe a wall painting in SL+A communities than in control communities (column 5). The differences between control and SL only, albeit positive, are not statistically significant. Only in very few GPs (3%) did GP officials recall the use of flyers to diffuse information about sanitation, and there are no notable differences between the treatment arms.[36]

[36]We do not have data available on GP officials' awareness of water quality tests, mason trainings or GP info sessions and therefore do not discuss any results on these here.

Table 28: MFI clients' awareness of sanitation activities in community

	(1) Any	(2) Street play	(3) Flyers	(4) Wall painting	(5) GP Info
treat==SL	0.0174	0.0137	0.00549	0.00229	0.0446**
	(0.0306)	(0.0201)	(0.0112)	(0.0209)	(0.0191)
treat==SL+A	0.0726**	0.0643***	-0.0186*	0.0246	0.0521**
	(0.0349)	(0.0237)	(0.0103)	(0.0251)	(0.0235)
Strata FE	Yes	Yes	Yes	Yes	Yes
Household covariates	Yes	Yes	Yes	Yes	Yes
F_stat	0.0969	0.0594	0.0238	0.314	0.740
control_mean	0.296	0.0832	0.0476	0.125	0.104
N	4200	4222	4222	4222	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline. Variable Wall painting includes reports of wall banners; Variables in columns 2-5 are set to zero if the respondent reported not being aware of any sanitation activities.

Similarly as for the GP officials, Table 118 shows that MF clients in SL+A sites were 7 percentage points more likely to report being aware of sanitation awareness activities that took place in their communities in the last three years. Given the much bigger sample size, this difference is now statistically significant (at the 5% level). Not all sanitation awareness activities were however equally effective in leaving a lasting impression on MF clients. The most significant impact seems to have come from the street plays (column 2, Table 118): Around 6 percentage points more clients report being aware of street plays in their communities.

Another 5 percentage points more clients report being aware of information workshops for GP officials, but this impact was similar in the SL only communities, suggesting that this impact is perhaps driven by events associated with the introduction of the new loans rather than the awareness creation activities. Consistent with GP official reports, MF clients in SL+A arm are no more likely than their counterparts in control communities to recall any distribution of flyers. Somewhat surprisingly, however, households in SL+A communities are also not more likely to recall seeing any wall paintings in their communities. We would have expected wall paintings in particular to have had a longer lasting effect, especially given the finding discussed above that interviewers during endline survey were significantly more likely to confirm having observed wall paintings in SL+A communities than in either SL only or control communities.

Table 29: MFI clients' attendance of MFI block level awareness training

	(1) Any	(2) Sanitation	(3) Hygiene
treat==SL	0.0427*	0.0354	0.0304
	(0.0216)	(0.0274)	(0.0222)
treat==SL+A	0.0929***	0.117***	0.0882***
	(0.0252)	(0.0293)	(0.0268)
Strata FE	Yes	Yes	Yes
Household covariates	Yes	Yes	Yes
F_stat	0.0679	0.00785	0.0329
control_mean	0.278	0.262	0.191
N	4202	4222	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

We also asked clients whether they have ever attended an MFI block level awareness workshop. Column 1 in Table 122 looks at the probability of the MF client to report that she attended such a workshop at least once. Column 2 and column 3 look at attendance of block level workshops about sanitation and hygiene, respectively. The results demonstrate that MF clients in the SL+A treatment arm were 9 percentage points more likely than control to report to have attended such a training. Note that a significant proportion of clients in the control group and SL only group seem to have attended block level trainings on sanitation and hygiene (26% and 19% respectively for the control group, and attendance of SL only was not significantly different to that of control). Given that these events were organized at the block level and not the GP level, such spillover effects were probably difficult to avoid. Nevertheless, clients in the SL+A treatment arm were significantly more likely to attend trainings on sanitation (12 percentage points) and trainings on hygiene (9 percentage points).

Table 119 shows similar statistics as Table 118 but now with the heads of the clients' households as respondents. Consistent with MF clients and GP officials reports, household heads in SL+A villages are about 8 percentage points more likely to report being aware of sanitation activities taking place in their communities in the last three years. This impact on awareness seems to be primarily driven by the impact on awareness of GP info sessions, however, while awareness of street plays is no longer significantly different to control.

Finally, Table 121 shows the results of whether masons residing in study communities are aware of trainings having been conducted. The sample size is too small to yield precise results but, if anything, masons in the treatment arms were *less* likely than control masons to report to be aware of any mason trainings in their area. However, the selection of masons in our sample was not necessarily random so we refrain from putting much weight on this result.

Table 30: MFI heads' awareness of sanitation activities in community

	(1)	(2)	(3)	(4)	(5)
	Any	Street play	Flyers	Wall painting	GP Info
treat==SL	0.00580	-0.0101	-0.00382	-0.000874	0.0414*
	(0.0329)	(0.0274)	(0.00865)	(0.0205)	(0.0230)
treat==SL+A	0.0760*	0.0440	0.00392	0.000237	0.0608**
	(0.0394)	(0.0287)	(0.00875)	(0.0233)	(0.0291)
Strata FE	Yes	Yes	Yes	Yes	Yes
Household covariates	Yes	Yes	Yes	Yes	Yes
F_stat	0.0562	0.0821	0.361	0.959	0.469
control_mean	0.338	0.123	0.0350	0.121	0.125
N	4222	4222	4222	4222	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline. Variable Wall painting includes reports of wall banners; Variables in columns 2-5 are set to zero if the respondent reported not being aware of any sanitation activities.

We conclude that there is strong and consistent evidence, triangulated from reports from different respondents in our study area, that sanitation awareness creation activities took place in our SL+A study communities and that GK client household members were aware of them. We find that, although sanitation activities also happened in control and SL only sites (mainly organized by the government), they reached a significantly higher proportion of households in SL+A study communities, suggesting that the sanitation awareness component of the intervention reached not only more GP officials but also more households with its activities than the government or the MFI (in the SL only arm) would have been able to do in the absence of these complementary awareness creation activities.

Table 31: Masons' awareness of sanitation activities in community

	(1)
	Mason training
treat==SL	-0.0768
	(0.0675)
treat==SL+A	-0.0403
	(0.0706)
Strata FE	Yes
F_stat	0.566
control_mean	0.146
N	120

Standard errors clustered at the village level in parentheses.

However, whereas SL+A villages were substantially more likely to host street plays and to install wall paintings, only the street plays seem to have left a lasting impression on the MF clients. MF clients in SL+A villages were also significantly more likely to have attended MF block level awareness workshops, particularly those about sanitation and hygiene. We find no evidence consistent with the distribution of flyers or with a systematic organization of mason trainings in our study area.

5.2.2 Sanitation loan conversion

Summary of key results

- A basic sanitation loan conversion calculation (i.e. the rate at which sanitation loans provided as part of the intervention translate into new toilets constructed because of the interventions) suggests that, on average, in the SL only arm every second loan translated into an additional toilet. In SL+A areas, only every fifth loan translated into an additional toilet.
- Overall, our evidence provides little support for the explanation that the low conversion rate of loans to toilets is driven by investment of loans into existing toilets.
- A significant proportion of loans is not used for sanitation investment. The estimate of this loan misuse is between 17% (self reported loan use) and 50% (observed conversion of loans to toilets in the SL only arm).
- We find evidence that MF staff were more likely to monitor how loans were used in the SL only areas compared to the SL+A areas, where they were primarily monitored through discussions in lending group meetings.

In this section we bring together our impact results on toilet ownership and sanitation loan uptake presented in Sections 5.1.1 and 5.2.1 respectively. Coefficient estimates on these two key outcomes are reproduced here in Table 32. For sanitation loan uptake we focus on estimates using the MFI's administrative data. As a reminder, we found that the SL only arm led to an 18 percentage points increase in sanitation loan uptake and a 9 percentage points increase in sanitation ownership, shown in the first row of the table. The last column calculates a simple conversion rate of loans to toilets by dividing the coefficient on *toilet* uptake by the coefficient on sanitation *loan* uptake. In particular, this statistic tell us the rate at which sanitation loans provided as part of the intervention translate into *new* toilets constructed *because of the interventions*.[37] We find that this rate is 50% in SL only areas

[37] Another way of thinking about this exercise is to look at the impact of loan uptake on toilet construction and instrumenting sanitation loan uptake by the intervention. We need to make the assumption that that the entire effect on toilet uptake comes only from taking a loan and not the information provision. Doing so (results not shown), provides us with almost identical conversion rates.

and 19% in SL+A areas. In other words, in areas where sanitation loans were introduced on their own, on average every second loan translated into an additional toilet. In areas where also awareness creation activities took place, only every fifth loan translated into an additional toilet.

Table 32: Loan conversion rates - whole sample

	Impact on...		
	...SanLoan	...Toilet ownership	Conversion
SL	18.1pp	9pp	50pp
SL+A	21.5pp	4pp	19pp

Notes: pp = percentage points; The coefficient estimate on toilet ownership in SL+A was insignificant.

The question that naturally arises is what happened to the other sanitation loans. We discuss three possible explanations in turn: (1) Loans might have been used to improve or repair existing toilets, (2) Loans might have been used instead of other sources of funding (implying that these toilets were also constructed in control areas, just not using micro-credit, (3) loans were diverted to other investment purposes.

(1) Were sanitation loans used to improve/repair existing toilets? To shed light on this question, we start by looking at whether we find that households with a toilet at baseline took up sanitation loans. And indeed, we find this to be the case. As can be seen in Table 33 households that already owned a toilet at baseline are at least as likely to take a sanitation loan as households that did not own a toilet.

Table 33: Loan conversion rates - whole sample

	Impact on...		
	...SanLoan	...Toilet ownership	Conversion
	Households without toilet at baseline		
SL	18.4pp	12.6pp	69pp
SL+A	20.5pp	5.8pp	28pp
	Households with toilet at baseline		
SL	17.4pp	0pp	0pp
SL+A	24.3pp	0pp	0pp

Notes: pp = percentage points; The coefficient estimate on toilet ownership in SL+A was insignificant.

Unfortunately, we did not collect data specific to investments made into existing toilets and can therefore not address this question directly. We have, however, three different avenues to address this question indirectly: Least reliable is to infer possible improvements by looking at whether households are more likely to own an improved toilet at endline. The problem with this approach is that the reporting of toilet type typically suffers from significant reporting error (households for example very often think they own a septic tank while they do not). In addition, a household might have invested into an existing toilet without changing its type. When running regressions on indicators whether the household switches toilet type between baseline and endline and whether the toilet at endline includes a bath or not (not shown), we do not find any significant impacts. The conclusion is the same when conditioning on having owned a toilet at baseline or not.

The second avenue is to use interviewer observations on toilet quality. We discussed impacts on toilet quality in detail in Section 5.1.2, showing that the interventions did not impact toilet quality on average on a number of margins considered.[38]

We note that the assumption is sensible for SL only areas and less so for SL+A. This caveat needs to be kept in mind.

[38] We do find some heterogeneous impacts on toilet quality indicators, discussed in Section 5.3. Some of these positive, others negative.

Finally, we asked clients that took a sanitation loan directly how they used this loan. Table 34 shows that reported loan use for upgrade or repair of toilets is minimal, with between 1 and 4% of clients reporting that they used their sanitation loan for either of these purposes. There is no statistical difference observed between treatment arms (not shown). When restricting the sample to those that owned a toilet at baseline (not shown), we find that SL+A clients are suggested to be less likely to invest in repair (by seven percentage points, significant at the 10% level). We raise caution though that the sample becomes very small, including only 174 observations.

Table 34: Sanitation loan use - reported by clients

	Sanitation loan used for...			
	...Upgrade		...Repair	
	N	Mean	N	Mean
Control	85	0.000	85	0.024
SL only	254	0.031	254	0.017
SL+A	292	0.021	292	0.041

Overall, our evidence provides little support for the explanation that the low conversion rate of loans to toilets is driven by investment of loans into existing toilets.

(2) Did sanitation loans replace other sources of funding? The second explanation for the low conversion rate of sanitation loans to toilets is that the loans were taken by households who would have constructed a toilet in any case. Without the sanitation loan these households might have used savings or finance from informal sources. In the next section, we analyze whether we have evidence of such shifting between lending sources happening. More specifically, we check whether the intervention led to households borrowing on average more, and from which sources. If they do not increase their overall borrowing, then this suggests that, at least on average, such switching from one financing source to the newly introduced source is likely to take place. We find that, while impact estimates on total household borrowing are positive, they are insignificant and therefore suggest that at least some degree of switching between credit sources is likely happening. Data presented to answer the third explanation for low loan conversion does however suggest that this switching can, if at all, only explain a small part of the low loan conversion rate.

(3) Were sanitation loans used for investments other than sanitation? The most obvious evidence for whether sanitation loans were diverted away from sanitation investment is to check toilet ownership post loan uptake. Table 35 provides ownership statistics using endline data for clients that took a sanitation loan from the implementing MFI, split by toilet ownership at baseline. We find that 31% of clients that took a sanitation loan did not own a toilet at the time of the endline survey. One might argue that toilets could be under construction but we remind that these toilets are included in the ownership statistics. In addition, referring back to Figures 10 and 11, we remind that sanitation loan uptake had stagnated months before the endline survey was conducted.

Table 35: Toilet ownership for sanitation loan-takers

		Toilet owned post-loan (endline)	
		No	Yes
Toilet owned pre-loan (baseline)	No	178 (31%)	224 (39%)
	Yes	0 (0%)	171 (30%)

As already mentioned above, we also ask clients directly what they use the sanitation loan for. We see from Table 36 that 16% of clients (and 18% of clients that appear in the administrative data) report that they use the sanitation loan for purposes other than sanitation investment. A further 12% (6% of clients in the administrative data) report to have used the loan only partly for sanitation investment. One might expect these statistics to be

under-reported. To gauge the extent of such possible under-reporting we look at clients' responses to questions whether *other* group members that took a sanitation loan used it to construct a toilet. More specifically, every client respondent was asked for each group member, whether she took a sanitation loan. If the answer was yes, the respondent was asked whether this group member constructed a toilet. Eleven percent of respondents recall that at least one of their group members took a loan for sanitation. Of these, 39% report that the group member did not use the loan to construct a toilet. As expected, the percentage of reported loan misuse by others is significantly higher than when clients are asked about their own use of funds. We however find no difference in this reported loan misuse by treatment arm.

Table 36: Reported sanitation loan use (%)

	Survey sample	Admin sample
Construct a new toilet	67.19	70.19
Upgrade existing toilet	2.22	2.59
Repair existing toilet	2.85	3.02
Other purpose	15.69	17.93
Sanitation investment + other purpose	12.04	6.26

We conclude from this exercise that a significant proportion of loans is not used for sanitation investment. The estimates of this loan misuse is between 17% (self reported loan use) and 50% (observed conversion of loans to toilets in the SL only arm).

5.2.3 Sanitation loan monitoring

Our previous analysis makes us confident that a non-negligible proportion of loans is not invested in the intended purpose, i.e. sanitation improvement or toilet construction. A natural next question is to understand to what extent loan use is monitored.

We start by looking at what loan officers themselves have to say about loan purpose monitoring. At the time of the endline survey, a short questionnaire was administered to available loan officers in the study branches. We have data from 25 loan officers, five per branch. All these loan officers report to have been trained on the loan product and have experience with its provision. All of them report that they usually monitor what clients do with their loans. They were not asked which checks they specifically perform, but what checks they are *supposed* to conduct. The most typical checks mentioned are that of assessing intentions to start works (32%) and checks on whether pit digging has started (40%). These statistics are shown in Table 37. The large category of 'Other' relates primarily to dwelling and land ownership status and availability of space/land.

Table 37: Sanitation loan monitoring - loan officers' reports

Check	%
None	0
Check intention to start construction works	32
Check whether client started digging the pit	40
Check whether client has fully dug the pit	8
Checkwhether client started toilet construction	20
Other	68

We also asked clients that took a sanitation loan, what monitoring checks the implementing MFI conducted. Table 38 shows the information we have available. The first column shows that 60% of clients report that loan officers asked them how loans were used and 30% reported that loan officers asked other group members. In total, 70% of clients who took a sanitation loan report one of these two answers. Thirty percent of clients report that a loan officer visited them at home to conduct checks, 19% say no checks were conducted. The second column in Table 38 shows responses to the question whether checks where conducted on toilet ownership at the time of

applying for a sanitation loan. Responses are very comparable to those just reported on. When running regressions on the types of monitoring checks conducted, we do not find any significant difference between the treatment arms (results not shown).

Table 38: Sanitation loan monitoring - clients' reports (%)

	Check on sanitation loan use	Check on toilet ownership when applying for loan
Yes, by asking me	60	60
Yes, by asking others	30	28
Yes, by visiting my home	30	31
No	19	17

A further way of monitoring loan use is by relying on group members. Especially in the context of group liability for loans, monitoring through group members is a common strategy employed by MFIs. Interviewed clients were asked about this channel and report that (sanitation) loan use is typically monitored one way or another - only 5% of clients do not mention any monitoring mechanism. In the SL only treatment arm (for which statistics are reported at the bottom of Table 123[39]), the predominant monitoring form reported is discussions during group meetings, mentioned by 58% of clients; 50% report that kendra leaders check, 51% say that the group leader does so and 11% that other group members conduct checks. Unfortunately we are not able to say what these latter checks look like, i.e. whether they involve a visit at the loan takers home and if so, at what point within the process this visit takes place. Eighteen percent of clients report that the branch manager come to check the loan use. We observe some differences between the two treatment arms.[40] Results suggest that, while the *degree* of monitoring does not differ between treatment arms, loan monitoring in SL+A areas relies more heavily on pure discussion rather than checks by leaders. Clients in SL+A areas are 10 percentage points more likely to report checks through discussions in group meetings and 8 percentage points less likely to report checks by kendra leaders. If such more informal approaches to monitoring (through discussions) are less effective, then these effects, significant at the 10% level, could be a potential explanation for the lower loan conversion rate we observe in the SL only arm.

Table 39: Impacts on monitoring of kendra group members

	(1) Any	(2) Meeting	(3) Kendra leader	(4) Group leader	(5) Other members	(6) Branch	(7) None
SL+A	0.00321	0.102*	-0.0820*	-0.0711	-0.0338	-0.00757	0.00809
	(0.0103)	(0.0548)	(0.0456)	(0.0671)	(0.0264)	(0.0320)	(0.0176)
Strata FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SL only	0.978	0.582	0.502	0.508	0.117	0.175	0.0462
N	723	723	723	723	723	723	723

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

We show in this section that loan monitoring is supposed to be part of any loan provision and that monitoring does indeed play an important role in the field. This is reported both by MFI staff as well as through clients themselves. However, the intensity and types of checks are not as high as intended and differ somewhat between treatment arms. Whether this difference is sufficient to explain the differential loan conversion rate discussion in

[39] These are the means for the SL only group. Averages for both groups combined (which is what we report on in Tables 37 and 38 above, are as follows: group meetings: 62%, kendra leader: 45%, group leader 49%, other group member:8%.

[40] Since loans were not provided in control areas, we compare here between the two treatment arms only. Note that we are faced with reduced power doing so.

Section 5.2.2 remains an open research question. A further point to note is that we do not have information what happens when loan monitoring reveals a degree of misuse of the sanitation loans.

5.2.4 Credit uptake

Summary of key results

- Using household survey data, estimates of impacts on overall household borrowing are positive but not statistically significant, neither at the extensive, nor at the intensive margin.
- Households were, on average, neither more nor less likely to borrow from an MFI and they did not switch from informal to more formal credit sources.
- We do not find any significant impacts on the composition of the MFI loan portfolio of MF clients in our sample, but note that we may not have sufficient statistical power in this dimension.

As discussed in section 4.2.1, there is a cap on the number of loans and amounts clients can borrow both in general, due to regulations from the Reserve Bank of India, but also imposed by the implementing MFI, based on risk considerations. Given this cap and the fact that clients took up sanitation loans, it is interesting to consider what happened to borrowing in client households more generally during the time of the intervention. This is what we analyze in this section, looking at both overall household borrowing and non-sanitation loan uptake from the implementing MFI.

Overall household borrowing

To analyze overall household borrowing we focus on data from the client household survey since the administrative data has no information on borrowing other than from the MFI itself. Respondents were asked details about three main loans they took since the baseline survey (i.e. since January 2015).[41] This data has one important caveat: Capping the number of loans we ask about to three implies that we may miss out on household borrowing in case more than three loans were taken in that period. If this is the case, then the information on total household borrowing needs to be interpreted as a lower bound. One way to check the extent of this happening is to check the percentage of respondents reporting more than two loans. In our sample, 22% of respondents report on three loans, as shown in Table 40. We can therefore assume that total household borrowing is capped for a maximum of 22% of households in the sample, possibly less, but nonetheless implying that our results below might indeed be lower bounds.

Table 40: Nr of loans reported on in HH survey

# loans	Freq.	%
0	1,225	29.01
1	1,042	24.68
2	1,009	23.90
3	946	22.41

With this in mind, we turn to impact estimates on outcomes created from this information. We start by looking at the likelihood of having borrowed, number of loans taken and total amount borrowed. Table 41 presents impact

[41] Respondents were first asked about the loan amounts of the three main loans taken since the baseline survey. Only after that were they asked to provide details on each of these loans. This approach minimises reporting fatigue and hence possible under-reporting of number of loans taken.

estimates on these variables. We find that, at the time of the endline survey, the interventions did not lead to an increase in overall household borrowing, neither at the extensive, nor at the intensive margin. The same conclusion on the intensive margin holds when we consider the amounts borrowed conditional on having borrowed (last column of Table 41).

Table 41: Impacts on credit uptake

	(1)	(2)	(3)	(4)
	Loan uptake	Nr.Loans	Tot. amount	
			uncond.	cond.
SL only	-0.0235	-0.0635	1047.6	3058.0
	(0.0402)	(0.0845)	(2520.7)	(2803.9)
SL+A	0.0202	0.0221	-88.91	-1425.9
	(0.0378)	(0.0742)	(2069.7)	(2232.3)
Strata FE	Yes	Yes	Yes	Yes
Household covariates	Yes	Yes	Yes	Yes
F_stat	0.294	0.320	0.630	0.104
controlmean	0.704	1.403	34421.1	34421.1
N	4222	4222	4222	2997

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

This finding, coupled with our previously presented result that households are more likely to take-up sanitation loans, could imply one of two things: Either clients change their composition of borrowing, accessing more funding from the implementing MFI and less from other sources, or their composition of borrowing sources remains the same and they change the types of loan products accessed from the implementing MFI.[42] Table 42 considers the first of these possible mechanisms, looking at impacts on the likelihood and amounts borrowed from MFIs and formal and informal sources more generally. We note that we did not ask households whether any loans they took were specifically from the implementing MFI, MFI borrowing needs to therefore be seen as a proxy variable.[43] Column 1 in Table 42 shows that households were, on average, neither more nor less likely to borrow from an MFI and columns 2 and 3 further show that they did not switch from informal to more formal credit sources.[44] The same finding holds at the intensive margin as can be seen by looking at impact estimates on amounts borrowed, shown in columns 4-6 of Table 42. We note that results on amounts borrowed are in line when running the regressions conditional on having borrowed.

These findings suggest that households do not react to the interventions by changing the composition of their borrowing with respect to formal and informal sources. We next consider the loan composition in terms of borrowing from the implementing MFI.

[42] A third possibility is based on the fact that the cap on number of loans reported on makes us miss just this additional sanitation loan borrowed. However, the fact that we do not find any impact on number of loans taken, we consider this unlikely.

[43] We remind here that the variable is for total household borrowing. If it concentrated on total borrowing of the client only, this issue would not arise given that regulations prohibit from being member of more than one MFI. Different members of a household can, however, be members of different MFIs.

[44] Formal sources are banks, MFIs, NGOs, cooperatives/savings funds, SHGs. Informal sources are moneylenders, relatives , friend/acquaintance/private financiers, work, pawnshop and other local shops.

Table 42: Impacts on credit sources/composition (likelihood (1-3) and amounts (4-6))

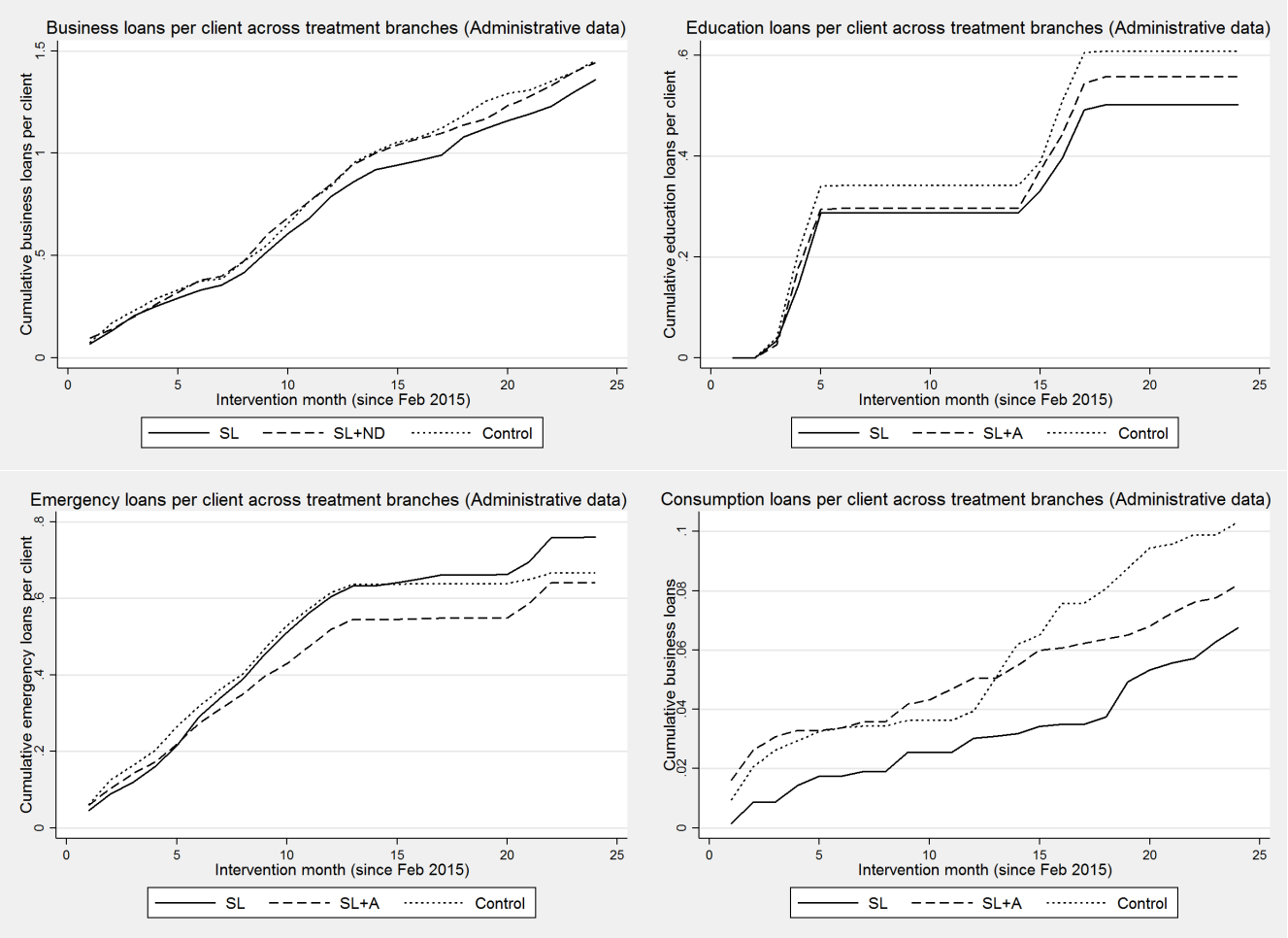
	(1)	(2)	(3)	(4)	(5)	(6)
	Loan uptake			Loan amount		
	MFI	Formal	Informal	MFI	Formal	Informal
SL only	0.0137	-0.0167	-0.00850	564.5	390.1	657.5
	(0.0407)	(0.0426)	(0.0212)	(1870.3)	(2529.9)	(1332.6)
SL+A	-0.0218	0.0218	0.000887	-1563.8	8.631	-97.54
	(0.0341)	(0.0418)	(0.0204)	(1573.1)	(2155.3)	(927.6)
Strata FE	Yes	Yes	Yes	Yes	Yes	Yes
Household covariates	Yes	Yes	Yes	Yes	Yes	Yes
F_stat	0.395	0.375	0.671	0.288	0.872	0.548
controlmean	0.337	0.650	0.100	15469.8	31145.0	3276.1
N	4222	4222	4222	4222	4222	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

Non-sanitation loan uptake from the implementing MFI

We analyze here what happens to non-sanitation loan uptake from the implementing MFI during the time of the intervention. We start by providing graphical evidence. Figure 12 shows the evolution of number of loans per clients for uptake. Starting in the upper left quadrant we see the evolution of business loan uptake, then education loan uptake and in the lower panel uptake of emergency loans and consumption loans. We can see that the evolution in the different treatment arms is very similar for all loan products considered. We can observe, however, some differences in the level of the uptake. For education loans the figure for example suggests that in both peak periods when education loans are typically accessed, control households take more such loans.

Figure 12: Uptake of different loan product by treatment (loans per client)



To analyze whether any of these differences are statistically significant, we turn to a regression analysis on loan uptake aggregated over the whole project period. Table 43 shows these impact estimates for loan uptake and Table 44 for loan amounts taken. We can see that none of the observed differences are statistically significant at the conventional 10 percent level.[45] We raise caution though that our experiment was not designed to detect impacts on these loan products and, in particular with control area offering and experiencing uptake of these loans, we loose power. We therefore, in the following sections, consider potential unintended consequences with respect to outcomes related to these other loan product types, such as businesses.. Before doing so, we will however consider intervention impacts on households' financial wellbeing.

[45] We come to the same conclusion when considering amounts, conditional on having borrowed. Results not shown.

Table 43: Impacts on other MFI loans

	(1) Business	(2) Education	(3) Emergency	(4) Consumption
SL only	0.00332	-0.0518	0.0121	0.000451
	(0.0318)	(0.0420)	(0.0613)	(0.0251)
SL+A	0.00470	-0.0392	0.000920	-0.00308
	(0.0266)	(0.0427)	(0.0562)	(0.0306)
Strata FE	Yes	Yes	Yes	Yes
Household covariates	Yes	Yes	Yes	Yes
F_stat	0.969	0.783	0.826	0.906
controlmean	0.815	0.467	0.390	0.101
N	4222	4222	4222	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

Table 44: Impacts on other MF loans (amount)

	(1) Business	(2) Education	(3) Emergency	(4) Consumption
SL only	1344.7	-838.2	101.5	6.108
	(1883.9)	(583.0)	(152.1)	(104.0)
SL+A	795.3	-433.6	-23.39	4.247
	(1499.4)	(618.4)	(135.5)	(124.4)
Strata FE	Yes	Yes	Yes	Yes
Household covariates	Yes	Yes	Yes	Yes
F_stat	0.775	0.533	0.360	0.988
controlmean	33294.7	5910.5	702.1	360.5
N	4222	4222	4222	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

5.2.5 Financial well-being

Summary of key results

- Using MF client survey data and focusing the analysis on active MF clients, we find that clients in the SL+A arm are 4 percentage points less likely to report that someone in their group had faced repayment difficulties. This is an almost 50% reduction to the control mean, which says that 9% of clients know of group members that had difficulties at some point.
- Conditional on having difficulties, we do not find any significant impacts on probability of default (possibly due to small sample size). Unconditional, we find that in SL+A communities, difficulties are reported to have been less likely to result in default of the loan. We note that all these findings using client survey data are significant at the 10% level only.
- Using household survey data, we find on the other hand that in SL + A arm, households are significantly more likely to report evidence suggestive of repayment difficulties. We find a similar, despite not significant effect in the SL only arm. While in control areas the percentage of households having at least one loan that was taken in 2015, i.e. two years before the endline survey, and are still not fully repaid is 11%, the SL+A intervention increases this percentage by 4 percentage points. This finding is indicative that repayment of loans from other providers than the implementing MFI suffered due to the introduction of sanitation loans.

The provision of loans that are typically classified as 'unproductive', especially in the short-term, might be considered risky in that repayment is likely more difficult. Given that sanitation loans fall under this 'unproductive' category, we consider in this section whether clients report to have more repayment difficulties on loans since the introduction of the sanitation loan product.

We start by looking at information collected in the client survey, hence focusing on borrowing with the implementing MFI only. Clients were asked whether, since they became a group member, anyone in their group had faced problems repaying a loan. If the client responded in the affirmative, she was then asked what type of loan the group member had faced difficulties with. We constrain our analysis to those clients that report to be active, i.e. attend group meetings and/or have a loan outstanding. The rationale for doing so is that we believe that active clients are more likely to know about repayment of other group members.

Impact estimates on this information are shown in Table 45. The first column shows whether the client reports any one in their group to have had difficulties and we find that coefficient estimates are negative and significantly so in the SL+A treatment arm. It suggests that clients in the SL+A arm are 4 percentage points less likely to report that someone in their group had repayment difficulties. This is an almost 50% reduction to the control mean, which says that 9% of clients know of group members that had difficulties at some point. We note that everybody in a group might be reporting about the same group member having had difficulties. Therefore, the coefficient cannot be used to infer on how many clients had difficulties. We look at this in the last column, which analyses the variable on number of group members that a client reports had difficulties. We see that the reduced likelihood is accompanied by a lower number of members having had trouble, again significantly so in the SL+A treatment arm. Columns 2-5 report the types of loans mentioned that clients had difficulties repaying. And, if difficulties happened, these were driven by both productive and consumption investment purposes.

Table 46 analyzes whether repayment difficulties translated into default. Respondents were asked whether, when a group member experienced repayment difficulties, these resulted in default. We pool the answers always

Table 45: Impacts on reported repayment difficulties

	(1) Any	(2) Productive	(3) Consumption	(4) Education	(5) Sanitation	(6) Nr
main						
SL only	-0.00901	-0.00634	-0.0101	-0.00423		-0.194
	(0.0241)	(0.0202)	(0.0171)	(0.0136)		(0.648)
SL+A	-0.0374*	-0.0320*	-0.0271*	-0.0179	0.00567	-1.181*
	(0.0209)	(0.0164)	(0.0156)	(0.0124)	(0.00768)	(0.621)
Strata FE	Yes	Yes	Yes	Yes	Yes	Yes
Household covariates	Yes	Yes	Yes	Yes	Yes	Yes
F_stat	0.171	0.134	0.269	0.264		
controlmean	0.0856	0.0671	0.0541	0.0397		
N	3588	3588	3588	3588	2244	3588

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at BL, dummy =1 if household has a child aged under 2 at time of baseline.

and sometimes (base category is hence 'never'). We show in column 1 unconditional estimates and in column 2 estimates conditional on having had difficulties. Conditional on having had difficulties, the coefficient estimates are negative but insignificant, possibly due to a small sample size. Unconditionally, we find that in SL+A communities, difficulties seem to have been less likely to result in default of the loan, significant at the 10% level.

Table 46: Impacts on whether repayment difficulties did not lead to default

	(1) Uncond.	(2) Cond. on difficulties
SL only	0.000420	-0.0117
	(0.0112)	(0.0805)
SL+A	-0.0161*	-0.101
	(0.00883)	(0.0829)
Strata FE	Yes	Yes
Household covariates	Yes	Yes
F_stat	0.0895	0.343
controlmean	0.0274	0.320
N	3588	263

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at BL, dummy =1 if household has a child aged under 2 at time of baseline.

This evidence suggests that the provision of sanitation loans does not lead to increased repayment difficulties or default of loans taken from the implementing MFI. If anything, repayment seems to have become easier. The variables analysed so far might suffer from recall error, and responses might also be affected by the intervention (if, as we showed earlier, the level of monitoring changed, this might affect recall of repayment difficulties). To broaden the picture, we turn to information from the household survey.

While we

have very limited information on the loans outstanding, we can create a proxy indicator for repayment difficulties. As discussed above, we collected information on up to three loans taken since the baseline survey was conducted. For each of these loans we know when it was taken and the outstanding amount. Based on this information we create an indicator of a loan being problematic if is was taken at some point before August 2015 (i.e. at least two

years before the endline survey[46]) and still has a positive amount outstanding. We do so for each loan and then create a summary indicator whether any of the loans the respondent's household report on is considered problematic under this definition. We repeat the exercise defining a loan to be problematic when it was taken at any point after August 2015 and still has a positive amount outstanding. In this way we are able to distinguish between loans that should have already been repaid, as they were taken more than two years before the endline survey, and loans that are still within their maturity. We focus our discussion on the first indicator discussed.

Results, presented in Table 47, suggest a different picture to the one we obtain looking at MFI administrative data. In both treatment arms, households are more likely to have problematic loans relative to the control group, although this impact is statistically significant only in the SL + A arm. While in control areas the percentage of households having at least one loan that was taken in 2015, i.e. two years before the endline survey, and are still not fully repaid is 11%, the intervention increases this percentage by 2-4 percentage points. This finding is hence suggestive that repayment of loans from other providers than the implementing MFI suffer due to the introduction of sanitation loans.

Table 47: Impacts on loan taken before/after August 2015 still outstanding

	(1)	(2)
	Before August 2015	After August 2015
SL only	0.0235	-0.00794
	(0.0181)	(0.0406)
SL+A	0.0382**	0.0355
	(0.0184)	(0.0342)
Strata FE	Yes	Yes
Household covariates	Yes	Yes
F_stat	0.489	0.287
controlmean	0.106	0.552
N	4222	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at BL, dummy =1 if household has a child aged under 2 at time of baseline.

5.2.6 Other investments

Summary of key results

- We find no impacts on business investment and profits in the SL only arm.
- There is suggestive evidence that households in SL+A communities increase investment into agricultural (business) assets, though we do not have sufficient power to estimate this effect precisely.
- We do not find any impacts on consumption expenditures

[46]The cut-off was chosen as sanitation loans have a maturity of two years, longer than a typical loan. Most sanitation loans were disbursed by August 2015 and their last installment would therefore have been scheduled by the time of the endline survey.

As discussed earlier, the provision of a new loan product, particularly one that can be considered non-productive (in the short-run), might raise concerns of possible crowding-out of other, potentially more productive, loan products and related investments. We already saw in Section 5.2.4 that overall borrowing of households did not change due to the intervention, which - combined with an increase in toilet construction in the SL only arm - would suggest possible switching of types of investments made. We looked at types of loans taken from the MFI and could not find supporting evidence of significant loan product switching due to the interventions. There is, however, the possibility that the loan product labels are not giving us the complete picture, i.e. given that money is tangible, a crowding out of investments might still take place even if switching between product types is not observed.

We therefore analyze next whether we detect any impacts of the interventions on outcomes related to other investment purposes. We start by concentrating on business outcomes and profits then on consumption outcomes - in line with important loan products offered by the implementing MFI. However, we note that data and power limitations might hamper our ability to shed light on investments made with diverted loans, especially if loans were diverted to multiple alternative purposes. In this case we might have insufficient power to detect impacts on any single purpose.

Business investment and profits

Table 48: Likelihood large investment made, likelihood MF loan used for investment

	(1)	(2)	(3)
	Large investment	MFI loan	MFI loan-cond.
SL only	-0.0341	-0.0276	-0.0846
	(0.0257)	(0.0185)	(0.0806)
SL+A	-0.00955	-0.00234	-0.0172
	(0.0270)	(0.0204)	(0.0894)
Strata FE	Yes	Yes	Yes
Household covariates	Yes	Yes	Yes
F_stat	0.364	0.213	0.415
controlmean	0.161	0.101	0.598
N	4222	4222	482

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at BL, dummy =1 if household has a child aged under 2 at time of baseline. Column 4 shows impact estimates on having used an MFI loan for business investment, conditional on having made an investment.

The first outcomes we consider with respect to business investment is the likelihood that households report to have made investments into a business. We consider two measures: For one, we asked households whether they have made any large investment into their existing or new businesses since the baseline survey and, if they did so, we asked whether micro-credit was the source for this investment. We can see from Table 48 that there are no statistically significant impacts of the interventions on these outcomes. Coefficient estimates are negative, suggesting potentially a reduction in investments made, but none are statistically significant and oftentimes small in magnitude.

We turn to analyze impacts on business ownership. The variables we consider are whether the household reports to own any type of business, whether the household closed a business since the baseline survey, and whether the household owns a business in agriculture.[47] We consider agriculture in particular as this is the most common

[47] A business in agriculture comprising crop production and animal husbandry (s.a. dairy).

form of businesses owned and, as we have seen in Section 4.4.3, the primary source of income for the majority of sampled households. We also know from loan purpose reported in monitoring data that more than 60% of all income generating loans provided by the implementing MFI in the study GPs are reportedly used for agricultural investment, predominantly animal husbandry. Impact estimates on these variables are presented in Table 49, columns 1-3. We do not see any significant impacts at the conventional ten percent level for the outcomes considered and coefficient estimates are small. One exception is a 5 percentage point increase in the likelihood of owning a business in agriculture in the SL+A treatment arm. Also this effect is insignificant but has a p-value of 0.18. Combining this latter result with the finding presented in the last column of the table, namely that households in SL+A areas are about 5 percentage points more likely to own agricultural land (significant at the 10% level), could be interpreted as sanitation loans coupled with awareness creation activities inducing some investment in agricultural activities. Again, we do not have sufficient power to place much emphasis on this conclusion. These findings might however alleviate some concerns about sanitation loans crowding out productive investments.

Table 49: Likelihood large investment made, likelihood MF loan used for investment

	(1)	(2)	(3)	(4)
	HH owns a business	Business closed	Agr. business	Own agri. land
SL only	-0.0461	-0.00233	-0.0124	-0.0140
	(0.0491)	(0.00699)	(0.0390)	(0.0308)
SL+A	0.0258	-0.00735	0.0574	0.0549*
	(0.0522)	(0.00559)	(0.0424)	(0.0316)
Strata FE	Yes	Yes	Yes	Yes
Household covariates	Yes	Yes	Yes	Yes
F_stat	0.181	0.464	0.124	0.0612
controlmean	0.450	0.0282	0.237	0.333
N	4222	4222	4222	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at BL, dummy =1 if household has a child aged under 2 at time of baseline.

Finally, we also do not find any impacts on business performance of existing businesses. Impact estimates on number of staff employed (from the household and from outside the household), and on profits, revenues and expenses are shown in Table 50. No significant impacts can be demonstrated on these variables.[48]

Consumption

The third set of variables we consider to understand possible unintended consequences (positive or negative) is consumption. Due to constraints on the budget and on respondent's time and possible (survey) fatigue, we were not able to implement a full consumption module. We had to restrict ourselves to asking about aggregated household food consumption expenditures and non-food expenditures in the last week. Problems with this data are obvious, and include measurement error and recall error as well as potentially missing non-frequent (particularly non-food) expenditures.

[48] We show linear regressions but conducted robustness checks, particularly on profits, revenues and expenses, exlcuding outliers and using other models such as a tobit regression on expenses and revenues, where values cannot be negative. Conclusions do not change.

Table 50: Staff, Revenues, Profits, Expenditures

	(1) HH staff	(2) Non HH staff	(3) Profits	(4) Revenues	(5) Expenditures
SL only	-0.120	-0.0355	-2092.1	-5979.7	24.34
	(0.102)	(0.183)	(4651.4)	(5160.7)	(3396.1)
SL+A	0.0299	0.191	6352.2	3167.8	-2269.6
	(0.111)	(0.233)	(5598.5)	(6673.3)	(2289.0)
Strata FE	Yes	Yes	Yes	Yes	Yes
Household covariates	Yes	Yes	Yes	Yes	Yes
F_stat	0.196	0.264	0.0902	0.124	0.477
controlmean	0.850	0.709	9631.1	26461.8	15800.7
N	4222	4222	4222	4222	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at BL, dummy =1 if household has a child aged under 2 at time of baseline.

Impact estimates on these two outcomes are presented in Table 51. We show impact estimates on the natural logarithm of reported expenditures, thereby reducing the impacts of outliers.[49] We find no significant impacts on any of these outcomes, independent on the specification used. This finding suggests that the introduction of sanitation loans does not lead households to cut back on their consumption expenditures (particularly in the longer-run given that we measured expenditures for many households post sanitation loan uptake and repayment).

Table 51: Impacts on (log) consumption expenditures

	(1) Total exp.	(2) Food exp.	(3) Non-food exp.
SL only	-0.0267	0.00291	-0.0717
	(0.0623)	(0.0380)	(0.0888)
SL+A	0.0378	0.0220	0.00669
	(0.0654)	(0.0389)	(0.0982)
Strata FE	Yes	Yes	Yes
Household covariates	Yes	Yes	Yes
F_stat	0.268	0.621	0.359
controlmean	7.265	6.595	6.436
N	4222	4222	4093

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at BL, dummy =1 if household has a child aged under 2 at time of baseline.

[49] We note that 129 households report zero non-food expenditures. These are dropped when taking the natural logarithm. As robustness checks we run the regression on levels, with and without excluding outliers (up to 5%). Conclusions remain unchanged. We also check, for consistency, whether results are affected by outliers in the natural logarithm transformation but do not find this to be the case.

5.2.7 Sanitation beliefs

Summary of key results

- We used some novel techniques to elicit households' perceptions of the monetary costs of constructing and maintaining different types of toilets. We find evidence that households in control areas systematically misperceive (either significantly over-report or under-report) the true costs of a toilet, which could affect their sanitation investment decisions. However, we do not find any robust evidence of impact of either intervention on average perceived toilet costs. We also do not find any significant impact of either intervention on households' perceptions about the time that toilets could be used without any hassle.
- To obtain perceptions on other non-monetary costs of sanitation, we asked respondents to tell us the extent to which they agreed or did not agree with a set of statements related to non-monetary costs including increased need for water, reduced opportunities for social interactions, etc. In addition, we obtained actual toilet costs and water needs for those with a toilet. We do not find any significant impacts on perceptions of these non-monetary costs.
- Neither intervention affected households' perceived non-monetary benefits of safe toilets, measured either by health expenditures or expected health expenditures, or by eliciting households' agreement or disagreement with six statements addressing potential benefits of a twin pit toilet (e.g. improved health, improved safety for women, increases in labor supply, improved household status, time saving and overall improved happiness)

One channel through which the interventions under consideration could have affected sanitation outcomes is through the provision of information on the actual costs and benefits of safe sanitation; directly, through awareness creation activities, but also indirectly through the set sanitation loan amount anchoring price expectations. The former, direct, channel might be one potential explanation for low adoption of safe sanitation in the absence of the interventions. If individuals are misinformed about the costs and benefits of safe sanitation, they might make sub-optimal sanitation adoption choices: For example, if households believe that a toilet is more expensive than it actually is, they may choose not to adopt it, even if it were beneficial for the household to do so. In this section, we test the impacts on perceived costs and benefits of safe sanitation.

We expect impacts on this dimension primarily in the SL+A arm, since awareness creation campaign messages highlighted both monetary (e.g. reduced health expenditures) and non-monetary benefits (e.g. safety for women, ability to attract brides for sons) of safe sanitation. As discussed in Section 2.3.2, the campaign also provided information on the costs of low-cost safe sanitation models and how long these could last, and trained local masons on how to construct these. Thus it could have improved knowledge on the costs of different toilet models through either the information provided, or through the trained masons informing potential clients.

We sought to measure perceptions of the costs and benefits of toilets on both monetary and non-monetary margins. Specifically, we elicited perceptions about costs of constructing a toilet, on how long the toilet could be used without hassle, and perceptions about non-monetary costs associated with toilets, including increased need for water, reduced opportunities for social interactions, etc. Monetary benefits include effects on health expenditures, and perceptions related to margins such as women's safety, and household status in a village.

We start by considering effects on perceived costs of different models of safe toilets, before looking at effects on perceived benefits of safe sanitation.

Perceived Costs of Sanitation

A number of monetary and non-monetary costs of sanitation have been identified in the literature. Monetary costs include the direct costs of constructing a toilet (materials, labor) and costs of maintaining the toilet. The latter includes for instance costs of emptying the pit of pit toilets, and of keeping it functional in the future. In addition, a wide range of non-monetary costs have been proposed by policy experts and in the literature. Toilets, particularly the most popular models constructed in rural India, require more water to keep them clean and functional compared to open defecation. If water connections are not available near the toilet, households might need to spend more time fetching water, particularly in the dry season when water may not be easily available. Individuals may also face disutility from using a toilet if it smells, or if it reduces opportunities to get exercise (since individuals may no longer need to walk as far away as they did for open defecation). Toilets could also indirectly reduce opportunities for social interaction for women in conservative societies.

Prevalent cultural practices may also impose non-monetary costs to the adoption of safe toilets (Coffey and Spears, 2017) [2] highlight Indian households' perceptions of ritual purity and untouchability as major barriers to the adoption of safe toilets by households. Many households consider having a toilet near or in one's house as making the house 'ritually impure'. Moreover, tasks such as pit emptying are also considered 'impure' for households from high castes. Cleaning toilets and emptying pits may be considered to be the task of 'untouchables', who would engage in ritually impure tasks. A desire to maintain ritual purity may thus impose a large non-monetary cost of adopting a safe toilet.

We used some novel techniques to elicit households' perceptions of the monetary costs of constructing different types of toilets, and of the different margins of non-monetary costs mentioned above in our surveys. Specifically, we elicited expectations of the minimum and maximum costs for 3 different toilets from clients. For these toilets, we also elicited expectations of how long clients expected to be able to use these toilets without any hassle. To obtain perceptions on other non-monetary costs of sanitation, we asked respondents to tell us the extent to which they agreed or did not agree with a set of statements related to the non-monetary costs outlined above. In addition, we obtained actual toilet costs and water needs for those with a toilet.

Expectations about costs of different types of toilets

We obtained respondents' perceptions of the minimum and maximum costs of constructing three different types of toilets: a simple, poor-quality pit toilet, a single pit toilet and a double-pit toilet. We showed respondents pictures of each type of toilet, to ensure that the elicited costs capture expectations about costs of constructing the same type of toilet, with the same underground and overground structures, rather than differences in quality of these.

Figure 22 in Appendix displays the pictures and text of the questions used to elicit these expectations. Specifically, we focused on the following three types of toilets: a basic toilet with poor underground and overground structures, a low-cost single pit toilet and a double-pit toilet. The latter type of toilet is a model that is recommended by the Indian Ministry of Drinking Water and Sanitation.[50] We elicited these expectations from the clients of the implementing MFI. Eliciting expectations is not an easy task (see Delavande et al, 2011), and requires the provision of extensive training and instructions to obtain meaningful data. Our questions were simpler than standard expectations questions since we didn't seek to elicit probabilities. Nonetheless, surveyors were carefully trained on how to explain the exercise and elicit the expectations, and were instructed to probe the respondent if she provided a maximum cost that was lower than the minimum cost provided.

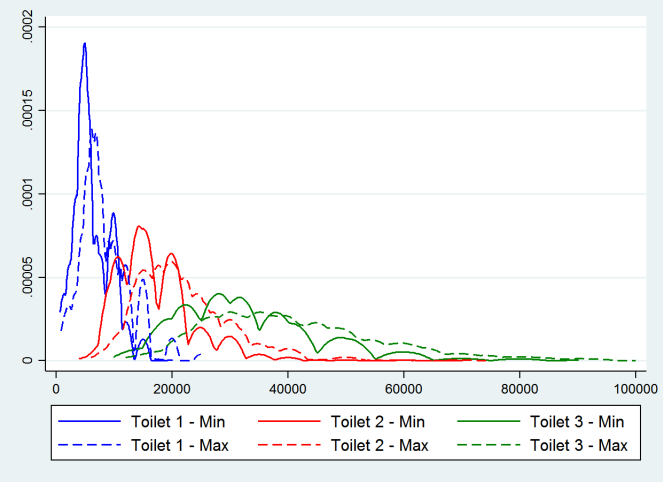
We first check the quality of the data to assess whether clients understood the questions, and provided sensible answers. Specifically, we check the number of households that reported maximum costs that were lower than or

[50] Source: http://www.mdws.gov.in/sites/default/files/Final%20Draft_Handbook%20MDWS%2BWaterAid%20%20onsite%20sanitation.pdf. Last accessed 28 March 2018.

equal to the minimum costs for each type of toilet; and also whether households reported higher costs for better quality toilets.

Figure 13 plots the densities of the elicited minimum and maximum costs for each of the 3 toilets in the control group, while Table 52 provides some descriptive statistics on the reported minimum and maximum values. Reassuringly, we find that with the exception of a handful of households, all households report maximum cost values that are above the minimum cost values.[51] Figure 13 confirms that the distributions for the maximum values are to the right of those of the minimum values for each toilet type, each of which represented by a different color, solid lines showing the distributions of expected minimum costs and dashed lines the distributions of expected maximum costs. Moreover, we can also see that the distributions for the minimum and maximum for toilet 2 (the low-cost single pit toilet) are to the right of those for toilet 1 (the very basic toilet), indicating that respondents reported higher minimum and maximum costs for the higher quality single-pit toilet than the poor quality pit toilet. The reported minimum and maximum costs for toilet 3 (the model recommended by the GoI) are usually higher than those reported for toilet 1 and 2 respectively, as evident from the distributions for these variables to the right of those for the other toilets. This is as expected, since the costs of building a twin pit toilet are higher than those of constructing a single pit toilet. This evidence thus suggests that respondents did indeed understand the questions, and provided sensible answers.

Figure 13: Distributions of Elicited Minimum and Maximum Costs for 3 Toilet Models, Control Group



From Table 52, we see that respondents in the control group reported a minimum cost of Rs 6,187 for the poorest quality toilet (toilet 1) on average, and a maximum cost of Rs 8,334 on average, yielding an average perceived cost of around Rs 7,261 if we assume a distribution where the mean falls in the middle of minimum and maximum, and a range between the maximum and minimum costs of Rs 2,147. Respondents report much higher minimum and maximum costs for the higher quality toilets 2 and 3. The minimum and maximum perceived costs for toilet 2 are on average Rs 17,135 and Rs 22,004 respectively, yielding an average perceived cost of close to Rs 20,000. For toilet 3, the minimum and maximum perceived costs reported are Rs 33,050 and Rs 40,945 respectively, which provides an average perceived cost of close to Rs 37,000. Interestingly, the perceived minimum costs for toilets 2 and 3 are on average higher than the subsidy amount available to eligible households in India's Swaccha Bharat Mission - Gramin, which is Rs 12,000-15,000 (See Section 5.7 for more information on this scheme). They are also substantially higher than the sanitation loan offered by the implementing MFI, which currently stands at Rs 15,000.[52] There is also a higher gap between maximum perceived costs and minimum perceived costs for toilets 2

[51] 5 households reported inconsistent maximum and minimum cost values. We drop these responses from the rest of the analysis.

[52] This gap between expected construction costs and loan size offered is reflected in reports by loan officers who say the loan amount is too small.

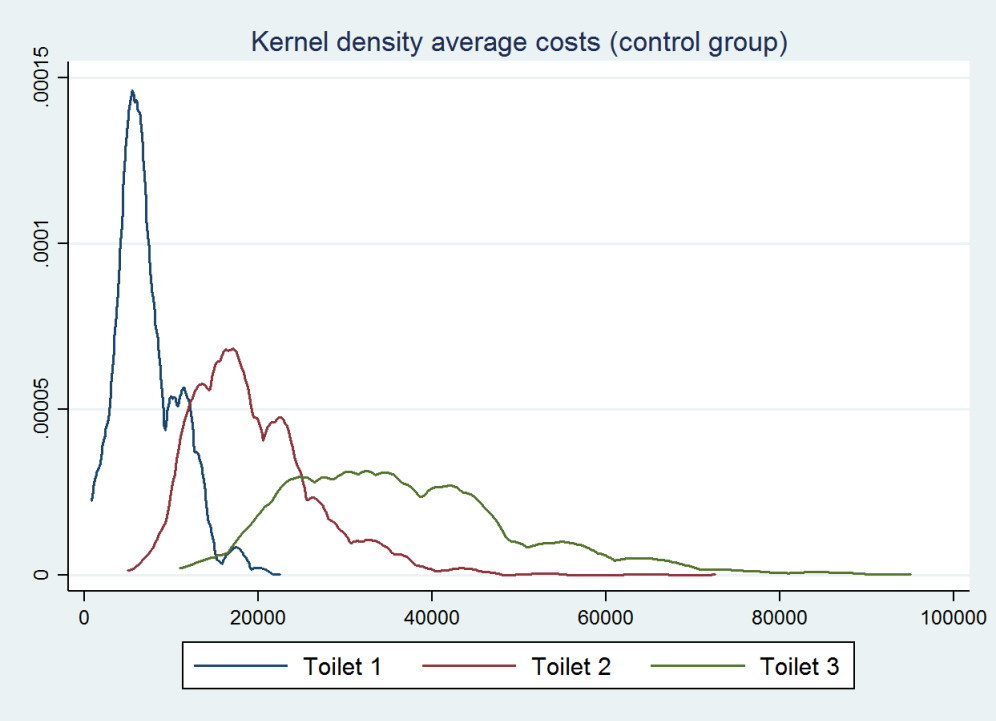
and 3 than toilet 1.

Table 52: Summary Statistics - Perceived Toilet Costs, Client Sample

	N	Mean	sd	Min	Max
		Toilet 1			
Minimum costs	1589	6187	3138	700	20000
Maximum costs	1589	8334	4230	900	25000
Average costs	1589	7261	3622	850	22500
Max costs - Min costs	1589	2147	1735	100	15000
		Toilet 2			
Minimum costs	1587	17135	6884	4000	70000
Maximum costs	1589	22004	8411	6000	75000
Average costs	1587	19566	7499	5000	72500
Max costs - Min costs	1587	4862	3373	500	50000
		Toilet 3			
Minimum costs	1589	33050	12496	10000	90000
Maximum costs	1589	40945	15265	12000	100000
Average costs	1589	36997	13640	11000	95000
Max costs - Min costs	1589	7895	5844	1000	55000

We use this information to construct the following measures of perceptions of toilet costs: (1) Log average perceived toilet costs, which are calculated as the midpoint between the minimum and maximum expected costs; (2) Log range of perceived toilet costs, which is calculated as the log difference between the maximum and minimum expected costs; (3) Difference between log average perceived toilet costs at household level, and log actual costs. The range of perceived toilet costs provides us with an estimate of how (un)certain a household is about the cost of the toilet: a larger range suggests that the respondent is more uncertain about the actual cost of such a toilet. By providing information on the costs of low-cost safe toilets, the awareness creation activities could have reduced uncertainty about the costs, and could have also updated household beliefs of the costs towards actual costs.

Figure 14: Distribution of Average Costs for 3 Toilet Models, Control Group



We want to assess whether the interventions altered households' perceptions of costs of safe toilets. In particular, they could have corrected misperceptions of actual costs of toilets, and also could have reduced respondents'

uncertainty about costs. The second and third measures proposed above can be used to assess these channels. Constructing the third measure requires an estimate of actual costs. Our surveys offer two sources of actual costs: First, we elicited expectations about the costs of constructing two of the three toilets - the single pit and double pit toilets - in the mason survey.[53] Second, we also have information on actual costs paid by households for the toilets they constructed, as reported by household heads in the household survey. The latter could differ from the costs quoted by masons if there is bargaining on prices (which is ubiquitous in developing countries, e.g. Keniston (2011) [9]), or if households acquire materials and other inputs at lower costs than those charged by masons.[54] Actual costs paid by households - as reported by heads - might hence provide a more accurate measure. To ensure comparability, we convert all costs to August 2017 prices using the OECD Consumer Price Index for India.[55] There are two limitations associated with using actual costs: First, we do not observe these for households who don't own a toilet; and second, they will depend on actual toilet quality, which is likely to differ from that displayed in the provided pictures.

To deal with the first limitation, we take median costs at the GP level. We impose a restriction that there should be at least eight observations of costs within a GP to take the median. If there are fewer than eight observations within the GP for a particular model, we take the median at a larger geographic level – the block. If there are insufficient observations for costs at the block level, we take the median at the district level.[56] Taking the median cost at the GP level also helps to alleviate concerns that the costs capture variation in quality.[57]

One limitation in using the GP level median cost in our context is that while our survey collected information on toilet type for households with a toilet, it didn't differentiate between single pit and double pit toilets, as in the case of the cost perceptions. We deal with this issue by reporting three sets of results: (i) assume that all pit toilets in the household data are single pit toilets; (ii) assume that all pit toilets in the household data are double pit toilets; and (iii) assume that half the pit toilets in the household data are single pit toilets, and the rest are double pit toilets.[58]

Figure 15 displays the distributions of costs from the mason survey, and the median GP level costs, while Table 53 provides some descriptive statistics on actual costs measured through these methods. The Figure indicates that mason reports on costs of the single pit toilet are lower than those of the double-pit toilet. However, the distribution of costs for the double-pit toilet reported by masons vary significantly across GPs, with some reports of costs above Rs 100,000. By contrast, when we consider the median GP level cost for all pit toilets obtained from household reports, we see that these lie between mason reports of costs of the two toilets. Of course, this could simply be a result of the median GP reported costs simply measuring the costs of a toilet that might be the average of a single pit or double pit toilet.

[53] In addition, we elicited the costs of constructing a toilet with a septic tank.

[54] Household's reported costs could also diverge from mason's cost estimates if households provide some labor.

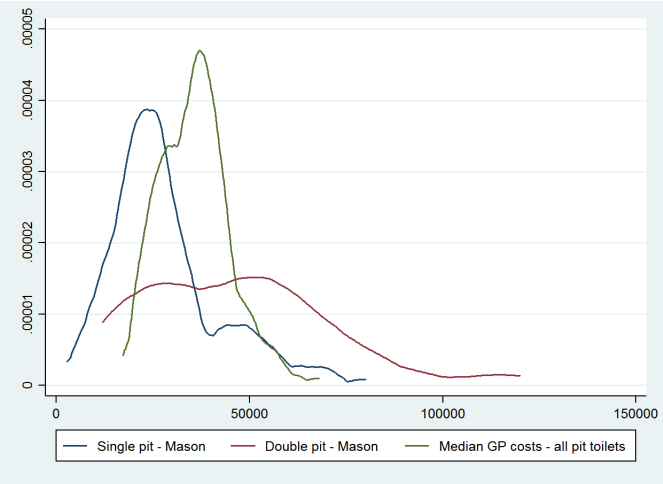
[55] Organization for Economic Co-operation and Development, Consumer Price Index: All Items for India [INDCPIALLMINMEI], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/INDCPIALLMINMEI, March 26, 2018.

[56] In 25 GPs we have less than eight observations within the GP for a particular model, so we imputed costs with the median at block level.

[57] One concern with using actual costs is that respondents with toilets may simply report the cost of their toilet as their perceived cost of the toilet, which could lead us to incorrectly conclude that the interventions changed perceptions if, as was the case here, the interventions did lead to an increase in toilet uptake. We believe that any such spurious correlation will be small and unlikely to be driving our findings for a number of reasons. First, we use median costs at the GP level, rather than actual household level costs. Moreover, the toilet costs and cost perceptions were collected from two different respondents – the household head and the MF client respectively – which should further reduce the risk of such a spurious correlation.

[58] This is obviously a strong assumption. In on-going work, we are trying to obtain estimates of single pit and double pit toilets in the study villages to construct a more meaningful weighted average for the perceived costs.

Figure 15: Distributions of average perceived costs for masons and median GP level costs



Masons report an average expected cost of around Rs 28,000 for a single pit toilet, and Rs 47,213 for a double-pit toilet, while the median GP costs have an average value of around Rs 35,000.

Table 53: Summary Statistics, Mason Costs and Median GP-Level Actual Costs

	N	**Mean**	**sd**	**Min**	**Max**
Mason - Single Pit	120	28033	14629	2800	80000
Mason - Double Pit	120	47213	24412	12000	120000
Median GP costs - All Pit Toilets	120	35186	8627	17269	63133

Table 53 displays descriptive statistics of the measure based on the difference between the log average household costs and log actual costs (measured using mason reports, and the median GP costs) for the second and third toilet models in the control areas. The Table indicates that households in control areas underestimate the costs of a single pit toilet, relative to both the measure of actual costs, and mason reported costs. The under-estimation is large, at roughly 0.57 log points for the median GP cost for all pit toilets and 0.27 log points for the mason reported cost. The under-estimation relative to the median GP cost could be a consequence of the fact that the actual GP cost includes more expensive double pit toilets. When we look at the measures for the double pit toilet, we can see that households in the control group overestimate the cost of the toilet when compared to actual costs, but underestimate them when compared to the mason's reported cost. The magnitude for the misperception is smaller, at less than 0.07 log points for the median GP cost, and 0.15 log points for the mason reported cost. Such misperceptions could affect households' sanitation investment decisions: if households overestimate costs, they may be discouraged from investing, while if they underestimate costs, they may save less, or borrow less than is required to build a safe toilet, making the toilet unaffordable.

Table 54: Summary Statistics - Key Cost Expectations Variables

	N	Mean	sd	Min	Max
			Toilet 2 - Single Pit		
Expected perceived costs - Median GP costs (All Pits)	1587	-14809	10588	-37357	46050
Expected perceived costs - Mason avg perceived costs (Single Pit)	1587	-9316	18007	-69000	51500
Log (Expected perceived costs) - Log (Median GP costs) (All Pits)	1587	-0.573	0.400	-1.983	1.055
Log (Expected perceived costs) - Log(Mason avg perceived costs) (Single Pit)	1587	-0.274	0.695	-2.274	2.249
			Toilet 2 - Double Pit		
Expected perceived costs - Median GP costs (Average Pit)	1589	2627	15368	-32343	68299
Expected perceived costs - Mason perceived costs (Double Pit)	1589	-10353	28876	-106000	71000
Log (Expected perceived costs) - Log (Median GP costs) (All Pits)	1589	0.064	0.421	-1.135	1.317
Log (Expected perceived costs) - Log(Mason avg perceived costs) (Single Pit)	1589	-0.147	0.713	-2.249	1.689

The interventions could have thus corrected such misperceptions. We first present the impacts of the interventions on average perceived costs in Table 55. The Table indicates no statistically significant differences in the log average perceived costs of the 3 different toilets. In most cases the coefficients are positive (with the exception of the SL+A arm for toilet 1) but are small in magnitude.

Table 55: Impacts on Average Perceived Costs

	(1) Toilet 1	(2) Toilet 2	(3) Toilet3
SL only	0.0554	0.00760	0.0271
	(0.0459)	(0.0336)	(0.0283)
SL+A	-0.0317	0.0208	0.0340
	(0.0417)	(0.0399)	(0.0295)
Strata FE	Yes	Yes	Yes
Household covariates	Yes	Yes	Yes
F_stat	0.0554	0.718	0.809
controlmean	8.750	9.816	10.45
N	4201	4198	4202

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

Tables 56 and 58 presents the results for the second measure, using actual median GP costs and mason costs respectively. However, the average perceived costs, on their own, are not informative about the effects of the interventions on correcting misperceptions about the costs of the single pit and double pit toilets. To shed light on this, we consider the impacts of the interventions on the difference in the log average household perceived cost and the log actual cost, proxied by either the median GP level cost, or the mason reported average cost for each toilet type. Tables 56 and 58 display the findings from this analysis. Table 56 indicates that households in both the SL only and SL+A treatment arms have lower cost expectations than those in the control areas for both toilet types. Column 1 compares expectations of cost for the single pit toilet relative to actual cost for all pit toilets, while column 2 does the the same for double pit toilets. Column 3 takes the average expected cost for both pit

toilets and compares this to the actual cost of pit toilets. Across all three columns, we see that households in both intervention arms reduce their cost expectations, relative to actual costs, by around 0.11 - 0.13 log points as compared to households in control communities. When we use mason reported costs as the measure of actual costs, as in Table 58, our conclusions change. In particular, we no longer obtain any statistically significant differences between household expected costs and mason expected costs, though the coefficients in Column 1 are negative and relatively large in magnitude. The coefficients in Column 2 of the table indicate little effect of either intervention on household expectations on the costs of double pit toilets relative to masons' expectations.

Table 56: Impacts on Differences Between Log Household Expected Costs and Log Median GP Costs

Table 57: Impacts on differences between expected costs and median GP costs (Logs)

	(1) Toilet 2	(2) Toilet3	(3) Average pit
SL only	-0.136*	-0.116*	-0.122*
	(0.0691)	(0.0637)	(0.0646)
SL+A	-0.122**	-0.109*	-0.113**
	(0.0610)	(0.0557)	(0.0563)
Strata FE	Yes	Yes	Yes
Household covariates	Yes	Yes	Yes
F_stat	0.832	0.900	0.876
controlmean	-0.573	0.0643	-0.196
N	4198	4202	4198

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

Table 58: Impacts on Differences Between Log Household Expected Costs and Log Mason Expected Costs

	(1) Toilet 2	(2) Toilet3
SL only	-0.0924	-0.000501
	(0.0984)	(0.0879)
SL+A	-0.0811	0.0115
	(0.124)	(0.0924)
Strata FE	Yes	Yes
Household covariates	Yes	Yes
F_stat	0.925	0.901
controlmean	-0.274	-0.147
N	4198	4202

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

The finding of similar effects in the arms that received the sanitation loans only on perceptions (relative to the median GP costs) is unexpected. It could be a result of the intervention sparking interest in building toilets, leading households to obtain more information on their costs. Equally, client households might also discuss sanitation issues, including sharing of information on toilet costs, more frequently leading households to update their expectations about the costs of single and double pit toilets.

Finally, Table 59 reports the findings for the range of perceived costs. It indicates no statistically significant effects of either intervention on the reported range of costs for the three different toilets. Interestingly, the coefficients are mostly positive, though relatively small in magnitude.

Table 59: Impacts on Log Range of Expected Costs

	(1) Toilet 1	(2) Toilet 2	(3) Toilet3
SL only	0.0297	0.0488	0.0328
	(0.0445)	(0.0445)	(0.0436)
SL+A	-0.00667	0.0418	0.0253
	(0.0399)	(0.0444)	(0.0422)
Strata FE	Yes	Yes	Yes
Household covariates	Yes	Yes	Yes
F_stat	0.387	0.873	0.863
controlmean	7.423	8.272	8.757
N	4201	4197	4202

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

Non-Monetary Costs

In addition to the expectations of costs of construction of three different models of toilets, we also elicited expectations on how long households expected to be able to use each of the three different types of toilets without any hassle. As with the costs, we elicited the minimum time and maximum time in years. Recent research by Gupta et al (2017) and Coffey and Spears (2016) argue that Indian households have a strong preference for toilet models that will not require manual emptying of a pit. The latter task is considered to be ritually polluting, and was traditionally undertaken by members of the so-called 'untouchable' castes. The stigma associated with doing such tasks discourages members of these castes in undertaking such work, leading to a shortfall in the supply of pit emptiers.

Figure 16 displays the distributions of the minimum expected time and maximum expected time that each of the three toilets could be used without any hassle as reported by households in the control group, while Table 60 provides related descriptive statistics.[59] As with the costs of the toilets, we see that the distributions for the minimum duration are always to the left of those for the maximum duration for each toilet type. Moreover, the distributions for the higher quality toilets are to the right of those for the lower quality toilets, indicating that households reported higher minimum and maximum durations for the higher quality toilets, which is in line with what one would expected.

Table 60 indicates that on average, households expect to be able to use the poor single pit toilet for about 6.2 years without hassle. This compares with close to 16 and 27 years respectively for the single and double pit toilets. By contrast, masons expect households to be able to use single and double pit toilets for far longer – 30 and 52 years respectively.

[59] As with the cost expectations data, only three respondents reported maximum values that were smaller than the minimum values, providing evidence that most respondents understood these questions.

Figure 16: Distributions of Elicited Minimum and Maximum Time for 3 Toilet Models, Control Group

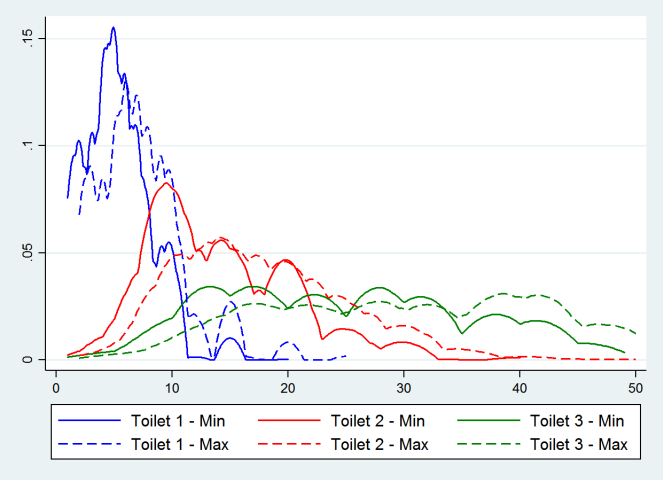


Table 60: Summary statistics - Toilet usage time: Household survey

	N	Mean	sd	Min	Max
	Toilet 1				
Minimum time (Household)	1589	5.29	2.91	1	20
Maximum time (Household)	1589	7.17	3.74	2	25
Average time (Household)	1589	6.23	3.27	1.5	22.5
Max time - Min time (Household)	1589	1.89	1.44	0	15
	Toilet 2				
Minimum time (Household)	1588	14.14	6.39	1	40
Maximum time (Household)	1589	17.74	7.47	2	50
Average time (Household)	1588	15.94	6.85	1.5	45
Max time - Min time (Household)	1588	3.61	2.41	0	20
Average time (Mason)	120	30.075	20.837	4.5	100
Max time - Min time (Mason)	120	5.517	3.616	0	20
	Toilet 3				
Minimum time (Household)	1589	24.76	10.73	1	49
Maximum time (Household)	1589	30.20	11.73	2	50
Average time (Household)	1589	27.48	11.09	1.5	49.50
Max time - Min time (Household)	1589	5.44	3.61	0	30
Average time (Mason)	120	52	28.33	3.5	110
Max time - Min time (Mason)	120	7.98	5.04	0	20

As with the expected costs, we construct the following measures of perceptions of toilet duration: (1) Log average expected duration, which is the simple average of the minimum and maximum expected time; (2) Differences between log household reports of average expected duration and log masons' report of average expected duration at the GP level; and (3) Range of duration, calculated as the log difference between the maximum and minimum expected time.

Table 61 reports descriptive statistics for the differences between log household expected duration and log masons' expected duration for the single and double pit toilets for the control group. On average, households underestimate how much time each toilet can be used without any hassle relative to the masons.

We next study the impacts of the interventions on perceptions of toilet duration. The awareness creation activities included information on how long the low-cost single pit and double-pit toilets could be used before requiring pit emptying. Since the frequency of pit emptying depends on the frequency of toilet usage, we control for household size in all the regressions.

Table 62 reports the results of the impacts on the average expected duration, while Table 63 does so for the difference between average household expected duration and the GP masons' expected duration and Table 64 reports the impacts on the range. Across all three measures, we find no statistically significant effects of either the

Table 61: Perceptions of toilet duration - Summary Statistics

	N	Mean	sd	Min	Max
Toilet 1					
Log(Expected duration) - Log(Expected mason duration at GP level)	1588	-0.600	0.786	-4.037	1.689
Toilet 3					
Log(Expected duration) - Log(Expected mason duration at GP level)	1589	-0.445	0.914	-4.094	2.639

SL only intervention or the SL+A intervention on expected toilet duration. Throughout, the coefficients are small in magnitude indicating no impacts of the interventions on this dimension.

Table 62: Average Expected Duration

	(1) Toilet 1	(2) Toilet 2	(3) Toilet3
SL only	0.00215	-0.00721	-0.0136
	(0.0335)	(0.0570)	(0.0572)
SL+A	-0.0486	0.0340	0.0341
	(0.0308)	(0.0692)	(0.0726)
Strata FE	Yes	Yes	Yes
Household covariates	Yes	Yes	Yes
F_stat	0.124	0.503	0.449
controlmean	1.678	2.671	3.213
N	4202	4200	4201

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

Table 63: Differences in HH Expected Duration and Mason Expected Duration

	(1) Toilet 2	(2) Toilet3
SL only	-0.0802	-0.112
	(0.0971)	(0.119)
SL+A	0.0526	-0.0602
	(0.142)	(0.144)
Strata FE	Yes	Yes
Household covariates	Yes	Yes
F_stat	0.284	0.692
controlmean	-0.600	-0.445
N	4200	4201

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

Table 64: Range of Household Expected Duration

	(1) Toilet 1	(2) Toilet 2	(3) Toilet3
SL only	0.0296	0.0488	0.0328
	(0.0446)	(0.0445)	(0.0436)
SL+A	-0.00691	0.0419	0.0253
	(0.0400)	(0.0444)	(0.0422)
Strata FE	Yes	Yes	Yes
Household covariates	Yes	Yes	Yes
F_stat	0.385	0.874	0.863
controlmean	7.423	8.272	8.757
N	4201	4197	4202

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

As discussed above, we also collected households' perceptions on other non-monetary costs. We did so by asking respondents the extent to which they agreed, or disagreed with various statements as applied to a specified picture of a twin pit toilet.[60] The statements were chosen based on reasons for not constructing or using toilets that have been mentioned in the academic and policy literatures. These include perceptions such as toilets are unhealthy because they stink, a reduction in social interactions with others due to the toilet, poor health because of the toilet, increases in time to fetch water, concerns about emptying the pit once it is full, including the expense in doing so. Respondents were asked to provide their agreement or disagreement with each statement on a 5 point Likert scale (strongly agree, agree, neither agree nor disagree, disagree, strongly disagree). The responses were recoded so that a higher value indicated more agreement with the statement. Table 65 displays the responses for each of the statements in the control group. For statements relating to the fact that toilets might stink, or having a toilet means spending less time with others, that toilets make users sick, most respondents (around 70% or more) either disagreed or strongly disagreed with the statement. A majority of households (around 60%) disagreed or strongly disagreed with the statements mentioning that it is difficult to empty the pit, or it is expensive to do so.

[60] We had originally intended to ask a random half our sample of their perceptions related to a poorer quality toilet, and the other half about their perceptions relating to the twin pit toilet. However, a programming error in the CAPI-based survey led to most households being shown the picture of the twin pit toilet. Around 148 households (98 in the control group and 48 in the SL+A group) were shown the picture of the poorer quality toilet. In what follows, we will display results for the twin-pit toilet. Analysis displayed in the appendix (Table 107) indicates that the sample balance on observables across treatment arms is still maintained for respondents shown the double pit toilet picture.

Table 65: Reasons for non constructing a toilet - Summary statistics

	Stink		**Time with others**		**Sick**		**Fetching Water**		**Difficult emptying the pit**		**Expensive emptying the pit**	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
1 Strongly Disagree	263	16.55	211	13.28	302	19.01	110	6.92	92	5.79	96	6.04
2 Disagree	855	53.81	905	56.95	946	59.53	719	45.25	528	33.23	505	31.78
3 No opinion	14	0.88	97	6.1	47	2.96	111	6.99	97	6.1	110	6.92
4 Agree	362	22.78	285	17.94	201	12.65	456	28.7	612	38.51	582	36.63
5 Strongly agree	95	5.98	91	5.73	93	5.85	193	12.15	260	16.36	296	18.63
Total	1589	100	1589	100	1589	100	1589	100	1589	100	1589	100

We combined the responses to six of these statements relating to perceived costs using polychoric principal components analysis. This was done to reduce the number of tests we conduct. The principal components analysis yielded two components with eigenvalues greater than 1. Table 108 in the Appendix displays the loadings for each component. The loadings for the first component are positive, indicating that it captures higher agreement, and hence perceived costs, on the six dimensions considered, while those for the second component are positive for the first three statements and negative for the remaining three statements, which ask about difficulties in fetching water and emptying the pit. The first three statements capture personal costs of using the toilet (e.g. they stink), while the latter three relate to the costs of maintaining it. Thus higher values of this component indicate more agreement with statements capturing costs related to using the toilet, rather than maintaining it. We retain both of these components and study the impact of the interventions on each of them. Table 66 displays the results. While the coefficients on the indicators for the SL only and SL+A interventions are negative for the first component, indicating lesser agreement with the statements, they are small and statistically insignificant, indicating no intervention effect on this margin. Similarly, we find no statistically significant effect of either intervention on the second component.[61]

Table 66: Impacts on Perceived Non Monetary Costs of Double Pit Toilet

	(1) Component 1	(2) Component 2
SL only	-0.0306	-0.00407
	(0.135)	(0.0699)
SL+A	-0.0853	0.000508
	(0.136)	(0.0729)
Strata FE	Yes	Yes
Household covariates	Yes	Yes
F_stat	0.714	0.944
controlmean	6.872	-0.491
N	4056	4056

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

Perceived Benefits of Sanitation

Having considered impacts on perceived costs, we now turn to the intervention impacts on perceived benefits. The academic and policy literatures have championed a number of benefits of sanitation. These include improved health (and as a consequence reduced health expenditures), improved safety for women and children, increases in labor supply due to better health, improved status, time saving (since one doesn't need to walk far to find a suitable place to defecate), and overall improved happiness and wellbeing.

We sought to measure perceptions of these benefits, and assess whether the interventions improved these. To do so, we used two methods: a vignette and opinions on a number of statements.

The vignette elicited respondents' expectations on how a fictional household's health expenditures would change once it installed a twin-pit toilet. The vignette talks about a farmer named Manu, who lives with his family in a house with two rooms and no toilet or bathroom in a village similar to that of the respondent. Manu has spent Rs 3,000 in the last year on health expenditures. He then gets a twin pit toilet (as in panel C in the cost expectations questions). The respondent is asked whether he expects Manu's health expenditures this year to be higher, lower or the same as in the year before constructing the toilet. If the respondent indicates that expenditures would be

[61] In analysis not shown, we also estimated the impacts of the interventions on each of the statements, and find no statistically significant coefficients. All coefficients are small in magnitude.

Table 67: Expected health expenditure - Vignette

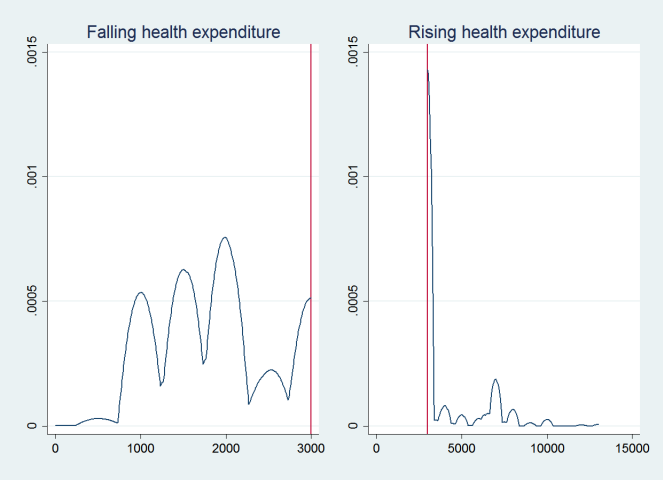
Expected health expenditure	N	%
Higher than last year	108	6.80
Lower than last year	1,208	76.02
Same as last year	257	16.17
Don't know	16	1.01
Total	1,589	100

higher or lower, we ask how much higher or lower they expect them to be.[62] The exact text of the vignette is reproduced in the Appendix.

We start by providing some descriptive statistics of the responses for the control group in Table 67. The vast majority of households, 76%, reported that they expected Manu's health expenditures to fall following the installation of the toilet, while 16% expected Manu's expenditures to remain the same and close to 7% expected them to be higher. Only 1% of respondents reported 'Don't Know' suggesting that most respondents understood the question.

Figure 17 displays the distributions of expected health expenditures for Manu reported by respondents. The Figure indicates that the most respondents who reported that Manu would have lower health expenditures as a result of the toilet expect these to fall to between Rs 1,000 - Rs 2,000 a year, which corresponds to a reduction in health expenditures of Rs 1,000 - Rs 2,000 a year. Among those who expect Manu's expenditures to rise, most report a value that is close to the Rs 3,000 incurred before the toilet was constructed. It is possible that this minority did not understand the question, or were anchored to the health expenditure value provided in the vignette.

Figure 17: Expected health expenditure after toilet construction (only consistent)



Next, we check the impacts of the interventions on perceptions of health expenditures. Table 68 shows the results.It shows that the interventions did not have any statistically significant effects on either the probability of reporting a lower health expenditure, or on the expected amount of the health expenditures.

[62] Care was taken to minimise the possibility of improbable answers to this question. If respondents gave an improbable answer, e.g. they said that costs would be lower by more than Rs 3,000, the surveyor repeated the question and asked the respondent if she was sure of her answer.

Table 68: Impacts on perceptions of health expenditures

	(1) Lower exp.	(2) Log(Expect. Expend.)
SL only	-0.0138	-0.0232
	(0.0298)	(0.0347)
SL+A	-0.00314	-0.00323
	(0.0276)	(0.0329)
Strata FE	Yes	Yes
Household covariates	Yes	Yes
F_stat	0.692	0.504
controlmean	0.760	7.571
N	4056	3950

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

We also elicited households' agreement or disagreement (on a Likert scale with 5 points) with six statements addressing potential benefits of a twin pit toilet (respondents were shown a specific picture of this).[63] The benefits included improved health, improved safety for women, increases in labor supply, improved household status, time saving and overall improved happiness. We combine these into a smaller number of factors using polychoric principal component analysis. This generated only 1 component with an eigenvalue greater than 1. Table 109 in the appendix displays the associated factor loadings. The Table indicates that the loadings associated with each factor is positive, indicating that a higher value of this component is associated with more agreement with the statements. Table 69 displays the impacts of the intervention on this component. The coefficients are small, relative to the control mean, and statistically insignificant, indicating that neither intervention affected households' perceived non-monetary benefits of safe toilets.

Table 69: Impacts on Perceived Benefits

	(1) Component 1
SL only	0.0547
	(0.0627)
SL+A	-0.0203
	(0.0643)
Strata FE	Yes
Household covariates	Yes
F_stat	0.253
controlmean	10.88
N	4056

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

Overall, the results reported in this section indicated that the two interventions had little additional impact on altering perceptions about the costs and benefits of safe sanitation relative to the control group. This is in contrast

[63] As with the statements related to perceived costs, we observe these responses for 4,056 households. 148 respondents were shown a different picture and are omitted from the analysis.

to the differences obtained when looking at actual toilet construction costs incurred by households with a toilet in the SL only arm.

5.3 Heterogeneity in the impacts

Summary of key results

- For impacts on toilet uptake and toilet usage, we find (as expected) that impacts are largely driven by households that did not own a toilet at baseline. While the average impact on toilet uptake in our GK client sample was an increase of 9 percentage points, we find that among GK client households who did not own a toilet at baseline, the SL only intervention led to a 13 percentage points increase in toilet ownership. We do not find any differential impacts on this outcome by gender of the household head or by BPL status. We find for SL only areas, that it is SC/ST/OBC households who are significantly more likely to construct a toilet. In SL+A communities on the other hand we find a significant increase in toilet ownership for households of the general castes.
- With regard to impacts on sanitation loan uptake, we do not find any differential impacts by whether or not the GK client household owned a toilet at baseline (they are both as likely to take up a sanitation loan), by gender of the household head or by BPL status. In both treatment arms, however, households belonging to a general caste are significantly more likely to take up sanitation loans than households belonging to one of the SC/ST/OBC categories.
- Interestingly, we find a small (4 percentage points) reduction in OD practice for GK client households in SL only areas that did own a toilet at baseline. This could potentially be driven by (unobserved) investment into existing toilets that makes these usable (again). In the SL+A treatment arm, we observe a reduction in OD behaviour for boys aged 6-15 years old. Otherwise, we do not find evidence of heterogeneity of impacts on OD practice by gender of household head, by BPL status or by caste.
- Overall, we do not observe any robust and consistent evidence of heterogeneous impacts on toilet quality in either treatment arm. One exception are impacts on toilet quality by household's caste. We find that the quality of underground constructions reduced significantly for general caste households in SL+A communities. We also find that for the same group of households our first measure of cleanliness (related to availability of cleaning products and the path) exhibits a significant reduction. On the other hand, in SL only areas, households belonging to the general caste experience no differences in any quality measure. Households belonging to any of the SC/ST/OBC category however display a positive impact on both dimensions of overground quality.

In this section we analyze whether impacts on sanitation loan uptake and our primary outcomes, toilet uptake, usage/OD practices, and toilet quality differ along a number of household characteristics. Specifically we check whether impacts are different for (1) households that owned a toilet at baseline or not, (2) whether the household is headed by a female or a male, (3) BPL status of the household and (4) the caste of the household. This involves estimating regressions of the following form:[64]

[64] We note that the specification deviates from the one reported in the research protocol. We decided to change the specification for ease of interpretation, making it directly obvious which is the impact for each othe the sub-groups in the treatment arms. In future academic work we will focus on the original specificatio, which looks as follows: $Y_{iv} = \gamma_0 + \gamma_1 SanitationLoan_v + \gamma_2 Awareness_v + \gamma_3 Z_{iv} + \gamma_4 Z_{iv} * SanitationLoan_v + \gamma_5 Z_{iv} * Awareness_v + \mu X_{iv} + \theta_v + \varepsilon_i$.

$$Y_{iv} = \gamma_0 + \gamma_1 SL * Z_{iv} + \gamma_2 SL * (1 - Z_{iv}) + \gamma_3 SLA_v * Z_{iv} + \gamma_4 * SLA * (1 - Z_{iv}) + +\gamma_5 Z_{iv} + \mu X_{iv} + \theta_v + \varepsilon_i \quad (3)$$

Where SL stands for SL only treatment, SLA for SL+A treatment, and Z_{iv} is the binary variable along which we want to test for heterogeneity in the treatment effect. All else is defined as in Equation 1. Take the example of our first dimension of heterogeneity considered, toilet ownership at baseline. Here, $Z_{iv} = 1$ if household i in village (GP) v had a toilet at the time of the baseline survey; coefficient γ_1 provides then the impact estimate of the SL only intervention for households that had a toilet at baseline and γ_2 provides then the impact estimate of the SL only intervention for households that did not have a toilet when the baseline survey was conducted. γ_3 and γ_4 are to be interpreted similarly, just for the SL+A intervention impacts. We add at the bottom of the impact tables statistics whether the coefficients for different sub-groups within treatment arms differ significantly from each other.

For each heterogeneity dimension considered we show three Tables showing the following outcomes:

- Table 1: Sanitation loan uptake (using administrative data), toilet ownership (as reported by the respondent), toilet in use, whether all household members go for OD.[65]
- Table 2: Toilet usage split by gender and by adult/children
- Table 3: Toilet quality indicators on overground, underground (two factors) and cleanliness (two components).[66]

5.3.1 Toilet uptake status at baseline

We start by looking at differential impacts by whether the client household had a toilet at the time of the baseline survey or not.[67] The rationale for doing so is that the sanitation loans are primarily intended to construct new toilets. Households without toilets are hence the primary target group of the intervention. However, we have observed that sanitation loan uptake did not seem to depend much on baseline ownership status, measured through recall at endline. This observation is confirmed in the first column of Table 70. We find that for both sub-groups, those with and without a toilet at baseline, sanitation loan uptake is highly significant for both treatments (about 18 percentage points for the SL only treatment arm and between 21 and 24 percentage points for the SL+A treatment arm) and coefficients do not differ within treatment between the two sub-groups considered (if anything, the coefficient for households with a toilet at baseline in the SL+A treatment arm is larger).

However, as one would expect when loans are primarily used for the construction of new toilets, the average impact on toilet uptake in SL only treatment areas that we reported on previously is driven by households that did not own a toilet at baseline, as can be seen in column 2 of Table 70. While the average impact in our sample was an increase of 9 percentage points (see Section 5.1.1), we find that among households who did not own a toilet at baseline, the SL only intervention leads to a 13 percentage points increase in toilet ownership. As before, we find that the increased toilet ownership is accompanied by an increase in usage and reduction in OD for all household members, shown in columns 3 and 4 of Table 70. Interestingly, we also find a small (4 percentage points) reduction in OD practice, significant at the 10% level, for households in SL only areas that did own a toilet at baseline. This could potentially be driven by (unobserved) investment into existing toilets that makes these usable (again). No differential impacts on any of the outcomes are found for the SL+A treatment arm, in line with not having found the insignificant average treatment effects reported on earlier.

[65] We do not show sanitation loan uptake constructed with household survey data, toilet ownership as checked by interviewers and whether some household members go for OD. The reason for this choice is that findings are in line and we reduce the number of results and tables presented.

[66] We refrain from presenting impacts on water and soap availability as no differential impacts along any dimension are observed.

[67] As discussed, baseline level toilet ownership is reconstructed using endline reports on age of toilet.

Table 70: Impacts on loan uptake, toilet uptake and usage - toilet ownership at baseline

	(1) San. loan uptake	(2) Own toilet	(3) Toilet in use	(4) All OD
SL only - toilet at BL	0.175***	-0.0109	0.0155	-0.0376*
	(0.0443)	(0.0179)	(0.0234)	(0.0205)
SL only - no toilet at BL	0.184***	0.127***	0.131***	-0.138***
	(0.0367)	(0.0377)	(0.0341)	(0.0344)
SL + A - toilet at BL	0.243***	0.00277	0.00800	-0.0227
	(0.0374)	(0.0172)	(0.0226)	(0.0210)
SL + A - no toilet at BL	0.205***	0.0574	0.0351	-0.0349
	(0.0301)	(0.0392)	(0.0341)	(0.0356)
HH owns a toilet at BL	-0.00965	0.725***	0.738***	-0.710***
	(0.0102)	(0.0304)	(0.0286)	(0.0271)
Strata FE	Yes	Yes	Yes	Yes
F_SL_only	0.795	0.00174	0.00716	0.0119
F_SL_A	0.200	0.231	0.507	0.760
controlmean_BL	0.0100	1	0.945	0.0675
controlmean_noBL	0.0142	0.268	0.203	0.782
N	4222	4222	4222	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

We show a break-down of who uses the toilet in Table 146. Since we find a reduction in OD behavior for all household members in SL only communities, it is not surprising to see that both adults and children, of both genders, are reported to be less likely to practice OD by between 12 and 16 percentage points. The effect is significant and in magnitude in line with toilet uptake for households without a toilet at baseline in SL only treatment communities. The results in Table 146 also suggest a significant reduction in OD behavior for boys aged 6-15 that lived in households with a toilet at baseline in areas where sanitation loans were accompanied with awareness creation activities. No average treatment effects were found for the SL+A treatment arm.

We next turn to impacts on toilet quality indicators, presented in Table 72. As a reminder, no average treatment effects were found on any of these dimensions. In this analysis of differential impacts by toilet ownership status at baseline, we also find no significant impacts on measures capturing quality of underground (column 1), our first measure of overground (which captures primarily safety of the toilet, column 2) and our first measure of cleanliness (capturing primarily the availability of cleaning products and having a clear path to access the toilet, column 4). We do, however, find that for households exposed to SL only the overground variable capturing information on the distance between the pan and wall, as well as cross-ventilation (column 3), is significantly improved if households owned a toilet at baseline. The estimated impact for this sub-group is 9 percentage points and significant at the 10% level. We also see that households living in SL+A areas who did have a toilet at baseline see a 6 percentage points reduction (significant at 10%) in their toilet's cleanliness related to visibility of feces, and presence of flies and smells. We raise caution that we, here and more generally throughout the report, do not make adjustments for multiple hypothesis testing. It is possible that these findings would not remain significant once doing so.

Table 71: Impacts on OD practice - toilet ownership at baseline

	(1) Female > 16	(2) Male > 16	(3) Girls 6-15	(4) Boys 6-15	(5) Kids 3-6
SL only - toilet at BL	-0.0279	-0.0405	-0.0322	-0.0555	-0.0208
	(0.0330)	(0.0332)	(0.0435)	(0.0468)	(0.0141)
SL only - no toilet at BL	-0.132**	-0.155**	-0.159***	-0.118***	-0.0532***
	(0.0586)	(0.0607)	(0.0428)	(0.0430)	(0.0148)
SL + A - toilet at BL	0.00615	-0.00491	-0.00785	-0.0656*	-0.00906
	(0.0404)	(0.0392)	(0.0384)	(0.0391)	(0.0181)
SL + A - no toilet at BL	-0.0609	-0.0445	-0.0280	-0.0303	-0.0265*
	(0.0569)	(0.0507)	(0.0405)	(0.0430)	(0.0145)
HH owns a toilet at BL	-0.689***	-0.658***	-0.713***	-0.686***	-0.172***
	(0.0450)	(0.0433)	(0.0363)	(0.0465)	(0.0158)
Strata FE	Yes	Yes	Yes	Yes	Yes
F_SL_only	0.108	0.0804	0.0416	0.352	0.120
F_SL_A	0.350	0.527	0.710	0.542	0.418
controlmean_BL	0.0787	0.0787	0.0804	0.110	0.0350
controlmean_noBL	0.762	0.749	0.796	0.795	0.204
N	868	865	1414	1634	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

Table 72: Impacts on toilet quality and cleanliness - toilet ownership at baseline

	(1) Underground	(2) Overground 1	(3) Overground 2	(4) Cleanliness 1	(5) Cleanliness 2
SL only - toilet at BL	0.000167	0.0568	0.0903*	-0.0145	0.00114
	(0.0353)	(0.0558)	(0.0500)	(0.0636)	(0.0316)
SL only - no toilet at BL	0.00529	0.0541	0.00721	0.0168	0.0173
	(0.0319)	(0.0612)	(0.0521)	(0.0754)	(0.0372)
SL + A - toilet at BL	-0.0391	0.0486	0.0393	0.0337	-0.0647*
	(0.0356)	(0.0585)	(0.0524)	(0.0642)	(0.0357)
SL + A - no toilet at BL	-0.00436	0.00514	0.0185	-0.00425	0.00550
	(0.0315)	(0.0574)	(0.0491)	(0.0668)	(0.0355)
HH owns a toilet at BL	0.0148	0.00881	-0.0553	0.0460	0.0289
	(0.0323)	(0.0565)	(0.0486)	(0.0589)	(0.0317)
Strata FE	Yes	Yes	Yes	Yes	Yes
F_SL_only	0.906	0.973	0.226	0.724	0.720
F_SL_A	0.462	0.542	0.755	0.592	0.141
controlmean_BL	1.184	2.465	0.273	1.368	1.300
controlmean_noBL	1.168	2.461	0.338	1.323	1.270
N	1926	1926	1926	1926	1926

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

5.3.2 Female headed households

The second dimension of heterogeneity we analyze is whether the client household is headed by a male or a female. We consider this an interesting margin given the generally accepted presupposition that women benefit more from sanitation and are therefore more interested. This, combined with a higher degree of female decision making power (typically proxied by the gender of the household head), might leave one to expect that a sanitation intervention (particularly one targeted at women as is the case with the sanitation loans) could be more effective among female headed households. We test this, once again along the dimensions of sanitation loan uptake, toilet uptake, usage, and quality and present results in Tables 73 to 75.

We find that both groups of households are equally likely to take up the sanitation loan product - about 18-19 percentage points in the SL only arm and 21-22 percentage points in the SL+A arm, shown in column 1 of Table 73. Similarly, the significant average impact of 9 percentage points in the SL only arm on toilet uptake does not differ by the gender of the household head, with both households types being about 9-10 percentage points more likely to own a toilet (significant at the 10% level for female headed households and at the 1% level for male headed households). The same conclusion is drawn for toilet usage, shown in column 3, and similarly for OD behavior, shown in column 4.

Table 73: Impacts on loan uptake, toilet uptake and usage - Female headed households

	(1)	(2)	(3)	(4)
	San. loan uptake	Own toilet	Toilet in use	All OD
SL only - female headed households	0.189***	0.0979*	0.104*	-0.0873
	(0.0525)	(0.0547)	(0.0562)	(0.0592)
SL only - male headed households	0.180***	0.0878***	0.0983***	-0.111***
	(0.0354)	(0.0275)	(0.0259)	(0.0260)
SL + A - female headed households	0.223***	0.0656	0.0710	-0.0744
	(0.0582)	(0.0541)	(0.0504)	(0.0534)
SL only - female headed households	0.214***	0.0407	0.0243	-0.0278
	(0.0294)	(0.0286)	(0.0271)	(0.0283)
HH head is female	-0.0296**	-0.0545*	-0.0292	0.0407
	(0.0147)	(0.0312)	(0.0329)	(0.0322)
Strata FE	Yes	Yes	Yes	Yes
F_SL_only	0.807	0.841	0.919	0.673
F_SL_A	0.865	0.618	0.367	0.381
controlmean_female	0	0.360	0.311	0.689
controlmean_male	0.0146	0.462	0.397	0.593
N	4221	4221	4221	4221

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

When considering usage at a less aggregated level, i.e. split by gender and for different age groups (adults and children), we find that the average impact of between 10 and 13 percentage points for SL only areas to be significant for household members living in male headed households, shown in Table 74. We are however not able to conclude that coefficient estimates for male-headed and female-headed households differ significantly and point the reader also to the smaller sample size.

We finally consider impacts on toilet quality indicators by female and male headed households in Table 75. We find that neither male nor female headed households experience a change in toilet quality due to the intervention.

Table 74: Impacts on OD practice - Female headed households

	(1) Female > 16	(2) Male > 16	(3) Girls 6-15	(4) Boys 6-15	(5) Kids 3-6
SL only - female headed households	-0.00419	-0.282	-0.112	-0.0608	-0.0438
	(0.115)	(0.402)	(0.107)	(0.0859)	(0.0403)
SL only - male headed households	-0.113***	-0.117**	-0.129***	-0.104***	-0.0435***
	(0.0417)	(0.0450)	(0.0334)	(0.0338)	(0.0119)
SL + A - female headed households	-0.0253	-0.207	-0.0228	0.0183	-0.0552
	(0.106)	(0.230)	(0.0900)	(0.0859)	(0.0370)
SL only - female headed households	-0.0438	-0.0266	-0.0252	-0.0439	-0.0181
	(0.0400)	(0.0398)	(0.0348)	(0.0355)	(0.0140)
HH head is female	0.00420	0.0739	0.0140	0.0110	0.0411
	(0.0689)	(0.153)	(0.0611)	(0.0518)	(0.0309)
Strata FE	Yes	Yes	Yes	Yes	Yes
F_SL_only	0.312	0.683	0.869	0.633	0.995
F_SL_A	0.856	0.446	0.981	0.501	0.380
controlmean_female	0.590	0.667	0.735	0.689	0.207
controlmean_male	0.564	0.539	0.637	0.624	0.156
N	868	865	1414	1634	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

The one exception is our second measure of overground quality, which relates to distance between wall and pan and cross-ventilation. We find improvements in this measure for female headed households in both treatment arms. The estimated impacts, while significant in both treatment arms, is significantly larger in magnitude in SL only areas than in SL+A areas.

5.3.3 BPL households

The third dimension we consider is the households' BPL status. This status is an economic benchmark used by the government of India to indicate economic disadvantage and to identify individuals and households in need of government assistance and aid. It is a priori unclear whether impacts should be larger or smaller for households with or without this status. One factor to consider is, however, the eligibility for SBM subsidy that comes automatically with this status and could, as discussed in Section 5.7, drive an increase in loan uptake.

When considering differential impacts by BPL status on sanitation loan uptake, toilet uptake, toilet usage and OD practice, displayed in Table 76, we find that coefficients are similar (in magnitude and significance), indicating no differential impacts along this dimension.

In terms of OD practice by different household member sub-groups, shown in Table 77, we also find that the significant average impacts found for households in SL only communities are relevant for both sub-groups of households. While the magnitude of coefficients are somewhat different for households with and without a BPL card, the estimates do not differ statistically.

Impact estimates on toilet quality indicators are again pre-dominantly insignificant, with two small exceptions related to overground quality in the SL only treatment arms. Results shown in Table 78 suggest that households

Table 75: Impacts on toilet quality and cleanliness - Female headed households

	(1) Underground	(2) Overground 1	(3) Overground 2	(4) Cleanliness 1	(5) Cleanliness 2
SL only - female headed households	-0.0146	0.0734	0.288**	0.0760	-0.0287
	(0.0797)	(0.107)	(0.120)	(0.135)	(0.0816)
SL only - male headed households	0.00324	0.0559	0.0333	-0.00623	0.0102
	(0.0282)	(0.0453)	(0.0381)	(0.0556)	(0.0281)
SL + A - female headed households	0.0180	0.00802	0.175*	-0.00383	-0.00369
	(0.0778)	(0.0919)	(0.0912)	(0.138)	(0.0734)
SL only - female headed households	-0.0295	0.0328	0.0170	0.0213	-0.0400
	(0.0275)	(0.0486)	(0.0407)	(0.0591)	(0.0297)
HH head is female	0.0207	0.0550	-0.0686	-0.0643	0.0452
	(0.0686)	(0.0810)	(0.0612)	(0.116)	(0.0682)
Strata FE	Yes	Yes	Yes	Yes	Yes
F_SL_only	0.838	0.873	0.0320	0.557	0.662
F_SL_A	0.582	0.797	0.0943	0.865	0.659
controlmean_female	1.194	2.523	0.250	1.299	1.322
controlmean_male	1.176	2.458	0.304	1.354	1.284
N	1926	1926	1926	1926	1926

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

Table 76: Impacts on loan uptake, toilet uptake and usage - BPL households

	(1) San. loan uptake	(2) Own toilet	(3) Toilet in use	(4) All OD
SL only - BPL households	0.180***	0.0938***	0.0980***	-0.115***
	(0.0364)	(0.0314)	(0.0302)	(0.0317)
SL only - no BPL households	0.183***	0.0839***	0.101***	-0.104***
	(0.0398)	(0.0311)	(0.0294)	(0.0303)
SL + A - BPL households	0.220***	0.0417	0.0254	-0.0401
	(0.0295)	(0.0289)	(0.0274)	(0.0287)
SL + A - no BPL households	0.206***	0.0466	0.0337	-0.0203
	(0.0329)	(0.0350)	(0.0334)	(0.0344)
HH owns BPL card	0.00140	0.00756	0.00903	0.00492
	(0.00783)	(0.0171)	(0.0182)	(0.0191)
Strata FE	Yes	Yes	Yes	Yes
F_SL_only	0.902	0.747	0.929	0.761
F_SL_A	0.457	0.859	0.781	0.505
controlmean_bpl	0.0127	0.454	0.393	0.604
controlmean_nobpl	0.0137	0.447	0.382	0.602
N	4222	4222	4222	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

Table 77: Impacts on OD practice - BPL households

	(1) Female > 16	(2) Male > 16	(3) Girls 6-15	(4) Boys 6-15	(5) Kids 3-6
SL only - BPL households	-0.114**	-0.0883*	-0.107***	-0.111***	-0.0412***
	(0.0546)	(0.0513)	(0.0399)	(0.0361)	(0.0153)
SL only - no BPL households	-0.0798	-0.166***	-0.156***	-0.0889**	-0.0495***
	(0.0523)	(0.0560)	(0.0521)	(0.0431)	(0.0157)
SL + A - BPL households	-0.0349	0.00171	-0.0424	-0.0570	-0.0157
	(0.0465)	(0.0497)	(0.0362)	(0.0401)	(0.0157)
SL + A - no BPL households	-0.0482	-0.0812*	-0.000996	-0.0185	-0.0290
	(0.0580)	(0.0489)	(0.0464)	(0.0410)	(0.0177)
HH owns BPL card	-0.0262	-0.0814*	-0.00973	0.0206	-0.0323**
	(0.0414)	(0.0424)	(0.0328)	(0.0270)	(0.0142)
Strata FE	Yes	Yes	Yes	Yes	Yes
F_SL_only	0.607	0.210	0.424	0.626	0.697
F_SL_A	0.833	0.197	0.406	0.409	0.556
controlmean_bpl	0.546	0.494	0.619	0.641	0.146
controlmean_nobpl	0.597	0.614	0.677	0.614	0.183
N	868	865	1414	1634	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

with a BPL card experience an increase in the factor that loads with a measure of security (having a lock), and households without a BPL card experience an increase in the factor related to distance between wall and pan and cross-ventilation. Both these estimated impacts are significant at the 10% level.

5.3.4 SC/ST/OBC versus general caste

The fourth and final dimension we consider is that of the households' caste. The important role that someone's caste plays in a large array of life in India is well established. We consider here whether the intervention impacts differ along this dimension as well. We create a dummy of whether a household belongs to the scheduled caste, scheduled tribes or any other backward caste as compared to belonging to any other general caste. Results on our three sets of outcomes are presented in Tables 79 to 81.

Starting with impacts on sanitation loan uptake, we find that both sub-groups in both treatment arms are significantly more likely to take up the new loan product. However, we do observe heterogeneity in the magnitude of impacts across caste groups. We find that, in both treatment arms, households belonging to a general caste are significantly more likely to take up sanitation loans than households belonging to one of the SC/ST/OBC categories. In the SL only treatment arm the coefficient for general castes is 27 percentage points compared to 15 for SC/ST/OBC categories. In the SL+A arm the respective coefficients are 28 and 19 percentage points. Interestingly, we on the other hand find for SL only areas, that it is SC/ST/OBC households who are significantly more likely to construct a toilet (a ten percentage points increase, significant at the 1% level). In SL+A communities on the other hand we find a significant increase in toilet ownership for households of the general castes (of 7 percentage points, significant at the 10% level). As in all other cases, usage OD practice move in line with the impacts on toilet ownership (with the exception here that no significant impacts are found for the general caste households in SL+A areas.

Table 78: Impacts on toilet quality and cleanliness - BPL households

	(1) Underground	(2) Overground 1	(3) Overground 2	(4) Cleanliness 1	(5) Cleanliness 2
SL only - BPL households	0.0279	0.105*	0.0164	0.0641	0.0291
	(0.0337)	(0.0537)	(0.0505)	(0.0694)	(0.0341)
SL only - no BPL households	-0.0330	-0.00361	0.104*	-0.0767	-0.0246
	(0.0392)	(0.0596)	(0.0591)	(0.0753)	(0.0389)
SL + A - BPL households	-0.0310	0.00348	0.00973	-0.0454	-0.0265
	(0.0297)	(0.0582)	(0.0520)	(0.0668)	(0.0339)
SL + A - no BPL households	-0.0122	0.0752	0.0587	0.122	-0.0480
	(0.0397)	(0.0614)	(0.0466)	(0.0852)	(0.0423)
HH owns BPL card	-0.0210	0.0433	0.0666	0.0694	-0.0467
	(0.0355)	(0.0502)	(0.0532)	(0.0686)	(0.0362)
Strata FE	Yes	Yes	Yes	Yes	Yes
F_SL_only	0.237	0.136	0.267	0.153	0.294
F_SL_A	0.688	0.345	0.431	0.109	0.675
controlmean_bpl	1.173	2.481	0.320	1.382	1.274
controlmean_nobpl	1.185	2.437	0.269	1.302	1.307
N	1926	1926	1926	1926	1926

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

Table 79: Impacts on loan uptake, toilet uptake and usage - Caste Household Head

	(1) San. loan uptake	(2) Own toilet	(3) Toilet in use	(4) All OD
SL only - general castes	0.268***	0.0655	0.0715*	-0.0847**
	(0.0537)	(0.0451)	(0.0386)	(0.0386)
SL only - other castes	0.152***	0.0961***	0.105***	-0.115***
	(0.0348)	(0.0275)	(0.0268)	(0.0270)
SL + A - general castes	0.284***	0.0687*	0.0391	-0.0462
	(0.0423)	(0.0382)	(0.0376)	(0.0349)
SL + A - other castes	0.193***	0.0326	0.0206	-0.0229
	(0.0299)	(0.0303)	(0.0269)	(0.0289)
General caste	-0.0596***	0.0272	0.0677**	-0.0710***
	(0.0178)	(0.0264)	(0.0266)	(0.0246)
Strata FE	Yes	Yes	Yes	Yes
F_SL_only	0.0144	0.462	0.386	0.423
F_SL_A	0.0303	0.349	0.628	0.515
controlmean_gen	0.00519	0.512	0.470	0.519
controlmean_oth	0.0157	0.432	0.363	0.630
N	4222	4222	4222	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

In terms of OD practice by age and gender, shown in Table 80, we find that the significant impacts are not driven by any caste group (coefficient estimates are not significantly different from each other).

Table 80: Impacts on OD practice - Caste Household Head

	(1) Female > 16	(2) Male > 16	(3) Girls 6-15	(4) Boys 6-15	(5) Kids 3-6
SL only - general castes	-0.0451	-0.0372	-0.0961*	-0.109*	-0.0259
	(0.0854)	(0.0767)	(0.0528)	(0.0585)	(0.0264)
SL only - other castes	-0.109**	-0.144***	-0.132***	-0.0889***	-0.0497***
	(0.0441)	(0.0468)	(0.0403)	(0.0337)	(0.0125)
SL + A - general castes	0.0416	-0.0328	-0.0405	-0.0883	-0.0406
	(0.0826)	(0.0772)	(0.0418)	(0.0536)	(0.0285)
SL + A - other castes	-0.0628	-0.0276	-0.0149	-0.0102	-0.0139
	(0.0415)	(0.0395)	(0.0403)	(0.0343)	(0.0120)
General caste	-0.163**	-0.144**	-0.106***	-0.0877**	-0.0171
	(0.0664)	(0.0555)	(0.0378)	(0.0383)	(0.0251)
Strata FE	Yes	Yes	Yes	Yes	Yes
F_SL_only	0.463	0.186	0.578	0.752	0.423
F_SL_A	0.220	0.950	0.658	0.205	0.378
controlmean_gen	0.368	0.382	0.552	0.582	0.151
controlmean_oth	0.623	0.591	0.674	0.644	0.165
N	868	865	1414	1634	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

And finally, while we found no average impacts on toilet quality indicators, we do find some differential impacts on this outcome by households' caste. Results are shown in Table 81. For one, we find that the quality of underground constructions reduced significantly for general caste households in SL+A communities. We also find that for the same group of households our first measure of cleanliness (related to availability of cleaning products and the path) exhibits a significant reduction. On the other hand, in SL only areas, households belonging to the general caste experience no differences in any quality measure. Households belonging to any of the SC/ST/OBC category however display a positive impact on both dimensions of overground quality, significant at the 10% level.

Table 81: Impacts on toilet quality and cleanliness - Caste Household Head

	(1) Underground	(2) Overground 1	(3) Overground 2	(4) Cleanliness 1	(5) Cleanliness 2
SL only - general castes	-0.0320	-0.0191	0.0123	-0.0999	-0.0173
	(0.0346)	(0.0658)	(0.0779)	(0.0839)	(0.0457)
SL only - other castes	0.0124	0.0840*	0.0661*	0.0369	0.0136
	(0.0314)	(0.0461)	(0.0385)	(0.0598)	(0.0280)
SL + A - general castes	-0.0576**	-0.0475	-0.0626	-0.175**	-0.0326
	(0.0260)	(0.0587)	(0.0654)	(0.0765)	(0.0414)
SL + A - other castes	-0.0150	0.0601	0.0680	0.0988	-0.0428
	(0.0329)	(0.0536)	(0.0441)	(0.0626)	(0.0310)
General caste	0.0706**	0.116**	0.0994*	0.178***	0.0558
	(0.0289)	(0.0484)	(0.0536)	(0.0658)	(0.0386)
Strata FE	Yes	Yes	Yes	Yes	Yes
F_SL_only	0.302	0.136	0.512	0.140	0.525
F_SL_A	0.288	0.111	0.0784	0.00144	0.827
controlmean_gen	1.234	2.529	0.334	1.473	1.348
controlmean_oth	1.156	2.438	0.286	1.302	1.264
N	1926	1926	1926	1926	1926

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

5.4 Impacts on non-eligible households

Summary of key results

- Relative to the control group, where awareness of sanitation activities in the community was high at 82%, we find no statistically significant difference in awareness about recent sanitation activities of non-eligible households in either intervention arm.
- When we look at awareness about specific sanitation activities, we find that non-client households were less likely to be aware of information sessions for GP officials compared to households in the control areas, where such sessions might have been organized by other actors including the Government. Overall, non-client households in the intervention areas were, for the most part, no more likely to be aware of sanitation activities in the community than similar households in the control villages.
- The interventions had no impacts on toilet ownership or open defecation behavior of non-client households, nor did they have any robust impact on toilet quality for this sub-group.

The interventions could also have impacted sanitation choices of non-client households who were ineligible for credit, both the sanitation loans and other loan products provided by the implementing MFI. A direct channel through which sanitation choices would have been influenced is through the awareness creation activities in the treatment arm that were targeted at the community as a whole, e.g. street plays and wall paintings . An indirect channel that could have been at play in both treatment arms is that of spillovers from client households, who were the primary targets of the two interventions. Such spillovers could have operated through sharing of information and resources between social contacts, both clients and non-clients of the client households; or a desire to maintain social status with the client households. In this section, we consider the overall impacts of the interventions on sanitation-related outcomes for non-client households. To do so, we will make use of information collected from the

sample of panel non-client households, and the supplementary sample of non-client households. We focus on the following outcomes: awareness about sanitation activities in the community, toilet uptake, toilet quality and toilet usage and open defecation. For the supplementary sample, we only have information on a subset of the sanitation outcomes. Specifically, we only collected information on household-reported sanitation ownership and usage for different groups within the household, and awareness about sanitation activities in the community. No information is available on toilet quality.

We start by considering awareness about sanitation activities among non-client households. Just like we did for clients in 5.2.1, Table 82 presents findings on the impacts of the interventions on awareness about various sanitation awareness creation activities in the community for the whole non-client sample. The first column indicates awareness about any of a list of sanitation activities (e.g. street plays, flyer distribution, wall painting and information sessions for GP officials). Relative to the control group, where awareness of sanitation activities in the community was high at 82%, we find no statistically significant difference in awareness of these in either intervention arm. When we look at awareness about specific sanitation activities (undertaken by our awareness creation partner, though not exclusively), we find only one statistically significant effect of the interventions. Specifically, we find that non-client households were less likely to be aware of information sessions for GP officials compared to households in the control areas, where such sessions might have been organized by other actors including the Government. Overall, non-client households in the intervention areas were, for the most part, no more likely to be aware of sanitation activities in the community than similar households in the control villages. This need not mean that these households were not reached by the awareness creation activities organized by our partner. It could be the case that other organizations, including the Government's SBM(G) program might have provided similar activities in control villages, leading to no difference in this margin between the treated and control communities.

Table 82: Impacts on Awareness of Sanitation Activities in the Community, Non-Client Sample

	(1) Any	(2) Street play	(3) Flyers	(4) Wall painting	(5) GP Info
SL only	-0.0217	-0.0127	-0.0104	0.00208	-0.0224
	(0.0314)	(0.0364)	(0.0156)	(0.0251)	(0.0277)
SL+A	-0.0399	-0.0352	0.0152	0.0303	-0.0609*
	(0.0283)	(0.0357)	(0.0151)	(0.0260)	(0.0337)
Strata FE	Yes	Yes	Yes	Yes	Yes
F_stat	0.542	0.526	0.115	0.266	0.278
control_mean	0.821	0.249	0.0811	0.335	0.360
N	6775	6775	6775	6775	6775

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.'Wall Painting' includes reports of wall banners and 'GP Info' refers to whether there were information sessions for GP Officials; Variables in columns 2-5 are set to 0 if the respondent reported not being aware of any sanitation activities.

Next, we consider overall impacts of the interventions on toilet uptake and usage. Table 83 reports these results. The supplementary sample of non-client households was asked about toilet usage in a slightly different manner to the client households, so that we are only able to study impacts on open defecation for household members aged 5-16 years and 16-55 years, rather than separately by sex. The Table indicates that the interventions had no impacts on toilet ownership or open defecation behavior of non-client households. Importantly, all the coefficients are very small in magnitude, suggesting that the interventions, directly though awareness creation activities or indirectly through spillover effects, had no impacts on non-clients on average.[68]

[68]We find no statistically significant impacts of either intervention on toilet uptake or usage among the panel non-client households. For this sub-sample, we are able to construct the same measures of toilet uptake and usage as for the main client sample.

Table 83: Impacts on Toilet Uptake and Open Defecation, Non-Client Sample

	(1) Toilet Ownership	(2) OD adults 16-55	(3) OD children 6-15
SL only	-0.00153	0.00611	-0.0109
	(0.0307)	(0.0324)	(0.0226)
SL+A	-0.0148	0.0325	0.00864
	(0.0309)	(0.0341)	(0.0215)
Strata FE	Yes	Yes	Yes
F_stat	0.674	0.426	0.381
control_mean	0.602	0.499	0.273
N	6775	6775	6775

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

Tables 84 and 85 consider the impacts of the interventions on toilet quality for non-clients. We have these measures for the panel non-client sample only. It is conceivable that the interventions did not inspire the construction of new toilets, but could have induced improvements of existing ones. For this sample, we construct similar measures for toilet quality using polychoric principal components analysis, following the same procedure as for the client sample households (see 5.1.2). Table 84 presents the effects of the interventions on the measures of underground and overground quality, while Table 85 presents effects on the toilet cleanliness measures. The Tables indicate no statistically significant effects of the interventions on underground quality. The first component relates positively to the type of toilet structure, availability of a door, lock, lighting, cross ventilation and whether there is sufficient distance between pan and wall; while the second captures primarily toilet structure, distance between wall and pan and cross-ventilation, rather than variables relating to accessibility of the toilet. We see that there is no statistically significant effect of the interventions on the first dimension of overground quality, with the coefficients relatively small in magnitude. We observe a positive and statistically significant impact (at the 10% level) of the combined sanitation loan and awareness intervention on the second dimension of overground quality. There is no impact of the sanitation loans only arm on this dimension of quality. The results reported in Table 85 indicate no statistically significant impacts of the two interventions on the measures of toilet cleanliness and maintenance.

Table 84: Impacts on Underground and Overground Toilet Quality, Panel Non-Client Sample

	(1) Underground	(2) Overground 1	(3) Overground 2
SL only	-0.0128	-0.0410	0.00541
	(0.0286)	(0.0552)	(0.0577)
SL+A	-0.0347	0.0624	0.0902*
	(0.0263)	(0.0462)	(0.0501)
Strata FE	Yes	Yes	Yes
Household Covariates	Yes	Yes	Yes
F_stat	0.468	0.0519	0.116
controlmean	1.370	2.689	-0.504
N	1045	1045	1045

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

Table 85: Impacts on Toilet Maintenance and Cleanliness, Panel Non-Client Sample

	(1) Cleanliness1	(2) Cleanliness 2
SL only	-0.0386	-0.0181
	(0.0529)	(0.0422)
SL+A	-0.0344	0.0110
	(0.0502)	(0.0407)
Strata FE	Yes	Yes
Household covariates	Yes	Yes
F_stat	0.939	0.485
controlmean	2.175	-0.536
N	1045	1045

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

Finally, Table 86 indicates that the intervention had no statistically significant impact on the availability of water or soap near the toilet for this sample. As with the client sample, households with a toilet in control areas were already very likely to have these facilities (94% and 95% respectively), leaving little margin for improvement on these margins.

Table 86: Impacts on Water and Soap availability, Panel Non-Client Sample

	(1) Water	(2) Soap
SL only	0.00172	-0.0333
	(0.0229)	(0.0223)
SL+A	0.0135	-0.00710
	(0.0241)	(0.0190)
Strata FE	Yes	Yes
Household covariates	Yes	Yes
F_stat	0.500	0.266
controlmean	0.944	0.952
N	1045	1045

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline.

5.5 Intervention costs

Summary of key results

- Using the MFI's estimates for their operational costs, head office costs and cost of capital (as a fraction of sanitation loan amounts), we estimate a total cost for the running of sanitation activities of Rs. 3,000 (USD 45) per sanitation loan disbursed during the experiment.
- Focusing on the treatment arm where only sanitation loans were introduced (without awareness creation activities), we find an overall implementation cost of Rs 1,095,000 (USD 16,425), or Rs. 27,375 (USD 411) per treated community.
- Translating the percentage points impacts on toilet uptake in the SL only arm that we estimated above into number of new toilets, we estimate that 171 new toilets were built in the SL only treatment arm as a result of the introduction of sanitation loans. Combining this with the estimate of sanitation loan costs in that area, we obtain Rs. 6,404 (USD 96) of intervention cost per new toilet in the SL only treatment group, or 24% of the average toilet construction costs reported by client respondents in the control sites.
- Considering a loan amount of Rs. 15,000 with a weekly repayment over a two year period, the break-even interest rate at a declining balance is 20%, which is the average interest rate charged by the MFI over the study period.
- The implementation costs incurred for the implementation of awareness creation activities (e.g. street plays, wall paintings, etc.) in 39 communities add up to Rs. 963,417 (USD 14,451), or Rs. 24,703 (USD 371) per community. Adding to this an estimate of Rs. 1,140,000 (USD 17,100) for the costs of running the sanitation loan activities in the SL+A sites we get a total of Rs. 2,103,417 (USD 31,551) of implementation costs for the SL + A treatment arm, or Rs. 53,934 (USD 809) per community. These expenses did not lead to any significant improvements in toilet uptake compared to the control group.

It is important to interpret and compare the impacts discussed above against the costs of implementing the intervention, incurred by the MFI and by its partner NGO organising the awareness creation activities. Before doing so, we point out that the impacts were measured at a particular point in time - that is, 2.5 years after the launch of the interventions - and it is possible that the interventions, particularly the provision of sanitation loans, yields further impacts in the future. We perceive is as unlikely that already disbursed loans will result in further toilets being constructed given our finding that the construction of toilets with these loans has stagnated in the last months of the intervention. Of course, the constructed toilets (and other possible investments made with sanitation loans) might yield other benefits, now and in the future, which we however abstract from in our analysis. We focus on the current intervention expenditures and relate these to the number of sanitation loans taken up by the MF clients in the treatment arms and to the number of new toilets constructed as a result of the interventions.

To recap, the implementing partners in this study (i) offered sanitation credit to clients in 79 treatment communities to advance the funds for the construction of the toilets and (ii) in a random sub-set of 39 of these treatment communities they organised a range of sanitation awareness creation activities, such as street plays, wall paintings and workshops. To run these activities, the implementing agencies incurred various costs, including among other things salaries and materials for awareness creation activities.

We first discuss costs incurred by the NGO that organised the awareness creation activities in the 39 SL+A treatment communities. These are displayed in Table 87. Incurred costs are grouped by activities. The largest cost factor are salaries, which amount to 25% of total implementation costs, closely followed by the costs for the

organisation of wall paintings and community level workshops. Combined, all costs add up to Rs. 963,417 (USD 14,451), or Rs. 24,703 (USD 371) per community[69][70].

Table 87: Implementation costs of awareness creation activities in SL+A treatment arm

	Total costs		Average cost/GP	
	Rs.	USD	Rs.	USD
Salaries	243,750	3,656	6,250	94
Project management costs	103,223	1,548	2,647	40
Branch staff trainings	4,875	73	125	2
Water quality tests	12,188	183	313	5
Kendra member trainings	6,581	99	169	3
Street plays	126,750	1,901	3,250	49
Wall paintings and GP workshops	230,100	3,452	5,900	89
GP training	27,300	410	700	11
Mason training	62,400	936	1,600	24
Branch level awareness workshop	146,250	2,194	3,750	56
Total costs	963,417	14,451	24,703	371

Table 88 in turn gives an overview of the estimated costs incurred by the MFI partner to promote and disburse the sanitation loans. Note that, unlike for the organisation of the sanitation awareness activities, no specific funds were earmarked for introduction and running of sanitation loans, as these were simply added to the portfolio of loans offered to the clients in the sites where the MFI was already operating. In practice, that means for instance that during the weekly kendra meetings in the communities the loan officers now also discussed and marketed sanitation loans and collected sanitation loan repayments. To get at an estimate of the additional costs of offering and administrating the sanitation loans, we consider operational costs (salaries, travel and transport, rent), head office costs and cost of capital as a fraction of disbursed loan amounts. The implementing MFI provided us with their estimates for each of these costs items as well as the fraction. Table 88 shows that, over the duration of the study period, around 6% of disbursed loan amounts were needed to cover operational costs, 2% to cover head office costs and 12% to cover costs of capital[71]. The latter refer to costs incurred by the MFI to raise funds to be able to lend the loan amounts (through equity or debts).

Note that these cost calculations assume that these loans will eventually be paid back. We believe this a reasonable assumption since default rates are very low in this context, partially because the partnering MFI has substantial experience in screening clients and partially because sanitation eligibility in this context is conditional on having been a member for at least one year.

In the next two panels in Table 88, we estimate the costs of the sanitation loan activities per treatment group and per treatment community (SL only and the SL+A. Given a sanitation loan amount of Rs. 15,000, we obtain a total cost per sanitation loan of around Rs. 3,000 (using the estimated cost of 20%, shown in the Table, and the average loan amount of 15,000). Considering that 365 sanitation loans were disbursed in the SL only study communities, we obtain an estimate of the total sanitation loan operational costs in the SL only treatment arm of around Rs. 1,095,000 (USD 16,425), or Rs. 27,375 (USD 411) per community. In the SL+A treatment arm, 380 sanitation loans were disbursed to MF clients, yielding an estimated total cost of Rs. 1,140,000 (USD 17,100), or Rs. 29,231 (USD 439) per SL+A community. Adding to this the total costs of running the awareness creation activities (see Table 87), we get Rs. 2,103,417 (USD 31,551) as the total implementation cost for the SL + A treatment arm, or Rs. 53,934 (USD 809) per community.

In Table 89 we present our estimate of the total amount that the MFI would eventually receive in terms of interest payments for the sanitation loans taken out in the study period. We also estimate the net profit per sanitation

[69] Throughout this section we use the USD to INR exchange rate evaluated by the XE currency converter on 19 June 2018: 1 INR = 0.015 USD

[70] We abstract from any office costs as the operations are run from the NGO's headquarter.

[71] The cost of capital changed over the last 2-3 years as the interest rates from the lenders have been coming down. Our calculations consider an average cost over this period.

Table 88: Estimated costs of sanitation loan activities

	Total costs	
	Rs.	USD
Estimates sanitation loan costs as a fraction of sanitation loan amount:		
Operational costs (salaries, transport and travel, rent)	6%	6%
Head office costs	2%	2%
Costs of capital	12%	12%
Total	20%	20%
Estimates total costs sanitation loan activities in study area:		
Sanitation loan amount	15,000	225
Costs per sanitation loan	3,000	45
Number of sanitation loans disbursed in SL only treatment arm	365	365
Number of sanitation loans disbursed in SL+A treatment arm	380	380
Total sanitation loan activity costs incurred in SL only arm	1,095,000	16,425
Total sanitation loan activity costs incurred in SL+A arm	1,140,000	17,100
Estimates costs sanitation loan activities per GP in study area:		
Total sanitation loan activity costs incurred per SL only GP	27,375	411
Total sanitation loan activity costs incurred per SL+A GP	29,231	439

Table 89: Estimate net profit per sanitation loan

	Rs.	USD
Loan amount	15,000	15,000
Interest rate p.a.	20%	20%
Average instalment amount	173	173
Number of installments	104	104
Interest revenues per sanitation loan	3029	45
Average sanitation loan cost	3,000	45
Net profit per loan	29	0

loan. Note that MFIs typically engage in on-lending, implying that they earn interest beyond that received for the sanitation loans provided during the experiment. We are not able to provide an estimate of this additional revenue earned by the MFI and focus our analysis on the interest earned through project specific sanitation loans. Considering a loan amount of Rs. 15,000 at an average interest rate of 20% per annum, at a declining balance with a weekly repayment over a two year period and assuming zero on-lending, we obtain an estimated revenue of Rs. 3,029 (USD 45) per sanitation loan disbursed. Subtracting from this the average loan cost of Rs. 3,000 (USD 39) derived in Table 88, and assuming zero on-lending, we get a net profit per sanitation loan of around Rs. 29 (USD 0). This suggests that the average interest rate of 20% charged by the MFI on average over the study period is a break-even interest rate.

To conclude, we relate the impacts on toilet uptake that we estimated in Section 5.1.1 to the costs incurred by the implementation partners to run the intervention activities, abstracting from loan amounts, interest revenues and on-lending. The analysis in Section 5.1.1 revealed an estimated average impact of the introduction of sanitation loans in the SL only treatment arm of around 9 percentage points at the time of the endline survey, and no significant impact of the provision of the loans when accompanied by awareness creation activities in the SL+A treatment arm. Considering that at baseline there were 1,894 clients in control sites in the client population from which the representative sample was drawn, these observed impacts translate into around 171 new toilets for MF clients in the SL only treatment arm (0.09*1894) and virtually zero new toilets in the SL+A intervention (0*1894). With an estimated net intervention cost of around Rs. 1,095,000 (USD 16,425) in the SL only treatment group (abstracting from interest revenues), this translates into Rs. 6,404 (USD 96) of cost per new toilet in the SL only treatment group, or 24% of the average toilet construction costs reported by client respondents in the control sites. In the SL+A treatment arm, the total intervention expenses of Rs. 2,103,417 (USD 31,551) did not lead to any improvements in terms of toilet uptake.

5.6 Targeting: a descriptive analysis

Summary of key results

- MF clients that took a sanitation loan and those who constructed a toilet live in households that at endline are on average slightly better off, better educated, include more elderly members, are more likely to belong to the general caste and less likely to belong to a scheduled caste or tribe and are more likely to be buddhist.

Having addressed the question of *what* impacts the intervention, specifically the sanitation loan provision, has had (on average and for specific subgroups), in this section we turn to the question of *who* the intervention reached. The implementing MF did not target any particular clients with its sanitation loans. Hence, when we look at targeting results in this context, the question we really ask is one related to self-selection. What is the profile of MF clients that decided to take up a sanitation loan in the last three years, and how do they compare to clients who decided not to do so? At endline, how does the profile of toilet owning MF client households compare between treatment and control arms? And within study arms, how does their profile compare to that of MF client households not owning a toilet at endline? This section provides descriptive evidence to shed some light on these questions.

To increase power (given the small number of sanitation loan taking households in our sample), we pool together all clients in both treatment arms. In Section 5.6 we focus on this pooled treatment sample and within that compare the profile of sanitation loan takers and non-takers. In Section 5.6, we compare characteristics of households with and without a toilet at endline and describe whether and how this characterization differs between control and treatment arms.

An important qualifier about the results presented in this section is in order. We do not have baseline data available for our full MF client sample. This means that the characteristics along which we make comparisons of profiles (sanitation loan takers versus non-takers and toilet owners versus non owners) are not necessarily all exogenous to the intervention. Although we focus most of the targeting analysis on characteristics that are unlikely to have changed over time (e.g. education head, religion, caste, etc.), it is possible that some of the endline outcomes that we consider are influenced by the intervention (particularly those related to income and assets), rather than that these have influenced selection into the intervention. We therefore refrain from putting any causality on the relationships we observe. We do, however, observe some interesting correlations which are informative for further research on this matter.

Profile of sanitation loan takers

In this section we compare characteristics of MF clients that took a sanitation loan to those that did not. We classify MF clients as sanitation loan takers or non-takers based on the administrative records we obtained from the MF (rather than using self-reported loan uptake by MF clients during survey). We believe this classification to be more objective and less correlated with potentially misreported survey data, from which we derive the summary statistics in this section. To recap, based on this measure about 21% of MF clients in our treatment sample (552 in total across the two treatment arms) ended up taking a sanitation loan by the time of endline (2.5 years after the introduction of the loans). The remaining clients, 2,072 in total, did not take up a sanitation loan.

In Table 90 we start by comparing baseline and endline levels of toilet coverage amongst households that did and did not take up sanitation credit. Both groups were as likely, about 30%, to report having had a toilet at baseline[72].

[72] Note that baseline level toilet coverage is re-constructed based on household reports on the age of the toilet at endline, and might be subject to recall error. However, we do not expect such measurement error to be different between households with and without sanitation credit. Also note a slight different with the results presented in Section 5.2.4 on credit, where we control for control variables when creating similar summary statistics. We do not control for any covariates in the descriptive comparison here.

This somewhat surprising result has already been discussed in Section 5.2.1. We have also already discussed the finding that at endline not all households that took a sanitation loan reported to have a toilet. Almost 30% of them reported not to. A new result in this Table is that, although sanitation loan takers were 20 percentage points more likely to own a toilet at endline, 50% of MF client households that did not take up a sanitation loan also reported to have a toilet. These results suggest that, since baseline, around 40% of all MF client households in our sample managed to construct a toilet using funds other than micro-credit from the MF implementation partner.

Table 90: Household demographic characteristics at endline: Sanitation loan takers versus non-takers

	No Sanitation loan	N	Sanitation loan	N
Households owned a toilet at baseline	0.28	2072	0.30	552
	(0.019)		(0.031)	
Households owns a toilet at endline	0.50	2072	0.69***	552
	(0.027)		(0.026)	
BL_notowntoilet	0.72	2072	0.70	552
	(0.019)		(0.031)	

Note: Standard Errors in parenthesis, clustered at the gram panchayat, ** p <0.10, ** p <0.05, *** p <0.01*
Source: household survey.

Table 91: Household demographic characteristics at endline: Sanitation loan takers versus non-takers

	No Sanitation loan	N	Sanitation loan	N
Age HH head	45.7	2072	45.8	552
	(0.28)		(0.48)	
Muslim	0.22	2072	0.27	552
	(0.030)		(0.059)	
Hindu	0.66	2072	0.64	552
	(0.028)		(0.057)	
Buddhist	0.12	2072	0.083*	552
	(0.016)		(0.019)	
Scheduled castes/tribes	0.43	2072	0.37	552
	(0.032)		(0.042)	
Backward caste (other backward, special backward, DTs, NTs)	0.31	2072	0.26	552
	(0.023)		(0.033)	
General caste	0.25	2072	0.36**	552
	(0.030)		(0.055)	
Female headed household	0.089	2072	0.078	552
	(0.0076)		(0.013)	
Nr of HH members	5.02	2072	5.15*	552
	(0.056)		(0.068)	
Proportion of female adult members	0.35	2072	0.35	552
	(0.0039)		(0.0071)	
Proportion of male adult members	0.39	2072	0.39	552
	(0.0043)		(0.0066)	
HHs with elderly (>64 years)	0.17	2072	0.21**	552
	(0.011)		(0.019)	
HHs with children <6 years	0.28	2072	0.28	552
	(0.011)		(0.022)	
HHs with children 6-14 years	0.48	2072	0.49	552
	(0.011)		(0.019)	

Note: Standard Errors in parenthesis, clustered at the gram panchayat, ** p <0.10, ** p <0.05, *** p <0.01*
Source: household survey.

Table 91 compares households of sanitation loan takers and non-takers in terms of their demographic characteristics. Given the small sample of loan takers, it is not surprising that several differences are not statistically significant, even though some of these look fairly substantial in terms of magnitude. Households of sanitation loan takers and non-takers do not seem to differ much in the age of their household heads, in whether or not they are female or male headed, in their proportion of male or female members and in whether or not there are children less than 6 years old living in the household. On the other hand, loan takers are significantly (4 percentage points) less likely to be buddhist (at the 10% significance level), and five percentage points more likely to be muslim (not statistically significant). On average, they are 4 percentage points more likely to have elderly members older than 64 years (significant at the 5% significance level) and are slightly larger in household size (significant at the 10% significance level). They are 11 percentage points more likely to belong to the general caste and this difference is significant at the 5% significance level. They are 6 percentage points less likely to belong to a scheduled caste or tribe, and 5 percentage points less likely to belong to a backward caste (other backward, special backward, DTs, NTs), although these differences are not statistically significant.

Table 92: Household socio-economic characteristics at endline: Sanitation loan takers versus non-takers

	No Sanitation loan	N	Sanitation loan	N
Head able to write	0.70	2072	0.76**	552
	(0.019)		(0.020)	
Head able to read	0.66	2072	0.74***	552
	(0.019)		(0.020)	
Years of education HH head	5.49	2072	6.51***	552
	(0.18)		(0.24)	
HH owns BPL card	0.60	2072	0.61	552
	(0.021)		(0.024)	
HH owns APL card	0.25	2072	0.24	552
	(0.020)		(0.023)	
Primary economic activity is agriculture	0.56	2072	0.59	552
	(0.026)		(0.039)	
Dwelling structure: Pucca House	0.21	2072	0.20	552
	(0.017)		(0.029)	
Dwelling owned by household member	0.96	2072	0.99***	552
	(0.0069)		(0.0030)	
HH owns agricultural land	0.36	2072	0.39	552
	(0.023)		(0.039)	
HH owns non-agricultural land	0.028	2072	0.020	552
	(0.0045)		(0.0063)	
HH assets: Bycicle	0.24	2072	0.28	552
	(0.019)		(0.025)	
HH assets: Motorcycle	0.23	2072	0.30***	552
	(0.015)		(0.022)	
HH assets: TV	0.63	2072	0.75***	552
	(0.017)		(0.023)	
HH assets: Livestock- Buffalo, cow, bullock	0.21	2072	0.24	552
	(0.017)		(0.030)	
Piped water available in own dwelling	0.076	2072	0.062	552
	(0.012)		(0.015)	
Public tap/stand pipe available within own yard/plot	0.058	2072	0.069	552
	(0.0072)		(0.012)	
Tube well/bore well available within own yard/plot	0.047	2072	0.042	552
	(0.0064)		(0.0080)	

Note: Standard Errors in parenthesis, clustered at the gram panchayat, *p <0.10, **p <0.05, ***p <0.01

Source: household survey.

Next, in Table 91 we look at differences with respect to households' socio-economic status. Head of households of MF clients that took up a sanitation loan are significantly better educated. They received on average more than one additional year of education and are 6 percentage points more likely to be able to write and 8 percentage points more likely to be able to read. These education related variables are significantly different at the 5% and 1% level, respectively. Almost all of them report to own the dwelling they are living in, compared to 96% of clients amongst those that did not take up a loan (a difference that is significant at the 1% level). They do not differ much in terms of land ownership (neither agricultural or non-agricultural) but they do differ significantly in the ownership of a selection of luxury assets, such as a motorcycle (30% relative to 23%) or a television (75% relative to 63%). Despite some observable differences in terms of particular assets, they are not more or less likely to report to be of APL or BPL status, nor do they differ much in terms of their access to water connections. Note however, as flagged in the introduction of this section, these income related measures are captured at endline and thus we cannot be confident that these are exogenous to the intervention activities. We should therefore refrain from drawing any causal conclusions in this regard.

Profile of toilet owners

In the previous section we highlighted some significant differences in the profile of MF clients that took a sanitation loan compared to those that did not. The question that arises next is whether this difference in profile translates into a change in composition of toilet owners at endline, in treatment groups relative to the control group.

Tables 93-94 in this section show average characteristics of households with and without a toilet at endline, for both control and treatment groups (as before, in the treatment group we pool SL only MF clients together with SL+A MF clients). For ease of comparison, we include the same set of characteristics as in the previous section. The stars indicate the statistical significance between toilet owners and non-owners, in each respective group. We also tested the significance of the difference in characteristics of toilet owners in the control group and those in the treatment group (that is, the difference between column 2 and column 5), and none of these differences are statistically significant (results available on request). Note however that the sample of toilet owners in each respective group is too small to have sufficient power to reject the Null hypothesis of zero difference even if in fact there are significant differences.

Perhaps more useful is a comparison of the statistics between the control group and the treatment group in Tables 93-94 , that is, a comparison of the extent to which the profile of toilet owners and non-owners differs within each group. Overall, we find that differences observed in the control group have the same sign but are magnified in the treatment group. To some extent this is probably driven by the fact that we have more precision in our estimates in the treatment group, given its large sample size compared to the control group. But overall, the difference in characteristics between toilet owners and non-owners is also larger in magnitude in the treatment group, not just in its significance level.

Table 93: Household demographic characteristics at endline: Toilet owners versus non-owners

	No toilet (Control)	Toilet (Control)	N Control	No toilet (Treatment)	Toilet (Treatment)	N Treatment
Age HH head	44.6	46.3**	1598	45.1	46.2**	2624
	(0.56)	(0.58)		(0.38)	(0.33)	
Muslim	0.17	0.21	1598	0.18	0.27***	2624
	(0.043)	(0.040)		(0.027)	(0.040)	
Hindu	0.70	0.65	1598	0.71	0.61***	2624
	(0.041)	(0.040)		(0.027)	(0.037)	
Buddhist	0.13	0.13	1598	0.11	0.11	2624
	(0.026)	(0.026)		(0.016)	(0.017)	
Scheduled castes/tribes	0.42	0.41	1598	0.47	0.38***	2624
	(0.047)	(0.043)		(0.033)	(0.033)	
Backward caste (other backward, special backward, DTs, NTs)	0.36	0.31	1598	0.31	0.29	2624
	(0.047)	(0.040)		(0.024)	(0.027)	
General caste	0.21	0.27**	1598	0.21	0.32***	2624
	(0.040)	(0.045)		(0.029)	(0.037)	
Female headed household	0.12	0.082**	1598	0.096	0.079	2623
	(0.015)	(0.011)		(0.0099)	(0.0077)	
Nr of HH members	4.81	5.27***	1598	4.83	5.22***	2624
	(0.089)	(0.11)		(0.061)	(0.067)	
Proportion of female adult members	0.36	0.36	1598	0.35	0.36	2624
	(0.0067)	(0.0058)		(0.0040)	(0.0050)	
Proportion of male adult members	0.37	0.41***	1598	0.38	0.40	2624
	(0.0068)	(0.0074)		(0.0053)	(0.0054)	
HHs with elderly (>64 years)	0.14	0.18*	1598	0.14	0.21***	2624
	(0.018)	(0.019)		(0.012)	(0.014)	
HHs with children <6 years	0.29	0.29	1598	0.27	0.29	2624
	(0.019)	(0.020)		(0.015)	(0.015)	
HHs with children 6-14 years	0.49	0.46	1598	0.49	0.48	2624
	(0.021)	(0.024)		(0.015)	(0.014)	

Note: Standard Errors in parenthesis, clustered at the gram panchayat, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: Household survey.

Let us have a closer look at the specific characteristics in which toilet owning households differ from households that do not own a toilet at endline. Table 93 starts with a comparison of households' demographics. In our treatment group, toilet owning households are on average slightly larger than those without a toilet, are headed by someone who is around one year older and more likely to include elderly members older than 64 years old. They are almost 10 percentage points more likely to be muslim and 10 percentage points less likely to be hindu. They are also 10 percentage points less likely to belong to a scheduled caste/tribe and 11 percentage points more likely to belong to the general caste, differences significant at the 1% significance level. In the treatment group, we do not observe any significant differences between toilet owners and non-owners in terms of household's probability to be headed by a female member, its composition of male and female adults or in the presence of children in the household.

Table 94: Household socio-economic characteristics at endline: Toilet owners versus non-owners

	No toilet (Control)	Toilet (Control)	N Control	No toilet (Treatment)	Toilet (Treatment)	N Treatment
Head able to write	0.72	0.77	1598	0.65	0.76***	2624
	(0.029)	(0.015)		(0.022)	(0.014)	
Head able to read	0.68	0.75**	1598	0.61	0.74***	2624
	(0.028)	(0.016)		(0.022)	(0.015)	
Years of education HH head	5.57	6.21**	1598	5.05	6.27***	2624
	(0.22)	(0.26)		(0.22)	(0.17)	
HH owns BPL card	0.59	0.59	1598	0.61	0.60	2624
	(0.022)	(0.024)		(0.021)	(0.022)	
HH owns APL card	0.27	0.29	1598	0.24	0.25	2624
	(0.023)	(0.022)		(0.020)	(0.020)	
Primary economic activity is agriculture	0.56	0.49**	1598	0.58	0.56	2624
	(0.045)	(0.043)		(0.026)	(0.031)	
Dwelling structure: Pucca House	0.11	0.26***	1598	0.12	0.28***	2624
	(0.024)	(0.032)		(0.017)	(0.025)	
Dwelling owned by household member	0.95	0.98**	1598	0.95	0.98***	2624
	(0.017)	(0.0050)		(0.0080)	(0.0065)	
HH owns agricultural land	0.32	0.35	1598	0.33	0.40**	2624
	(0.036)	(0.037)		(0.027)	(0.027)	
HH owns non-agricultural land	0.022	0.019	1598	0.028	0.024	2624
	(0.0072)	(0.0052)		(0.0050)	(0.0050)	
HH assets: Bycicle	0.19	0.28***	1598	0.21	0.28***	2624
	(0.023)	(0.024)		(0.018)	(0.021)	
HH assets: Motorcycle	0.18	0.37***	1598	0.16	0.31***	2624
	(0.017)	(0.032)		(0.014)	(0.018)	
HH assets: TV	0.56	0.74***	1598	0.57	0.73***	2624
	(0.024)	(0.027)		(0.019)	(0.018)	
HH assets: Livestock- Buffalo, cow, bullock	0.19	0.21	1598	0.20	0.22	2624
	(0.024)	(0.024)		(0.019)	(0.021)	
Piped water available in own dwelling	0.058	0.11***	1598	0.046	0.096***	2624
	(0.012)	(0.018)		(0.0088)	(0.014)	
Public tap/stand pipe available within own yard/plot	0.057	0.078*	1598	0.045	0.073***	2624
	(0.0083)	(0.013)		(0.0072)	(0.0089)	
Tube well/bore well available within own yard/plot	0.025	0.040	1598	0.026	0.063***	2624
	(0.0054)	(0.0090)		(0.0050)	(0.0099)	

Note: Standard Errors in parenthesis, clustered at the gram panchayat, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: Household survey.

Next, we consider households' socio-economic characteristics using results presented in Table 94. We observe substantial differences between households with and without a toilet in terms of educational outcomes of their heads, who had on average more than 1 additional year of education and are 11-13 percentage points more likely to be able to read or write. Whereas we do not observe any differences in terms of APL/BPL status, households that decided to construct a toilet are 16 percentage points more likely to live in a Pucca type of house and are three percentage points more likely to own that house. Whereas they are not more likely to own livestock such as buffaloes, cows or bullocks, they are significantly more likely to own agricultural land. They are also consistently better off in terms of a set of assets (bicycle, motorcycle and TV) and are also significantly more likely to be well connected to water sources. For instance, 10% of them report to have piped water available in their dwelling whereas less than 5% of households without a toilet report to be connected to such water source.

To sum up, MF clients that took a sanitation loan live in households that at endline are on average slightly better off, better educated, include more elderly members, are more likely to belong to the general caste and less likely to belong to a scheduled caste or tribe and are more likely to be buddhist. Overall, the profile of households of sanitation loan takers is strikingly similar to that of households owning a toilet at endline, both in treatment and control groups. This evidence suggests that, on average so far, the introduction of sanitation loans has been picked up by demographic and socio-economic groups that in the absence of the intervention would also have shown a relatively higher desire and/or ability to construct a toilet. It is very well possible that we are currently only able to pick up prime mover effects, and that loans will reach other groups in the longer term. But at least in the first three years after the loans were introduced, some particular groups of households seem to have benefited more and others less from the intervention, both in terms of sanitation loan uptake and in terms of toilet coverage.

5.7 Interaction with SBM(G)

Summary of key results

- The significant impacts we established above are achieved in a context of an active SBM(G) scheme.
- Significant impacts are observed not just for SBM(G) ineligible APL households, but also for BPL households in principle eligible for SBM(G) subsidies.
- Descriptive evidence suggests that average toilet costs are double the amount of the SBM(G) subsidy.
- Reports by SBM officials and household respondents suggest significant delays in subsidy disbursements.
- Combined, this evidence suggests that micro-credit might have been used by households as a means to cover funding gaps.
- Whereas we do not find any impacts of access to sanitation loans on households' subsidy application rate, we do observe highly significant correlation with applicants' probability of successfully receiving a subsidy (within the time frame of our study).

Introduction

In October 2014, the Government of India embarked on a mission to achieve an Open Defecation Free India by 2019 (GoI, 2014) and launched the ambitious Swachh Bharat Mission (SBM) - called SBM Gramin (G) in rural areas - a nationwide sanitation campaign that boosts the efforts of earlier such programs named the Total Sanitation Campaign (TSC, 1999) and Nirmal Bharat Abhiyan (NBA, 2012). Rather than constructing toilets, SBM(G) seeks to generate awareness and to influence behavior amongst the rural population to adopt safe and sustainable sanitation practices. This is to be achieved mainly through Information, Education, Communication (IEC), through capacity building and by providing financial incentives to communities and their members to construct community and individual household toilets (GoI, 2014).

One of SBM(G)'s key components is IEC. In our study area, this possibly includes (amongst other) awareness creation activities that are also covered in our SL+A arm, such as the installation of wall paintings and the organization of street plays. Another key component is the provision of sanitation subsidies, targeted at all Below Poverty Line (BPL) households and particular groups of underprivileged Above Poverty Line (APL) households such as SC/ST and persons with a disability. The amount of the subsidies has gradually increased over time, and currently stands at Rs 12,000-Rs 15,000. The objective of these subsidies - often called 'incentives' in this context - is not to cover the total cost of the toilet but to incentivize people to construct a safe toilet of their own (GoI, 2014).

The launch of SBM(G) in October 2014 happened to coincide with the start of the intervention. Considering the significant improvements in toilet coverage in our control sites since then (see Section 5.1.1), it is likely that SBM(G) and/or other actors in the area are indeed making a difference. This sudden boost in sanitation activity raises the concern that perhaps there was is no longer a need for the implementation partners to intervene. And yet, as discussed in Section 5.1.1, we find significant impacts on toilet uptake of the introduction of sanitation loans in the SL only arm, over and above the upward trend observed in the control group. This suggests that there might be complementarities between the interventions and SBM(G). In this part of the report we explore the nature of these complementarities, if any.

In Section 5.2.1we find that in the SL+A treatment arm, MF clients and SBM officials were significantly more

aware of any sanitation awareness creation activities (such as street plays) to have taken place in their communities in the last three years, relative to the control group. This suggests that, even if there might have been some overlap, the activities organized in the SL+A arm did not go un-noticed by MF clients, within the context of SBM(G). At the same time, however, in Section 5.4, we do not find any impacts on project awareness for non-clients. It is possible that this is driven by SBM(G) awareness creation activities taking place in our study area, including in our control sites, although we cannot confirm that claim.

In this section we focus on the possible interaction between the sanitation loans and SBM(G) sanitation subsidies, specifically. We discuss three different mechanisms in particular. To start with, one possible barrier to toilet uptake in the context of SBM(G) is the fact that subsidies are partially provided post-toilet construction only. Until recently, the entire subsidy amount was given ex-post construction only. Recently there has been a change allowing households to receive parts of the funding once preparation work is done. Still, a substantial share of the amount is disbursed only after the completion of a safe toilet is confirmed. Such conditionality, if not accompanied by complementary funding support, could potentially hinder toilet construction for credit-constrained households. Second, the subsidy amount might not be sufficient to cover all construction costs for the types of toilets that SBM(G) subsidy beneficiaries desire and/or require in order to satisfy SBM(G)'s quality standards. Finally, not all households are eligible for subsidies. Ineligible APL households may still be in need of financial support. One way to bridge the funding gap and/or to avail a subsidy is to use micro-credit. In the sections that follow we explore (descriptively) whether we find evidence consistent with any of these three possible sources of complementarities between SBM(G)'s subsidy program and the provision of sanitation loans.

Sample eligibility for SBM(G) subsidies

We start by describing the profile of our client sample with respect to the SBM(G) subsidy eligibility criteria. The government considers the following households eligible for incentives under SBM(G), in order of priority:

1. BPL
2. APL
   (a) SC/ST
   (b) Persons with disability
   (c) Widow/old age pensioners
   (d) Landless laborers with homestead
   (e) Small farmers
   (f) Marginal farmers
   (g) Female headed households

Our survey was not designed to identify households in groups (d)-(f) but we can identify BPL versus APL households and we can also identify households with disabled individuals, widows, pensioners and female headed households. Table 95 shows the proportion of our client household sample that falls within these categories. Given that our client sample is balanced in terms of APL/BPL status (as shown in Section 4.4.3), we focus on overall sample averages in this table.

Panel 1 shows the proportion of households that report to have BPL status or APL status.[73] In these summary statistics, we use household's self-reported BPL/APL-status. In our regressions below we will control for whether

[73] Note that there are other types of ration cards under the National Food Security Act, such as the Antyodaya card. Here we only report on the two main ones, BPL and APL. Hence, we do not expect the sum of APL% and BPL% to be 100%.

or not the respondent was able to show a card to confirm their status.[74] Also note that the sample proportion shown for the APL eligible group is a lower bound of all eligible APL households as we are missing categories (d)-(f) in the targeted groups listed above. The same holds for the eligible (total) group. Panel 2 breaks down the APL group and shows the shares of specific APL groups that are eligible for subsidies. Note that these groups are not mutually exclusive.

Table 95: : SBM subsidy eligibility: Targeting criteria

	N	%
BPL/APL eligibility status (all sample):		
BPL	4,222	0.5988 (60%)
		(0.4902)
APL	4,222	0.2587
		(0.4379)
APL eligible	4,222	0.1435
		(0.3507)
Eligible (total)	4,222	0.7423
		(0.4374)
APL sub-groups (vulnerable APL households):		
SC/ST	1,092	0.3828
		(0.4863)
Disabled/pensioners	1,092	0.1035
		(0.3047)
Widow(er)s	1,092	0.2115
		(0.4086)
Female headed	1,092	0.0989
		(0.2987)
Eligible (total)	1,092	0.5550
		(0.4972)

Note: Standard deviations in parentheses

We see that at least 74% of the MF clients in our sample are in principle eligible for SBM(G) subsidies if they do not yet own a toilet. Almost 60% of them have BPL status and 26% have APL status. Amongst the APL households, more than half are eligible as well, because they fall under specific APL categories targeted by the government. A large share of those with APL status are SC/ST households (38%), around 10% have a household member that is not able to work (disabled and pensioners), 10% is female headed and 21% have a widow(er).

Subsidy receipts and toilet construction: Timing and costs

In this section we describe evidence on two possible mechanisms through which sanitation loans could potentially complement SBM(G)'s subsidy scheme in its mission to boost toilet coverage. One is by providing funds that MF clients can use to cover up-front toilet construction costs, in advance of subsidy receipts. Second is by means of providing additional funds for MF clients who wish to construct a toilet of a cost higher than the amount of the subsidy, or others who wish to upgrade their old toilet. In particular, we describe some information provided to us by SBM(G) officials at the GP level and by households themselves with regard to the cost of toilet construction relative to the subsidy amount and the timing of subsidy receipts relative to the time of toilet construction.

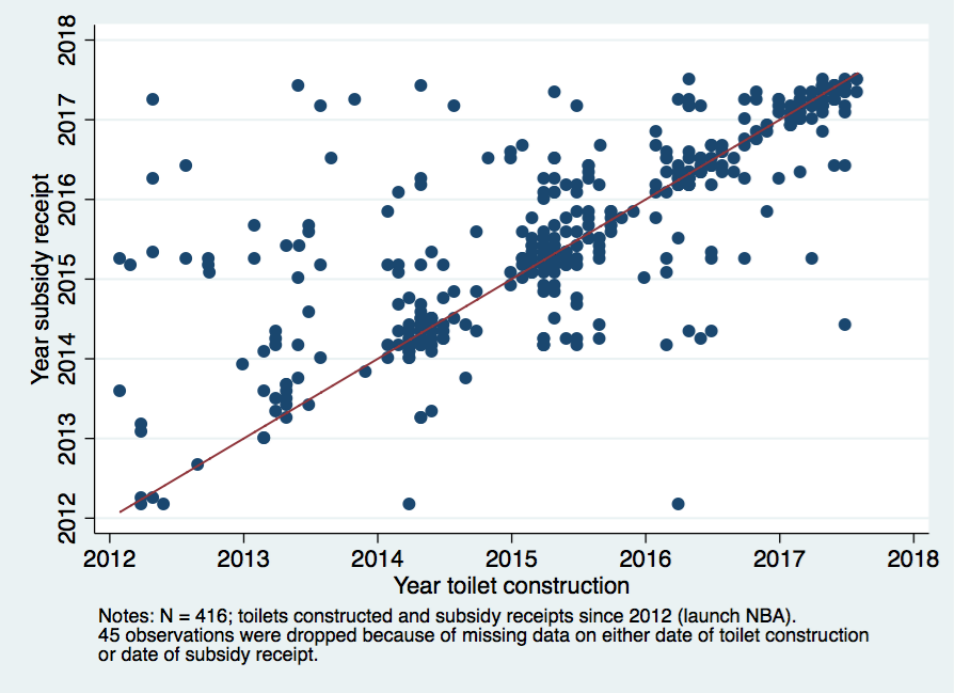
Officially, eligible SBM(G) beneficiary households are supposed to receive their subsidy within 15-20 days after submission of application documents. And yet, half of SBM(G) officials in 115 subsidy receiving GPs in our sample reported that it took, on average, more than 3 months after application for subsidy applicants in their communities to receive their subsidy (results not reported in tables). In 45 communities (39%) it took on average 3-6 months, in 6 communities (5%) 6-12 months and in 6 other communities (5%) more than a year. Consistent with this, 30%

[74] This is important, as only 70-74% of self-reported BPL households were able to present a card confirming their status.

of them report that more than half of subsidy applicants in their communities experienced major delays in subsidy disbursements.

To gain further insights on the relative timing of toilet construction and subsidy receipts we asked the household heads about the month and year that their toilet was constructed and when they received their subsidy (if they did). Figure 18 plots the responses we received. To avoid distraction by outliers, we restrict our sample here to toilets constructed and subsidies received from 2012 onwards (which coincides with the launch of NBA) and we drop around 10% of the sample because of missing information for either date of toilet construction and/or date of subsidy receipt.[75]

Figure 18: Relationship time toilet construction and time subsidy receipt



At least half of the observations fall above the red 45 degree line, that is, they report to have received the subsidy ex-post toilet construction. Half of these had to wait for longer than 3 months and one quarter (or 13% of our sample) had to wait for more than a year after subsidy application to receive their subsidy. Interestingly, half of the respondents report to have received their subsidy prior to completion of toilet construction (those observations falling below the 45 degree line). This may partially reflect the recent change in SBM(G)'s policy that parts of the subsidy can now be obtained prior to completion of toilet construction. Also, there will certainly be some degree of measurement error. We did not ask for the exact day in the month on which the toilet was constructed or the day on which the subsidy was received. Reports might also be subject to recall error. Many of these cases concern differences of less than 2 months (60% of these) or at least less than 3 months difference (74% of these). Only in about 13% of our sample do we find that households report to have received their subsidy more than 3 months prior to toilet construction.

Next, we look descriptively at the relationship between toilet costs and subsidy amount to get a sense of the extent to which subsidies are able to cover the actual toilet construction costs. Figure 19 compares average toilet cost and average subsidy amount over time, for toilets constructed since 2012. And Figure 20 plots toilet costs against subsidy amounts. On average, both subsidy amounts and toilet construction costs (as reported by household heads) seem to have been fairly constant over the last six years. On average, reported toilet costs have been around

[75] We decided to plot all toilets since NBA (and not only since SBM) in order to put SBM's scheme into its wider context.

Rs 24,032 in our study area whereas reported subsidy disbursements have been almost half of that amount, around Rs 12,397.

The results described in this section, based on reports by SBM(G) officials and households themselves, demonstrate the need for additional sources of funding such as micro-credit to cover potential resource gaps. Some of the expenses might need to be advanced temporarily until receipt of the subsidy, but for almost all households a share of the cost (half, on average) will need to be paid out of their own pockets. Micro-credit could help these households in smoothing their expenses (and therefore consumption) over a longer period of time.

Figure 19: Toilet cost and subsidy amount over time

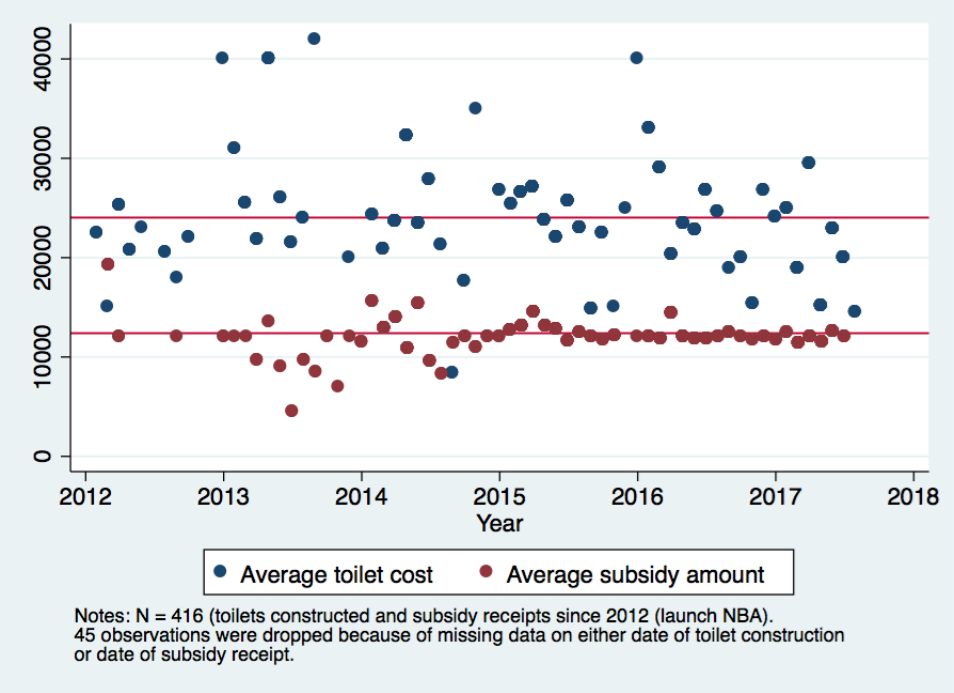
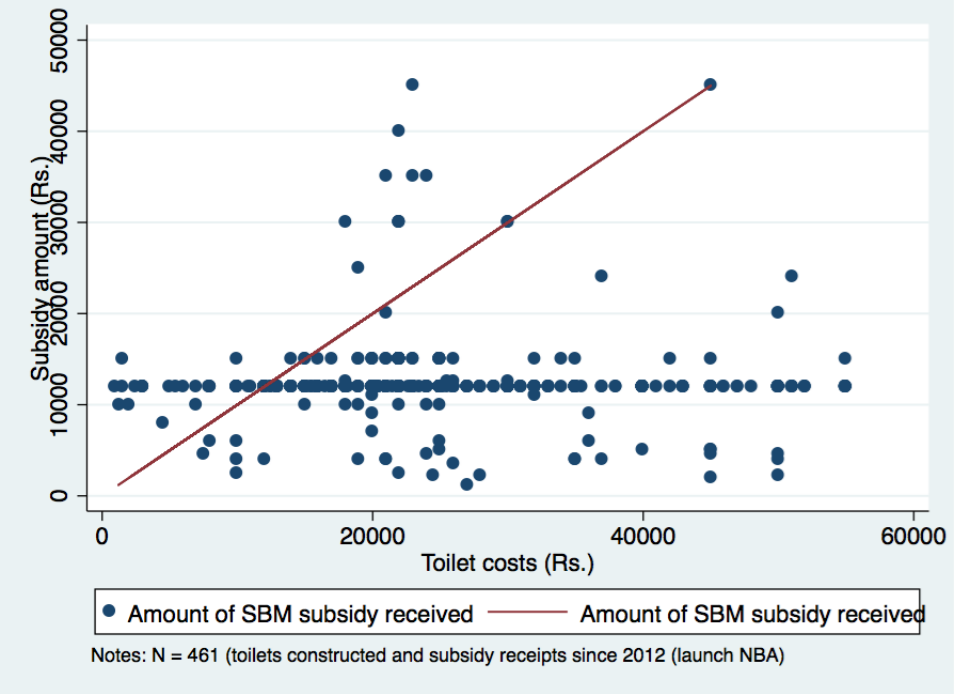


Figure 20: Relationship between toilet cost and SBM(G) subsidy amount



Impacts on toilet uptake: SBM(G) eligible versus non-eligible

In previous sections of this report, we establish that the intervention had impacts on toilet coverage, over and above significant upward trends generally observe in the area. What we have not yet assessed, however, is whether complementarities between SBM(G) and the intervention, if any, are relevant for subsidy eligible or ineligible households, or both. Do we observe impacts, on average, because subsidy ineligible households turn to other sources of funding, such as micro-credit, to cover toilet expenses? Or perhaps subsidy eligible households make use of sanitation loans, either to cover up-front toilet costs in advance of subsidy receipt, or to cover the difference between the toilet cost and the subsidy amount. To get a better idea of where potential complementarities are concentrated, in this section we assess impacts of the provision of loans separately for SBM(G) eligible and ineligible households. Throughout the analysis in this section, we restrict our sample to households that did not own a toilet at baseline. In Section 5.3 we highlight that those households are the ones for which we observe the biggest impacts. They are also the ones for which interaction (if any) between SBM(G) and the intervention applies.[76]

Table 96 shows these new results. Restricting the sample to MF client households that had no toilet at baseline increases the impact of the SL only treatment arm on toilet uptake from 9 percentage points (see Section 5.3) to 13 percentage points (column 1).[77] Looking at sub-groups, impacts are lowest and not statistically significant (likely driven by the small sample size) for APL households that can be classified amongst the following APL groups eligible for SBM(G) subsidies: SC/ST castes, pensioners, disabled, female headed and widow(ers). In contrast,

[76] For households that already owned a toilet at baseline, their reports on subsidy uptake (if any) most likely relate to toilets constructed prior to the intervention. Toilet uptake decisions of these clients cannot have been influenced by either of the two intervention components (sanitation loans or awareness creation activities). In the previous sections we have not found evidence that households that already owned a toilet used loans to upgrade their toilets. Hence, since we do not expect the intervention to have affected subsidy uptake other than through toilet uptake, we can safely exclude the intervention as a possible mechanism influencing subsidy uptake decisions of these households. Note that this is not the case for our analysis on toilet uptake, since the introduction of loans might have had an impact on loan uptake even for MF clients that already owned a toilet (indeed, as seen in Section 5.3 this is the case for 30% of such households). That is why we include such households in our analysis of average impacts in Chapter 5.1 .

[77] This is expected given that impacts of the intervention on sanitation loan uptake or sanitation awareness are not expected to influence toilet coverage for those who already owned a toilet a baseline (even if the intervention might affect outcomes other than toilet uptake). Therefore, pooling together households with toilet (positive impact) and without toilet (no impact) brings down average impacts in a pooled regression analysis on toilet uptake.

impact of sanitation loans (only) is highest in magnitude and significance for APL households that do not form part of these particular marginalized APL groups (column 5).[78] Such APL households living in SL only villages are 15 percentage points more likely than their counterparts in control to have constructed a toilet since baseline. A similar impact (though slightly lower, at 14 percentage points) is observed for BPL households (Column 2).

In the analysis that follows we are not able to look at heterogeneous impacts across SBM(G) eligibility status, given the small sample sizes of the respective categories (combined with the fact that we will be adding more conditions to the regressions). However, the results in Table 96 provide us with some more information with regard to the nature of potential complementarities between SBM(G) and micro-credit: We observe impacts of sanitation loans for both SBM(G) subsidy eligible (BPL) and (possibly) ineligible APL households in our dataset. This means that i) even households that are in principle eligible for SBM(G) subsidies take up sanitation loans, and ii) households ineligible for SBM(G) subsidies also seem to benefit from the introduction of sanitation loans. We are not able to identify mechanisms through which these groups benefit, but we consider a few possibilities. The former group could benefit, either in order to bridge funding until their expenses are reimbursed through SBM(G) subsidies, or to cover potentially higher construction costs, or because for some reason they are not able to access SBM(G) subsidies; The latter group could benefit, possibly because they are not eligible for SBM(G) subsidies, have insufficient savings and rely on funding from micro-credit to smooth their expenses and consumption.

Table 96: Impacts on toilet uptake by SBM eligibility status

	(1) All	(2) BPL	(3) APL	(4) Eligible APL	(5) Other APL
treat==SL	0.126***	0.135***	0.0874*	0.0470	0.135**
	(0.0378)	(0.0422)	(0.0499)	(0.0643)	(0.0581)
treat==SL+A	0.0581	0.0547	0.0321	0.0321	0.0472
	(0.0397)	(0.0396)	(0.0580)	(0.0770)	(0.0593)
Strata FE	Yes	Yes	Yes	Yes	Yes
Household covariates	Yes	Yes	Yes	Yes	Yes
F_stat	0.0823	0.0610	0.267	0.831	0.140
controlmean	0.268	0.271	0.271	0.283	0.260
N	3076	1852	774	435	339

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 if household has a child aged under 2 at time of baseline. Regression in Columns 2 controls for whether or not BPL status was confirmed by presentation of BPL card. Regression in Column 3 and 5 controls for whether or not APL status was confirmed by presentation of APL card.

Impacts on SBM(G) subsidy applications and subsidy receipts

In the previous section we present evidence consistent with possible complementarities between micro-credit for sanitation and SBM(G) subsidies in terms of toilet uptake. That is, we find impacts of sanitation loans on toilet uptake over and above the upward trend also observed in our control area. In addition, we observe high impacts of sanitation loans on both SBM(G) eligible and ineligible households, suggesting that micro-credit offers additional, needed support not just for households not targeted by SBM(G) but also those who could in principle rely on subsidies. In this section, we examine whether possible complementarities between sanitation loans and subsidies go beyond toilet uptake, and look at possible interactions particularly around impacts on subsidy application and subsidy receipts.

[78] Note that, as discussed above, some of these other APL households might still include other groups targeted by SBM(G), such as landless laborers with homestead, small farmers or marginal farmers.

Figure 21: Toilet uptake and SBM(G) subsidy uptake over time

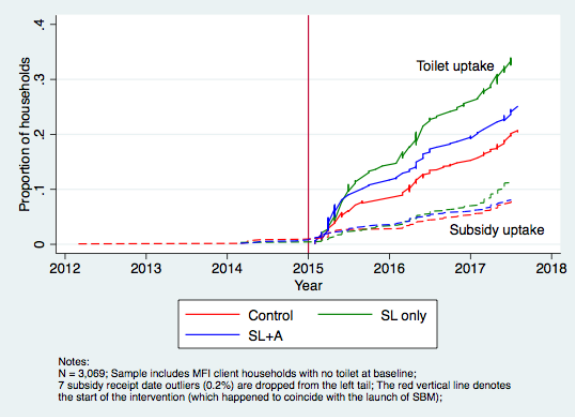


Figure 21 shows trends in toilet uptake (solid lines) and SBM(G) subsidy receipts (dashed lines) over time, for the sub-sample of MF clients who did not own a toilet at baseline. Toilet ownership here also includes toilets still under construction. SBM(G) subsidy receipt is measured through report by head of household.[79] Note that, assuming households could only apply for and receive a subsidy after toilet construction (as per SBM(G)'s guidelines), we only asked about SBM(G) subsidy applications and receipts of households who reported to own a toilet. To the extent that also households without a toilet can receive subsidies (which as we have seen in Section 5.6 is likely), our measure of SBM(G) subsidy uptake of MF clients is a lower bound.

These trends show clearly that SBM(G) subsidy uptake follows a similar pattern as the one we observe for toilet uptake, albeit it with a delay of about a year: Initially, subsidy uptake growth is similar across our study arms, possibly because of the gap between toilet construction and subsidy receipts. About two years into the intervention, however, SBM(G) subsidy uptake in the SL only arm starts accelerating, at a rate higher than in the control or SL+A arms. This is consistent with the higher toilet uptake that we observe in the SL only arm, starting more or less a year before the boost in subsidy uptake in that treatment arm.

On the one hand, the boost in SBM(G) subsidy uptake could be a mere artifact of the impact of sanitation loans on toilet coverage we observed earlier: The more households have a toilet, the more households will be able to apply for and receive SBM(G) subsidies. However, it is also possible that the interventions impacted on subsidy receipts, not just via their impacts on toilet uptake, but also potentially by impacts on households' probability to apply for a subsidy (for instance, through awareness creation about SBM(G) by the implementing MFI agency in the SL+A arm) and/or by impacts on subsidy application success (for instance, if loans allow MF clients to construct better quality toilets).

Regression results in Table 97 investigate this further. We focus on MF clients households who managed to construct a toilet since baseline, and assess whether the intervention had any impacts on MF clients' households' probability of applying for a subsidy (column 1), and/or whether the intervention had any impact on the households' probability to obtain a subsidy (conditional on having applied) (column 2) and/or on the amount of subsidies received (conditional on receiving a subsidy) (column 3).[80]

Column 1 shows no impacts on MF clients' households probability to apply for a SBM(G) subsidy, conditional on owning a toilet. However, client households that own a toilet and that applied for a subsidy in the SL only arm are more likely to receive the subsidy relative to their counterparts in control (column 2). It is possible that

[79] We do not have data on date of subsidy application so we cannot present its time trend here.

[80] We restrict the sample to MF clients that had a toilet at endline, since we do not have information about subsidy applications or receipts for MF clients that did not own a toilet.

Table 97: Impacts on SBM subsidies: for households not owning a toilet at baseline

	(1) Applied for subsidy	(2) Received subsidy	(3) Subsidy amount received
treat==SL	-0.0133	0.0994*	980.4
	(0.0442)	(0.0597)	(623.1)
treat==SL+A	-0.0559	0.00876	736.7
	(0.0442)	(0.0593)	(869.0)
Strata FE	Yes	Yes	Yes
Household covariates	Yes	Yes	Yes
F_stat	0.363	0.159	0.770
controlmean	0.567	0.533	12474.2
N	990	532	286

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Toilet uptake status at baseline, dummy =1 household has a child aged under 2 at time of baseline. In Column (3) we replace 7 outlier observations ? Rs.45,000 of subsidy amount to sample median (3 of sample)

this result is driven by selection bias, that is, clients in SL only arm that end up constructing a toilet - at least partially by being influenced by the provision of sanitation loans - might differ in characteristics compared to clients who construct a toilet in control group - who were incentivized by factors other than access to sanitation loans. In Section 5.6 on targeting we discuss some observable differences between toilet owners in our control group and toilet owners in our treatment arm, although these differences are not statistically significant.

However, it is also possible that SL only treatment arm's higher subsidy application success rate is driven by factors other than differences in toilet owners' profile across study arms. One such factor, for instance, is toilet quality. In Section 5.1.2 we learnt that the intervention did not have any observable impacts on overall toilet quality, in terms of its underground structure or overground and environmental features. There is a possibility that households invest in very specific toilet quality features that they know improve their chances of obtaining a subsidy. SBM(G)'s official guidelines with regard to SBM(G) subsidy eligibility state that "A duly completed household sanitary latrine unit shall comprise of i) a sanitary substructure (that safely confines human feces and eliminates the need for human handling before it is fully decomposed), ii) a super structure with water facility, and iii) a hand wash unit for cleaning and hand-washing. [...] The toilets must have a superstructure acceptable to the beneficiaries, as poor quality of toilets constructed has been one of the main complaints against earlier sanitation programs. [...] ". However, in Section 5.1.2, we do not find any significant impacts on the presence of hand washing facilities either.

To conclude, the evidence discussed in this chapter suggests there to be an important role to play for sanitation micro-credit in the context of SBM(G) subsidy scheme. We find that the introduction of sanitation loans in areas where SBM(G) was clearly very active, led to a significant additional impact on toilet coverage. High impacts are observed not just for SBM(G) ineligible APL households, but also for BPL households in principle eligible for SBM(G) subsidies. This observation, combined with descriptive evidence of the fact that average toilet costs are double the amount of the subsidy and of reports of there being significant delays in subsidy disbursements, suggest that micro-credit might have been used by households as a means to cover funding gaps. Whereas we do not find any impacts of access to sanitation loans on households' subsidy application rate, we do observe highly significant correlation with applicants' probability of successfully receiving a subsidy (within the time frame of our study).

6 Discussion and conclusions

This report presents and discusses the results of the impact evaluation titled "Incentivizing Sanitation Uptake and Sustainable Usage through Microfinance"[81]. It includes a detailed description of the interventions evaluated, a discussion of the evaluation design and research questions and the findings of the evaluation along a number of different dimensions.

We demonstrate in the report that any potential risks identified at the time of setting up the impact evaluation and as well as at the time of writing the project's baseline report did not materialize to an extent that would threaten the design and hence the ability to draw policy relevant conclusions. In particular, we demonstrate compliance with the randomization by field and/or branch level staff of the implementing institutions and we show that attrition is low and unrelated to treatments. We also show that, while we observe a remarkable positive trend in sanitation uptake in control areas during the 2.5 years of our experiment, possibly driven by schemes such as the GoI's SBM(G), the majority of control households remain without toilet access at the time of the endline survey. The sanitation loan provision fills about twenty percent of this gap for credit-eligible households, but leaves still an important margin of improvements necessary to achieve open defecation free rural areas in India. Finally, while we do not address possible information spillover across treatment arms, we show that spillover within communities, if happening at all, does not lead to significant changes in our primary and secondary outcomes.

Based on these and other findings, we are confident in results presented in this report and we draw the following policy relevant headline conclusions:

1. The provision of micro-credit loans for sanitation investments is a viable strategy to increase sanitation coverage and usage in our study setting.

2. Combining the sanitation loans with awareness creation activities - at least in this context - reduces the positive impact of providing sanitation loans only.

3. The significant impacts of the intervention on loan uptake combined with the finding of increased toilet ownership in the SL only arm, allows us to conclude that households were lacking financing for the construction of toilets before sanitation loans were introduced.

4. Loan take-up does not always translate into toilet construction. At least 17% of loans, and as many as 50% of loans (possibly more in SL+A communities) are not used for sanitation investment purpose.

5. The introduction of potentially non-productive sanitation loans does not seem to crowd out (more) productive investments.

6. Neither intervention component seems to have significant effects on households not eligible for the sanitation credit.

7. There might be an important role to play for sanitation micro-credit in the context of SBM(G) subsidy scheme, in particular to serve as bridge funding.

8. MF clients that took a sanitation loan and who ended up constructing a toilet live in households that at endline are on average slightly better off on a number of margins. It is yet to be seen whether this is due to prime mover effects or specific intervention targeting.

The report reveals a number of other interesting findings and raises additional questions that will be addressed in future research, either with available data or considering new experiments. These include questions such as: Why

[81] The project's initial title was "Understanding the Links and Interactions between Low Sanitation and Health Insurance in India". The component on health insurance was dropped at some point during the project, leading to a focus on understanding the role of informational and credit constraints in sanitation uptake.

are awareness creation activities hampering impacts? Why is the conversion rate of sanitation loans to toilets below 1one?, What is the role of monitoring of loan usage and can it be made more effective to ensure that sanitation loans are used for constructing/improving toilets as intended? How do non-productive (in the short term) sanitation loans affect households' financial well-being in the long-term? Why have some socio-economic and demographic groups systematically been left behind, in terms of both sanitation loan uptake and toilet uptake? Why does the provision of sanitation loan uptake leads to a higher success rate of SBM(G) subsidy applications in our study area?

A Appendix - List of study GPs

Table 98: List of GPs in the study area

Sr No	GP	District	Sr No	GP	District
1	ACHEGAON	Nanded	61	KINIYALLADEVI	Latur
2	ALUR	Nanded	62	KOKALGAON	Latur
3	AMBULGA VI	Latur	63	KOLHEBORGAON	Nanded
4	AMDAPUR	Nanded	64	KRUSHNUR	Nanded
5	ANDHORI	Latur	65	KUMTHA KH	Latur
6	ANSARWADA	Latur	66	KUNTUR	Nanded
7	ARJAPUR	Nanded	67	KUSHAWADI	Nanded
8	BAGANTAKLI	Nanded	68	LAMBOTA	Latur
9	BANSHELKI	Latur	69	LANJI	Latur
10	BELKONI BK	Nanded	70	LOHARA	Latur
11	BELUR	Latur	71	LOHGAON	Nanded
12	BETAKBILOLI	Nanded	72	LONI	Nanded
13	BHAKASKHEDA	Latur	73	LONI LATUR	Latur
14	BHAYEGAON	Nanded	74	MADANSURI	Latur
15	BHOPALA	Nanded	75	MAKNI	Latur
16	BIJUR	Nanded	76	MALEGAON (M)	Nanded
17	BORGAON	Nanded	77	MALKAPUR	Latur
18	CHANDEGAON	Latur	78	MANATHPUR	Latur
19	CHILKHA	Latur	79	MANJARAM	Nanded
20	CHINCHALA	Nanded	80	MARKHEL	Nanded
21	DAPKA	Latur	81	MARTALA	Nanded
22	DAVANGIR	Nanded	82	MARTOLI	Nanded
23	DAWANGAON	Latur	83	MUKRAMABAD	Nanded
24	DEGAON	Nanded	84	NAGALGAON	Latur
25	DEWARJAN	Latur	85	NALGIR	Latur
26	DHALEGAON	Latur	86	NANAND	Latur
27	DHANORA	Latur	87	NARANGAL BK	Nanded
28	DHOSNI	Nanded	88	NARSI	Nanded
29	EKURGA ROAD	Latur	89	NETRAGAON	Latur
30	GADGA	Nanded	90	NIDEBAN	Latur
31	GHUNGRALA	Nanded	91	NITUR	Latur
32	GOJEGAON	Nanded	92	PALASGAON	Nanded
33	HADGA	Latur	93	PIMPALGAON	Nanded
34	HADOLTI	Latur	94	PIMPARI	Latur
35	HALGARA	Latur	95	RAMTIRTH	Nanded
36	HANCHANAL	Latur	96	SALGARA KH	Nanded
37	HANDRAL	Latur	97	SANGAVI (SU)	Latur
38	HANEGAON	Nanded	98	SARWADI	Latur
39	HANMANTWADI AB	Latur	99	SAWARKHED	Nanded
40	HARIJAWALGA	Latur	100	SHAHAPUR	Nanded
41	HIPPARGA KAJAL	Latur	101	SHEKAPUR	Latur
42	HOTTAL	Nanded	102	SHELHAL	Latur
43	JAHUR	Nanded	103	SHIROL	Latur
44	JAJNOOR	Latur	104	SINDHKHED	Latur
45	JAU	Latur	105	SOMNATHPUR	Latur
46	JEWARI	Latur	106	SOMTHANA	Nanded
47	KAHALA BK	Nanded	107	TALBID	Nanded
48	KALLUR	Latur	108	TALNI	Nanded
49	KAMALWADI	Latur	109	TEMBHURNI	Latur
50	KANDALA	Nanded	110	THODGA	Latur
51	KAREGAON	Nanded	111	UMARDARI	Nanded
52	KARKHELI	Latur	112	UMARGA H	Latur
53	KASRALI	Nanded	113	UNDRI PD	Nanded
54	KELGAON	Latur	114	VILEGAON	Latur
55	KHAIRGAON	Nanded	115	WADHONA (BK)	Latur
56	KHANAPUR	Nanded	116	WALAG	Nanded
57	KHAROSA	Latur	117	WALANDI	Latur
58	KINGAON	Latur	118	WAZARGA	Nanded
59	KINHALA	Nanded	119	YELNOOR	Latur
60	KINI	Nanded	120	ZARI	Nanded

B Appendix - Additional sample balance checks

Table 99: Randomization tests: Non-client Household characteristics

	Treatment Status						
	Whole Sample	Control	SL only	SL + A	F-stat (t(SL + A) = t(SL only) = 0)	F-stat (T(SL + A) - t(SL only) = 0)	N
Nr of HH members	5.32	5.34	5.28	5.35	0.11	0.213	1770
	(0.052)	(0.12)	(0.13)	(0.10)			
Nr of children <2 years	0.11	0.11	0.12	0.10	0.27	0.533	1770
	(0.0080)	(0.018)	(0.017)	(0.017)			
Nr of children 6-14 years	0.79	0.83	0.75	0.81	0.92	0.784	1770
	(0.024)	(0.035)	(0.049)	(0.048)			
Nr of elderly (>64 years)	0.38	0.37	0.37	0.39	0.21	0.258	1770
	(0.015)	(0.032)	(0.030)	(0.032)			
Gender HH head (fraction male)	92.0	91.3	91.5	93.3	0.81	0.951	1770
	(0.65)	(1.32)	(1.43)	(1.14)			
Age HH head	49.1	48.4	49.0	49.8	0.48	0.429	1770
	(0.35)	(1.11)	(0.69)	(0.87)			
Years of education HH head	6.24	6.28	6.28	6.16	0.070	0.115	1770
	(0.12)	(0.27)	(0.25)	(0.27)			
HH head is married	0.92	0.91	0.92	0.94*	1.84	1.633	1770
	(0.0064)	(0.013)	(0.014)	(0.011)			
HH head's caste: Backward (other b., special b., DTs, NTs)	41.0	36.5	44.9*	41.9	1.45	0.389	1770
	(1.17)	(3.62)	(3.42)	(3.40)			
HH head's caste: Scheduled castes/tribes	28.1	28.1	25.9	30.4	0.86	1.709	1770
	(1.07)	(2.56)	(2.48)	(2.40)			
HH head's caste: General caste	30.7	35.0	29.2	27.7	1.31	0.111	1770
	(1.10)	(3.61)	(3.48)	(2.84)			
HH head's religion: Hindu	82.4	83.0	78.3	85.8	1.98	3.833*	1770
	(0.91)	(2.35)	(3.34)	(1.86)			
HH head's religion: Islam	10.6	10.1	13.3	8.48	0.96	1.823	1770
	(0.73)	(1.91)	(3.24)	(1.52)			
HH head's religion: Buddism	7.01	6.93	8.36	5.71	1.14	2.277	1770
	(0.61)	(1.46)	(1.36)	(1.11)			
HH owns BPL card	60.2	54.1	61.1	65.7*	1.62	0.496	1770
	(1.16)	(4.82)	(5.01)	(4.30)			
Card was shown confirming BPL status	0.58	0.52	0.59	0.64*	1.74	0.639	1770
	(0.012)	(0.048)	(0.050)	(0.043)			
HH owns APL card	0.32	0.39	0.32	0.26**	2.07	0.925	1770
	(0.011)	(0.049)	(0.051)	(0.041)			
Card was shown confirming APL status	0.31	0.36	0.31	0.25*	1.93	1.061	1770
	(0.011)	(0.046)	(0.049)	(0.039)			
Owned by HH member	97.2	96.9	98.0	96.7	0.44	0.397	1770
	(0.39)	(1.22)	(0.65)	(1.86)			
Dwelling structure: Pucca House	38.0	37.3	40.8	35.8	0.50	0.902	1770
	(1.15)	(3.74)	(3.43)	(3.95)			
Dwelling structure: Semi-pucca house	49.9	52.5	45.9	51.2	1.21	1.375	1770
	(1.19)	(3.43)	(3.04)	(3.35)			
Dwelling structure: Kutcha House	12.1	10.2	13.3	13.0	0.94	0.0124	1770
	(0.78)	(1.52)	(2.06)	(2.19)			
Primary activity HH: Cultivator	41.0	40.4	37.2	45.5	1.05	2.093	1770
	(1.17)	(4.19)	(3.78)	(4.31)			
Primary activity HH: Agriculture wage labour	17.8	17.8	19.3	16.3	0.41	0.816	1770
	(0.91)	(2.28)	(2.13)	(2.57)			
Primary activity HH: Allied agriculture	13.6	13.9	15.0	11.9	0.29	0.555	1770
	(0.82)	(3.24)	(3.18)	(2.63)			
Primary activity HH: Waged employment	17.5	18.2	18.3	16.1	0.28	0.483	1770
	(0.90)	(2.22)	(1.95)	(2.43)			
Primary activity HH: Self-employment	4.86	3.80	5.12	5.71	0.64	0.0636	1770
	(0.51)	(1.00)	(1.82)	(1.47)			
Primary activity HH: Other	4.35	5.12	4.10	3.81	0.31	0.0301	1770
	(0.48)	(1.38)	(1.35)	(0.98)			
HH owns agricultural land	0.56	0.57	0.56	0.55	0.049	0.0494	1770
	(0.012)	(0.033)	(0.032)	(0.039)			
Agricultural land owned by HH - Acres	4.54	4.34	4.87	4.43	0.92	0.667	990
	(0.15)	(0.26)	(0.30)	(0.44)			
Total HH income	114320.9	114321	128352	95017*	3.52**	5.349**	1770
	(3143.9)	(10699.0)	(12543.9)	(7081.6)			
Typical HH yearly income	113840.7	113841	127558	95216*	3.28**	5.027**	1770
	(3134.6)	(10736.7)	(12568.5)	(7063.1)			
Food expenditure last week	902.0	915.9	907.8	881.5	0.20	0.175	1770
	(15.1)	(42.7)	(50.2)	(37.8)			
Non-food expenditure last week	855.1	894.8	865.2	803.3	0.38	0.235	1770
	(21.9)	(89.0)	(110.1)	(64.8)			
Value of assets owned: Livestock- Buffalo, cow, bullock	64341.7	64342	72383	58441	0.69	1.351	600
	(2552.8)	(6912.4)	(9802.8)	(6878.0)			
Value of assets owned: Livestock- Calf	14690.1	14690	12859	15050	0.78	0.336	242
	(985.7)	(2355.9)	(1903.4)	(3249.2)			
Value of assets owned: Livestock- Livestock-Goat, Sheep	21819.4	21819	18283	22818	0.69	0.673	144
	(2705.1)	(8054.2)	(2218.2)	(5022.2)			
Value of assets owned: Livestock- Livestock-Chicken	2343.1	2343	2795*	3141***	5.93***	0.196	65
	(232.8)	(234.1)	(609.6)	(468.6)			
HH owned toilet at BL (1st Jan 2018 - reconstructed using EL data on age	0.31	0.30	0.36	0.28	2.11	3.869*	1770
	(0.011)	(0.027)	(0.033)	(0.031)			

Note: Standard Errors in parenthesis, clustered at the gram panchayat, *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

Source: Household survey.

Table 100: Panel clients versus non-panel clients

	Sample Status			
	Whole Sample	**Non-panel**	**Panel**	**N**
Nr of HH members	5.03	4.86	5.28***	4222
	(0.030)	(0.068)	(0.046)	
Nr of children <2 years	0.10	0.090	0.12***	4222
	(0.0050)	(0.0089)	(0.0071)	
Nr of children 6-14 years	0.86	0.84	0.90*	4222
	(0.017)	(0.029)	(0.025)	
Nr of elderly (>64 years)	0.20	0.18	0.22***	4222
	(0.0072)	(0.013)	(0.013)	
Gender HH head (fraction male)	90.7	90.6	90.8	4222
	(0.45)	(0.73)	(0.73)	
Years of education HH head	5.76	5.68	5.89	4222
	(0.073)	(0.17)	(0.15)	
Age HH head	45.6	45.4	45.8	4222
	(0.16)	(0.31)	(0.32)	
Marital status HH head	2.23	2.24	2.21	4222
	(0.012)	(0.018)	(0.021)	
HH head caste: Backward (other b., special b., DTs, NTs) (%)	31.5	30.9	32.4	4222
	(0.72)	(1.96)	(2.74)	
HH head caste: Scheduled castes/tribes (%)	41.9	39.8	45.1**	4222
	(0.76)	(2.34)	(3.00)	
HH head caste: General caste	26.1	28.8	22.0**	4222
	(0.68)	(1.96)	(3.27)	
HH head religion: Hindu (%)	66.5	64.6	69.3*	4222
	(0.73)	(2.09)	(2.80)	
HH head religion: Islam (%)	21.2	23.8	17.4***	4222
	(0.63)	(1.97)	(3.08)	
HH head religion: Buddhism (%)	11.8	10.7	13.3*	4222
	(0.50)	(1.39)	(1.43)	
HH owns BPL card (%)	59.9	60.2	59.4	4222
	(0.75)	(1.42)	(1.82)	
Card was shown confirming BPL status	0.44	0.44	0.44	4222
	(0.0076)	(0.017)	(0.020)	
HH owns APL card	0.26	0.26	0.26	4222
	(0.0067)	(0.015)	(0.016)	
Card was shown confirming APL status	0.18	0.19	0.17	4222
	(0.0059)	(0.012)	(0.016)	
HH owned toilet at BL (%)	27.1	26.2	28.6	4222
	(0.68)	(1.73)	(1.55)	

Note: Endline characteristics; Standard Errors in parenthesis, clustered at the gram panchayat, ** p <0.10, ** p <0.05, *** p <0.01*
Source: Household survey.

Table 101: Attritors versus Stayers: Whole sample

	Sample Status			
	Whole Sample	**Stayers**	**Attritors**	**N**
Nr of HH members	5.43	5.45	4.82***	3580
	(0.035)	(0.049)	(0.14)	
Nr of children < 2 years	1.03	1.03	1.03	3580
	(0.0033)	(0.0041)	(0.014)	
Nr of children 6-14 years	0.78	0.78	0.88	3580
	(0.017)	(0.018)	(0.084)	
Nr of elderly (> 64 years)	0.27	0.28	0***	3580
	(0.0090)	(0.0095)	(0)	
Gender HH head (fraction male)	92.6	92.7	90.5	3580
	(0.44)	(0.56)	(2.77)	
Years of education HH head	6.04	6.02	6.50	3580
	(0.078)	(0.11)	(0.43)	
Head can read (%)	66.9	66.8	69.3	3580
	(0.79)	(1.03)	(4.18)	
Head can write (%)	70.6	70.4	75.2	3580
	(0.76)	(1.08)	(4.06)	
Age HH head	45.5	45.6	43.2***	3580
	(0.20)	(0.29)	(0.88)	
HH head is married (%)	92.3	92.4	90.5	3580
	(0.44)	(0.53)	(2.59)	
HH head caste: Backward (other b., special b., DTs, NTs) (%)	34.5	35.1	19.0***	3580
	(0.79)	(1.68)	(3.79)	
HH head caste: Scheduled castes/tribes (%)	34.6	34.7	33.6	3580
	(0.80)	(1.50)	(4.38)	
HH head caste: General caste	28.9	29.6	11.7***	3580
	(0.76)	(1.69)	(3.14)	
HH head religion: Hindu (%)	75.8	75.9	72.3	3580
	(0.72)	(1.63)	(4.50)	
HH head religion: Islam (%)	13.7	13.8	9.49	3580
	(0.57)	(1.53)	(2.89)	
HH head religion: Buddhism (%)	10.5	10.2	18.2**	3580
	(0.51)	(0.92)	(3.30)	
HH owns BPL card (%)	41.9	42.1	35.0	3580
	(0.82)	(1.34)	(4.44)	
HH owned toilet at BL (%)	30.4	30.7	24.1	3580
	(0.77)	(1.75)	(4.16)	
Primary activity is agriculture (%)	76.8	77.0	73.0	3580
	(0.71)	(1.21)	(4.28)	
HH owns agricultural land (%)	43.5	44.1	30.7***	3580
	(0.83)	(1.48)	(4.36)	
Total consumption expenditure (last year)	180577.6	180578	232708	3580
	(6982.2)	(10108.7)	(43753.0)	
Value representative assets (Rs.)	710769.2	710769	409102***	3580
	(29547.5)	(36918.2)	(60240.3)	
HH lives in a pucca type dwelling (%)	16.2	16.4	12.4	3580
	(0.62)	(0.95)	(3.21)	

Note: Baseline characteristics; Standard Errors in parenthesis, clustered at the gram panchayat, *p <0.10, **p <0.05, ***p <0.01
Source: Household survey.

Table 102: Attritors versus Stayers: Client sample

	Sample Status			
	Whole Sample	**Stayers**	**Attritors**	**N**
Nr of HH members	5.41	5.44	4.82***	1794
	(0.046)	(0.064)	(0.16)	
Nr of children < 2 years	1.02	1.02	1.01	1794
	(0.0034)	(0.0035)	(0.010)	
Nr of children 6-14 years	0.89	0.89	0.99	1794
	(0.025)	(0.026)	(0.097)	
Nr of elderly (> 64 years)	0.19	0.20	0***	1794
	(0.011)	(0.012)	(0)	
Gender HH head (fraction male)	92.4	92.5	90.9	1794
	(0.63)	(0.76)	(3.43)	
Years of education HH head	6.03	6.00	6.45	1794
	(0.11)	(0.15)	(0.47)	
Head can read (%)	68.2	68.1	69.7	1794
	(1.10)	(1.43)	(4.85)	
Head can write (%)	72.4	72.1	76.8	1794
	(1.06)	(1.46)	(4.63)	
Age HH head	44.6	44.7	42.8**	1794
	(0.21)	(0.23)	(0.85)	
HH head is married (%)	93.6	93.7	91.9	1794
	(0.58)	(0.59)	(3.00)	
HH head caste: Backward (other b., special b., DTs, NTs) (%)	29.5	30.2	18.2***	1794
	(1.08)	(1.95)	(4.26)	
HH head caste: Scheduled castes/tribes (%)	43.8	44.4	33.3*	1794
	(1.17)	(2.43)	(5.58)	
HH head caste: General caste	23.7	24.8	4.04***	1794
	(1.00)	(1.93)	(1.99)	
HH head religion: Hindu (%)	69.4	69.0	75.8	1794
	(1.09)	(2.12)	(5.14)	
HH head religion: Islam (%)	16.8	17.2	9.09**	1794
	(0.88)	(1.96)	(3.11)	
HH head religion: Buddhism (%)	13.7	13.6	15.2	1794
	(0.81)	(1.46)	(3.79)	
HH owns BPL card (%)	44.2	44.9	32.3**	1794
	(1.17)	(1.68)	(4.96)	
HH owned toilet at BL (%)	26.2	26.7	17.2**	1794
	(1.04)	(1.96)	(4.64)	
Primary activity is agriculture (%)	72.4	72.3	73.7	1794
	(1.06)	(1.60)	(4.72)	
HH owns agricultural land (%)	32.3	32.6	27.3	1794
	(1.10)	(1.74)	(4.85)	
Total consumption expenditure (last year)	168205.4	168205	205517	1794
	(9683.0)	(12058.9)	(49287.7)	
Value representative assets (Rs.)	453985.5	453986	319807***	1794
	(27209.4)	(33428.5)	(48337.0)	
HH lives in a pucca type dwelling (%)	10.4	10.3	13.1	1794
	(0.72)	(0.94)	(4.17)	

Note: Baseline characteristics; Standard Errors in parenthesis, clustered at the gram panchayat, ** p <0.10, ** p <0.05, *** p <0.01*
Source: Household survey.

Table 103: Attritors versus Stayers: Non-client sample

	Sample Status			
	Whole Sample	**Stayers**	**Attritors**	**N**
Nr of HH members	5.44	5.46	4.84*	1786
	(0.051)	(0.066)	(0.32)	
Nr of children < 2 years	1.05	1.05	1.08	1786
	(0.0056)	(0.0063)	(0.042)	
Nr of children 6-14 years	0.67	0.67	0.58	1786
	(0.023)	(0.024)	(0.15)	
Nr of elderly (> 64 years)	0.34	0.35	0***	1786
	(0.014)	(0.015)	(0)	
Gender HH head (fraction male)	92.7	92.8	89.5	1786
	(0.61)	(0.72)	(5.08)	
Years of education HH head	6.05	6.03	6.63	1786
	(0.11)	(0.14)	(0.82)	
Head can read (%)	65.5	65.4	68.4	1786
	(1.13)	(1.27)	(7.79)	
Head can write (%)	68.8	68.8	71.1	1786
	(1.10)	(1.26)	(7.63)	
Age HH head	46.4	46.4	44.1	1786
	(0.34)	(0.52)	(2.41)	
HH head is married (%)	91.1	91.2	86.8	1786
	(0.67)	(0.77)	(5.62)	
HH head caste: Backward (other b., special b., DTs, NTs) (%)	39.5	39.9	21.1***	1786
	(1.16)	(2.06)	(6.43)	
HH head caste: Scheduled castes/tribes (%)	25.4	25.2	34.2	1786
	(1.03)	(1.36)	(7.95)	
HH head caste: General caste	34.2	34.3	31.6	1786
	(1.12)	(2.07)	(8.38)	
HH head religion: Hindu (%)	82.1	82.6	63.2**	1786
	(0.91)	(1.52)	(8.35)	
HH head religion: Islam (%)	10.5	10.5	10.5	1786
	(0.73)	(1.37)	(4.78)	
HH head religion: Buddhism (%)	7.33	6.92	26.3***	1786
	(0.62)	(0.77)	(7.25)	
HH owns BPL card (%)	39.5	39.5	42.1	1786
	(1.16)	(1.47)	(8.22)	
HH owned toilet at BL (%)	34.7	34.5	42.1	1786
	(1.13)	(1.97)	(8.35)	
Primary activity is agriculture (%)	81.2	81.5	71.1	1786
	(0.92)	(1.23)	(7.51)	
HH owns agricultural land (%)	54.8	55.1	39.5*	1786
	(1.18)	(1.79)	(8.49)	
Total consumption expenditure (last year)	193005.3	193005	303547	1786
	(10057.9)	(12494.7)	(85525.1)	
Value representative assets (Rs.)	968703.0	968703	641740*	1786
	(51841.0)	(59529.4)	(159069.1)	
HH lives in a pucca type dwelling (%)	22.1	22.3	10.5**	1786
	(0.98)	(1.37)	(5.08)	

Note: Baseline characteristics; Standard Errors in parenthesis, clustered at the gram panchayat, ** p <0.10, ** p <0.05, *** p <0.01*
Source: Household survey.

C Appendix - Toilet quality: additional tables

Table 104: Factor Loadings from Polychoric PCA, Underground Quality, Clients

	Loadings
Materials lining the walls of the underground storage chamber	-.0471
No bad smells	.7062
No flies	.7065

Table 105: Factor Loadings from Polychoric PCA, Overground Quality, Clients

	Comp1	Comp2
Toilet structure - observed by interviewers	.2132	.2990
Provision to lock	.3620	-.3423
Toilet easy to access	.3861	-.3701
Natural lighting during the day	.3575	-.2402
The toilet has a door that can be locked	.4795	-.1698
Light at night	.3858	.1829
Distance between pan and wall sufficient	.3085	.5298
Cross-ventilation	.2697	.5057

Table 106: Factor Loadings from Polychoric PCA, Cleanliness, Clients

	Comp1	Comp2
Path to toilet clear	.3305	.0935
Path to toilet trodden	.1779	-.3776
Anal cleaning products	.4540	-.2265
Floor cleaning products	.5212	-.0296
Toilet brush next to the toilet	.5128	-.0660
No visible faeces on the slab/toilet	-.1047	.4841
No bad smells	.2704	.5104
No flies	.1854	.5453

D Appendix - Eliciting Expectations of Costs: additional tables

Figure 22 reproduces the questions used to elicit expectations of costs for 3 different toilet types – a basic toilet with low-quality underground and overground structures (picture A), a single pit toilet, and a double-pit toilet.

Figure 22: Questions and Figures used to elicit expectations of toilet costs

71. How much do you think would it cost you to build a toilet as shown in the next three pictures?

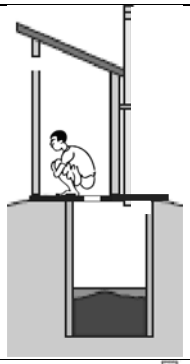
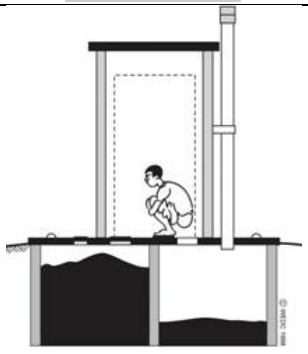
Toilet description	**Picture**	**Expected construction cost -** *ENTER Min and Max AMOUNT in Rs.* ***INTERVIEWER:*** *Code -99 for Don't Know*	**How long do you think would your household be able to use this toilet without any hassle, e.g. having to repair it or having the pit(s) fill up?** – ENTER min and max Number of years ***INTERVIEWER****: Code -99 for Don't Know*
1. A simple toilet, with simple hole dug out to be a pit (no lining) and a simple structure that ensures that one can't be seen by others when using it. This structure could be made of plastic sheets, palm leave, other locally available materials.		71.1.1.1.min *Minimum cost:* *(Rs.)* _____ 71.1.1.1.max *Maximum cost:* *(Rs.)*_____	71.1.1.2.min *Minimum years:* _____ 71.1.1.2.max *Maximum years:* _____
2. A toilet, with a lined single pit and a structure that ensures privacy protects from the elements (such as rain).		71.1.2.1.min *Minimum cost:* *(Rs.)* _____ 71.1.2.1.max *Maximum cost:* *(Rs.)*_____	71.1.2.2.min *Minimum years:* _____ 71.1.2.2.max *Maximum years:* _____
3. A double pit (vault) latrine, with two well-lined pits, a pucca super-structure (i.e. walls, roof, door) that ensures privacy, can be locked and has a vent-pipe for aeration.		71..1.3.1.min *Minimum cost:* *(Rs.)* _____ 71..1.3.1.max *Maximum cost:* *(Rs.)*_____	71.1.3.2.min *Minimum years:* _____ 71..1.3.2.max *Maximum years:* _____

Table 107: Sample Balance Among Households Shown Picture of Double Pit Toilet

	Treatment Status						
	Whole Sample	**Control**	**SL only**	**SL + A**	**F-stat (t2 = t1 = 0)**	**F-stat (t2 - t1 = 0)**	**N**
Nr of HH members	5.04	5.02	5.05	5.04	0.033	0.0113	4056
	(0.031)	(0.085)	(0.073)	(0.070)			
HH owns BPL card	59.6	58.5	58.0	62.3	0.85	1.341	4056
	(0.77)	(2.00)	(2.61)	(2.68)			
Primary activity HH: Cultivator	19.1	17.4	18.1	22.0	1.06	1.241	4056
	(0.62)	(1.89)	(2.29)	(2.66)			
Primary activity HH: Agriculture wage labour	22.7	21.9	23.1	23.2	0.13	0.00108	4056
	(0.66)	(2.09)	(2.04)	(2.37)			
Primary activity HH: Allied agriculture	13.6	13.9	14.0	12.8	0.15	0.258	4056
	(0.54)	(1.96)	(1.73)	(1.73)			
Primary activity HH: Waged employment	25.8	27.3	25.9	24.1	0.46	0.297	4056
	(0.69)	(2.32)	(2.36)	(2.44)			
Primary activity HH: Self-employment	10.5	10.9	9.98	10.5	0.092	0.0402	4056
	(0.48)	(1.73)	(1.44)	(2.29)			
Primary activity HH: Other	6.34	6.84	5.99	6.10	0.099	0.00776	4056
	(0.38)	(1.70)	(0.96)	(0.83)			

Note: Standard Errors in parenthesis, clustered at the gram panchayat, ** p <0.10, ** p <0.05, *** p <0.01*
Source: Household survey.

	Treatment Status						
	Whole Sample	**Control**	**SL only**	**SL + A**	**F-stat (t2 = t1 = 0)**	**F-stat (t2 - t1 = 0)**	**N**
=1 if religion is hindu	66.6	68.6	65.4	65.6	0.27	0.00190	4056
	(0.74)	(3.08)	(3.89)	(4.57)			
=1 if religion is islam	20.7	17.0	22.3	23.2	0.82	0.0226	4056
	(0.64)	(3.08)	(4.03)	(5.12)			
=1 if religion is buddhism	12.1	13.4	11.8	11.0	0.32	0.0842	4056
	(0.51)	(2.47)	(2.28)	(1.76)			
Backward caste (other backward, special backward, DTs, NTs)	31.5	34.7	31.6	27.7	1.06	0.763	4056
	(0.73)	(4.18)	(3.49)	(2.70)			
Scheduled castes/tribes	42.2	42.1	40.1	44.4	0.22	0.448	4056
	(0.78)	(3.95)	(4.42)	(4.49)			
General caste	25.8	22.8	27.4	27.7	0.49	0.00204	4056
	(0.69)	(3.50)	(4.23)	(4.93)			
Gender HH head (fraction male)	90.5	89.3	91.4	91.0	1.25	0.0690	4055
	(0.46)	(1.04)	(0.92)	(1.06)			
Age HH head	45.6	45.5	45.5	45.9	0.28	0.471	4056
	(0.16)	(0.45)	(0.35)	(0.40)			
Years of education HH head	5.75	5.81	6.01	5.43	1.65	3.294*	4056
	(0.075)	(0.20)	(0.20)	(0.25)			

Note: Standard Errors in parenthesis, clustered at the gram panchayat, ** p <0.10, ** p <0.05, *** p <0.01*
Source: Household survey.

	Treatment Status						
	Whole Sample	**Control**	**SL only**	**SL + A**	**F-stat (t2 = t1 = 0)**	**F-stat (t2 - t1 = 0)**	**N**
Owned by HH member	96.4	96.2	96.7	96.4	0.094	0.0731	4056
	(0.29)	(1.09)	(0.75)	(0.86)			
Dwelling structure: Pucca House	19.8	17.7	20.3	21.6	0.60	0.159	4056
	(0.63)	(2.49)	(2.01)	(2.80)			
Dwelling structure: Semi-pucca house	65.1	65.0	64.9	65.4	0.0079	0.0150	4056
	(0.75)	(2.96)	(2.65)	(3.24)			
Dwelling structure: Kutcha House	15.1	17.3	14.8	13.0	0.92	0.550	4056
	(0.56)	(2.84)	(1.90)	(1.69)			
Material floor: Mud/clay/earth	33.9	35.9	32.5	33.0	0.45	0.0180	4056
	(0.74)	(2.87)	(2.49)	(2.98)			
Material floor: Cement	21.5	22.5	20.7	21.0	0.18	0.0132	4056
	(0.64)	(2.32)	(2.26)	(2.23)			
Material floor: Tiles	4.04	4.02	3.75	4.34	0.12	0.235	4056
	(0.31)	(0.79)	(0.64)	(1.04)			
Material floor: Other	44.6	41.5	46.8	46.0	1.05	0.0460	4056
	(0.78)	(2.70)	(2.97)	(2.87)			

Note: Standard Errors in parenthesis, clustered at the gram panchayat, ** p <0.10, ** p <0.05, *** p <0.01*
Source: Household survey.

Table 108: Factor Loadings of polychoric PCA related to Perceived Costs

	e(L)	
	Comp1	Comp2
Costs - Statement 1	.3501354	.5336911
Costs - Statement 2	.414409	.2560431
Costs - Statement 3	.3813348	.4569606
Costs - Statement 4	.4378762	-.1827415
Costs - Statement 5	.432555	-.4378301
Costs - Statement 6	.4259281	-.4644492

Figure 23: Vignette Eliciting Expectations About Health Costs

75. Manu is a farmer, and lives in a house with 2 rooms, and no toilet or bathroom, with his family in a village similar to yours. In the last year, his family spent Rs. 3000 in health expenditures, to cover costs including doctor fees, medicines, tests and hospitalisations. This year, he has decided to build a toilet of type A or B. Do you think his health expenditures will be higher than, lower than or about the same as last year?

1 Higher than last year → Go to 76.

2 Lower than last year → Go to 77.

3 Same as last year → END OF QUESTIONNAIRE.

99 Don't know → END OF QUESTIONNAIRE.

76. You said that you think Manu's health expenditures this year will be higher than last year. How much higher would you say they would be?

_____Rs → END OF QUESTIONNAIRE

99 – Can't say → END OF QUESTIONNAIRE

77. You said that you think Manu's health expenditures this year will be lower than last year. How much lower would you say they would be?

_____Rs → END OF QUESTIONNAIRE

99 – Can't say → END OF QUESTIONNAIRE

Table 109: Perceived Benefits - Factor Loadings from Polychoric PCA

	e(L)
	Comp1
Benefits - Statement 1	.404372
Benefits - Statement 2	.4268298
Benefits - Statement 3	.4160226
Benefits - Statement 4	.4008704
Benefits - Statement 5	.4002118
Benefits - Statement 6	.4004475

E Appendix - Regression tables without controls

Impact on eligible households

Table 110: Impacts on toilet uptake over time

	(1) Own Jan 2016	(2) Own Jan 2017	(3) Own Jan 2018
SL only	0.0691**	0.0945***	0.111***
	(0.0296)	(0.0322)	(0.0360)
SL+A	0.0699**	0.0723**	0.0706*
	(0.0311)	(0.0361)	(0.0403)
Strata FE	Yes	Yes	Yes
F_stat	0.982	0.555	0.301
control_mean	0.354	0.412	0.451
N	4222	4222	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Table 111: Impacts on toilet usage and open defecation

	(1) Toilet uptake	(2) Toilet in use	(3) All OD	(4) Some OD
SL only	0.111***	0.0258*	-0.132***	-0.127***
	(0.0360)	(0.0142)	(0.0351)	(0.0342)
SL+A	0.0706*	0.00293	-0.0597	-0.0605
	(0.0403)	(0.0143)	(0.0416)	(0.0408)
Strata FE	Yes	Yes	Yes	Yes
F_stat	0.301	0.144	0.0855	0.107
control_mean	0.451	0.952	0.603	0.611
N	4222	1935	4222	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Table 112: Impacts on open defecation practice: by age and by gender

	(1) Female > 16	(2) Male > 16	(3) Girls 6-15	(4) Boys 6-15	(5) Kids 3-6
SL only	-0.117**	-0.121**	-0.151***	-0.130***	-0.0408**
	(0.0501)	(0.0480)	(0.0442)	(0.0437)	(0.0157)
SL+A	-0.0583	-0.000894	-0.0589	-0.0832	-0.0250
	(0.0537)	(0.0525)	(0.0465)	(0.0526)	(0.0156)
Strata FE	Yes	Yes	Yes	Yes	Yes
F_stat	0.279	0.0312	0.0593	0.382	0.277
controlmean	0.567	0.542	0.643	0.629	0.161
N	868	865	1414	1634	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Table 113: Impacts on toilet quality

	(1) Underground	(2) Overground 1	(3) Overground 2
SL only	0.00147	0.0551	0.0545
	(0.0262)	(0.0431)	(0.0383)
SL+A	-0.0251	0.0314	0.0304
	(0.0251)	(0.0462)	(0.0396)
Strata FE	Yes	Yes	Yes
F_stat	0.238	0.620	0.534
controlmean	1.178	2.463	0.299
N	1926	1926	1926

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Table 114: Impacts on toilet cleanliness

	(1) Cleanliness1	(2) Cleanliness 2
SL only	-0.00173	0.00577
	(0.0535)	(0.0260)
SL+A	0.0194	-0.0367
	(0.0558)	(0.0273)
Strata FE	Yes	Yes
F_stat	0.699	0.0898
controlmean	1.349	1.287
N	1926	1926

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Table 115: Impacts on water and soap availability

	(1) Water	(2) Soap
SL only	0.00352	0.000304
	(0.0159)	(0.0226)
SL+A	0.0150	0.0186
	(0.0169)	(0.0243)
Strata FE	Yes	Yes
F_stat	0.481	0.433
controlmean	0.936	0.898
N	1926	1926

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Table 116: Impacts on construction cost items

	(1) Total costs	(2) Labour costs	(3) Labour costs	(4) Materials costs
SL only	4330.2***	670.8	2275.4**	1411.7***
	(1348.3)	(476.2)	(955.1)	(465.4)
SL+A	1913.7	511.4	1573.4	-19.10
	(1319.1)	(537.6)	(1043.8)	(379.0)
Strata FE	Yes	Yes	Yes	Yes
F_stat	0.0676	0.775	0.482	0.00297
controlmean	26936.5	7414.3	14922.2	4480.1
N	1589	1273	1273	1273

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Mechanisms

Intervention participation

Sanitation loans

Table 117: Impacts on sanitation loan uptake (amounts)

	(1) MF SL	(2) Survey SL	(3) MF SL	(4) Survey SL
SL only	0.181***	0.153***	2625.4***	789.2**
	(0.0360)	(0.0342)	(527.2)	(302.4)
SL+A	0.215***	0.164***	3109.4***	779.8***
	(0.0296)	(0.0317)	(426.6)	(222.4)
Strata FE	Yes	Yes	Yes	Yes
F_stat	0.369	0.735	0.376	0.978
controlmean	0.0131	0.0535	197.1	309.8
N	4222	4200	4222	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Awareness creation

Table 118: MFI clients' awareness of sanitation activities in community

	(1) Any	(2) Street play	(3) Flyers	(4) Wall painting	(5) GP Info
SL only	0.0183	0.0140	0.00571	0.00320	0.0453**
	(0.0308)	(0.0202)	(0.0111)	(0.0209)	(0.0192)
SL+A	0.0742**	0.0649***	-0.0186*	0.0258	0.0531**
	(0.0352)	(0.0237)	(0.0102)	(0.0252)	(0.0238)
Strata FE	Yes	Yes	Yes	Yes	Yes
F_stat	0.0949	0.0583	0.0224	0.309	0.731
control_mean	0.296	0.0832	0.0476	0.125	0.104
N	4200	4222	4222	4222	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Variable Wall painting includes reports of wall banners; Variables in columns 2-5 are set to zero if the respondent reported not being aware of any sanitation activities.

Sanitation loan monitoring

Table 119: MFI heads' awareness of sanitation activities in community

	(1) Any	(2) Street play	(3) Flyers	(4) Wall painting	(5) GP Info
SL only	0.00772	-0.00912	-0.00384	-0.000603	0.0421*
	(0.0333)	(0.0276)	(0.00861)	(0.0206)	(0.0231)
SL+A	0.0787*	0.0454	0.00401	0.000756	0.0621**
	(0.0400)	(0.0289)	(0.00874)	(0.0233)	(0.0295)
Strata FE	Yes	Yes	Yes	Yes	Yes
F_stat	0.0557	0.0818	0.356	0.950	0.458
control_mean	0.338	0.123	0.0350	0.121	0.125
N	4222	4222	4222	4222	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Variable Wall painting includes reports of wall banners; Variables in columns 2-5 are set to zero if the respondent reported not being aware of any sanitation activities.

Table 120: GP officials' awareness of sanitation activities in community

	(1) Any	(2) Street play	(3) Flyers	(4) Wall painting	(5) Wall painting (observed)
SL only	-0.0370	0.0744	-0.000727	0.0502	0.0736
	(0.0835)	(0.103)	(0.0624)	(0.0961)	(0.0871)
SL+A	0.0828	0.238**	0.00183	0.364***	0.339***
	(0.0798)	(0.103)	(0.0602)	(0.100)	(0.0963)
Strata FE	Yes	Yes	Yes	Yes	Yes
F_stat	0.109	0.111	0.967	0.00237	0.00655
control_mean	0.805	0.512	0.0732	0.366	0.293
N	120	120	120	120	120

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Variable Wall painting includes reports of wall banners; Variables in columns 2-5 are set to zero if the respondent reported not being aware of any sanitation activities.

Table 121: Masons' awareness of sanitation activities in community

	(1) Mason training
SL only	-0.0768
	(0.0675)
SL+A	-0.0403
	(0.0706)
Strata FE	Yes
F_stat	0.566
control_mean	0.146
N	120

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Table 122: MFI clients' attendance of MFI block level awareness training

	(1) Any	(2) Sanitation	(3) Hygiene
SL only	0.0433*	0.0356	0.0303
	(0.0220)	(0.0276)	(0.0222)
SL+A	0.0942***	0.118***	0.0884***
	(0.0253)	(0.0292)	(0.0267)
Strata FE	Yes	Yes	Yes
F_stat	0.0666	0.00759	0.0320
control_mean	0.278	0.262	0.191
N	4202	4222	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Table 123: Impacts on monitoring of kendra group members

	(1) Any	(2) Meeting	(3) Kendra leader	(4) Group leader	(5) Other members	(6) Branch	(7) None
SL+A	0.00222	0.103*	-0.0862*	-0.0736	-0.0340	-0.00941	0.00760
	(0.00999)	(0.0553)	(0.0463)	(0.0672)	(0.0268)	(0.0321)	(0.0175)
Strata FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
GK_mean	0.978	0.582	0.502	0.508	0.117	0.175	0.0462
N	723	723	723	723	723	723	723

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Variable Wall painting includes reports of wall banners; Variables in columns 2-5 are set to zero if the respondent reported not being aware of any sanitation activities.

Credit uptake

Overall household borrowing

Table 124: Impacts on credit uptake

	(1) Loan uptake	(2) Nr.Loans	(3) Tot. amount	(4) Tot. amount - cond.
SL only	-0.0235	-0.0635	1047.6	3058.0
	(0.0402)	(0.0845)	(2520.7)	(2803.9)
SL+A	0.0202	0.0221	-88.91	-1425.9
	(0.0378)	(0.0742)	(2069.7)	(2232.3)
Strata FE	Yes	Yes	Yes	Yes
F_stat	0.294	0.320	0.630	0.104
controlmean	0.704	1.403	34421.1	34421.1
N	4222	4222	4222	2997

Notes: Robust standard errors clustered at the village level are shown in parentheses.
*, **, *** indicates significance at the 10, 5 and 1 percent level.

Table 125: Impacts on credit sources/composition (likelihood (1-3) and amounts (4-6))

	(1) MFI	(2) Formal	(3) Informal	(4) MFI	(5) Formal	(6) Informal
SL only	0.0142	-0.0172	-0.00860	562.9	361.2	649.6
	(0.0406)	(0.0427)	(0.0211)	(1866.2)	(2536.6)	(1321.2)
SL+A	-0.0212	0.0216	0.000758	-1549.1	24.11	-102.5
	(0.0341)	(0.0417)	(0.0204)	(1570.4)	(2159.6)	(927.1)
Strata FE	Yes	Yes	Yes	Yes	Yes	Yes
F_stat	0.397	0.370	0.672	0.292	0.887	0.549
controlmean	0.337	0.650	0.100	15469.8	31145.0	3276.1
N	4222	4222	4222	4222	4222	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Table 126: Impacts on other GK loans

	(1) Business	(2) Education	(3) Emergency	(4) Consumption
SL only	0.00309	-0.0509	0.0105	0.000328
	(0.0319)	(0.0420)	(0.0614)	(0.0252)
SL+A	0.00433	-0.0379	-0.000667	-0.00307
	(0.0268)	(0.0427)	(0.0563)	(0.0306)
Strata FE	Yes	Yes	Yes	Yes
F_stat	0.972	0.776	0.826	0.910
controlmean	0.815	0.467	0.390	0.101
N	4222	4222	4222	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Table 127: Impacts on other MF loans (amount)

	(1) Business	(2) Education	(3) Emergency	(4) Consumption
SL only	1342.4	-822.2	98.41	7.906
	(1883.9)	(582.9)	(152.5)	(103.8)
SL+A	790.3	-409.4	-26.46	6.844
	(1500.6)	(619.5)	(135.7)	(123.6)
Strata FE	Yes	Yes	Yes	Yes
F_stat	0.774	0.524	0.361	0.993
controlmean	33294.7	5910.5	702.1	360.5
N	4222	4222	4222	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Table 128: Impacts on reported repayment difficulties

	(1) Any	(2) Productive	(3) Consumption	(4) Education	(5) Sanitation	(6) Nr
main						
SL only	-0.00897	-0.00637	-0.0102	-0.00427		-0.195
	(0.0240)	(0.0201)	(0.0170)	(0.0135)		(0.648)
SL+A	-0.0373*	-0.0320*	-0.0272*	-0.0180	0.00567	-1.182*
	(0.0208)	(0.0164)	(0.0155)	(0.0124)	(0.00769)	(0.622)
Strata FE	Yes	Yes	Yes	Yes	Yes	Yes
F_stat	0.171	0.134	0.269	0.262		
controlmean	0.0856	0.0671	0.0541	0.0397		
N	3588	3588	3588	3588	2244	3588

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Financial well-being

Table 129: Impacts on whether repayment difficulties did not lead to default

	(1) Uncond.	(2) Cond. on difficulties
SL only	0.000385	-0.0128
	(0.0112)	(0.0782)
SL+A	-0.0162*	-0.102
	(0.00881)	(0.0821)
Strata FE	Yes	Yes
F_stat	0.0872	0.334
controlmean	0.0274	0.320
N	3588	263

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Table 130: Impacts on loan taken before/in or before 2016 still outstanding

	(1) Before 2016	(2) in or before 2016
SL only	0.0548**	0.0307
	(0.0211)	(0.0355)
SL+A	0.0610***	0.0389
	(0.0216)	(0.0338)
Strata FE	Yes	Yes
F_stat	0.811	0.834
controlmean	0.143	0.424
N	4222	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Other investments

Business investment and profits

Table 131: Likelihood large investment made, likelihood MF loan used for investment

	(1) Large investment	(2) MFI loan	(3) MFI loan cond.
SL only	-0.0337	-0.0281	-0.0910
	(0.0255)	(0.0184)	(0.0814)
SL+A	-0.00892	-0.00267	-0.0180
	(0.0269)	(0.0204)	(0.0894)
Strata FE	Yes	Yes	Yes
F_stat	0.359	0.210	0.381
controlmean	0.161	0.101	0.598
N	4222	4222	482

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Column 3 shows impact estimates on having used an MFI loan for business investment, conditional on having made an investment.

Table 132: Likelihood large investment made, likelihood MF loan used for investment

	(1) HH owns a business	(2) Business closed	(3) Agr. business	(4) Own agr. land
SL only	-0.0438	-0.00241	-0.0137	-0.0130
	(0.0488)	(0.00700)	(0.0390)	(0.0308)
SL+A	0.0287	-0.00732	0.0563	0.0564*
	(0.0518)	(0.00560)	(0.0428)	(0.0316)
Strata FE	Yes	Yes	Yes	Yes
F_stat	0.175	0.473	0.125	0.0596
controlmean	0.450	0.0282	0.237	0.333
N	4222	4222	4222	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** . indicates significance at the 10, 5 and 1 percent level

Table 133: Staff, Revenues, Profits, Expenditures

	(1) HH staff	(2) Non HH staff	(3) Profits	(4) Revenues	(5) Expenditures
SL only	-0.113	-0.0352	-2004.5	-5744.2	153.7
	(0.101)	(0.183)	(4620.0)	(5128.2)	(3363.9)
SL+A	0.0370	0.192	6500.9	3503.1	-2093.6
	(0.110)	(0.232)	(5562.2)	(6638.4)	(2285.1)
Strata FE	Yes	Yes	Yes	Yes	Yes
F_stat	0.192	0.262	0.0886	0.120	0.488
controlmean	0.850	0.709	9631.1	26461.8	15800.7
N	4222	4222	4222	4222	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Consumption

Table 134: Impacts on (log) consumption expenditures

	(1) Total exp.	(2) Food exp.	(3) Non-food exp.
SL only	-0.0179	0.0103	-0.0607
	(0.0630)	(0.0384)	(0.0904)
SL+A	0.0458	0.0284	0.0188
	(0.0661)	(0.0398)	(0.0995)
Strata FE	Yes	Yes	Yes
F_stat	0.281	0.648	0.361
controlmean	7.265	6.595	6.436
N	4222	4222	4093

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Sanitation beliefs

Table 135: Impacts on toilet expected costs (Logs)

	(1) Toilet 1	(2) Toilet 2	(3) Toilet3
SL only	0.0561	0.00633	0.0263
	(0.0458)	(0.0338)	(0.0286)
SL+A	-0.0309	0.0194	0.0328
	(0.0416)	(0.0401)	(0.0297)
Strata FE	Yes	Yes	Yes
F_stat	0.0552	0.722	0.821
controlmean	8.750	9.816	10.45
N	4201	4198	4202

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Perceived Costs of Sanitation

Non-Monetary Costs

Table 136: Impacts on differences between expected costs and median GP costs (Logs)

	(1)	(2)	(3)
	Toilet 2	Toilet3	Average pit
SL only	-0.117*	-0.0972*	-0.103*
	(0.0617)	(0.0531)	(0.0550)
SL+A	-0.0602	-0.0467	-0.0509
	(0.0617)	(0.0508)	(0.0534)
Strata FE	Yes	Yes	Yes
F_stat	0.430	0.425	0.422
controlmean	0.0287	0.666	0.406
N	4198	4202	4198

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level

Table 137: Differences between average perceived costs and average mason costs (Logs)

	(1)	(2)
	Toilet 2	Toilet3
SL only	-0.0921	0.000414
	(0.0988)	(0.0876)
SL+A	-0.0804	0.0121
	(0.124)	(0.0924)
Strata FE	Yes	Yes
F_stat	0.922	0.903
controlmean	-0.274	-0.147
N	4198	4202

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level

Table 138: Impacts on Range of Expected Costs (Logs)

	(1)	(2)	(3)
	Toilet 1	Toilet 2	Toilet3
SL only	0.0299	0.0474	0.0330
	(0.0445)	(0.0450)	(0.0436)
SL+A	-0.00647	0.0401	0.0251
	(0.0399)	(0.0448)	(0.0421)
Strata FE	Yes	Yes	Yes
F_stat	0.388	0.868	0.855
controlmean	7.423	8.272	8.757
N	4201	4197	4202

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Table 139: Impacts on toilet expected duration (Logs)

	(1)	(2)	(3)
	Toilet 1	Toilet 2	Toilet3
SL only	0.00427	-0.00697	-0.0140
	(0.0332)	(0.0570)	(0.0573)
SL+A	-0.0465	0.0344	0.0336
	(0.0306)	(0.0690)	(0.0725)
Strata FE	Yes	Yes	Yes
F_stat	0.121	0.501	0.450
controlmean	1.678	2.671	3.213
N	4202	4200	4201

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Household size

Table 140: Differences between average perceived duration and average mason duration (Logs)

	(1)	(2)
	Toilet 2	Toilet3
SL only	-0.0786	-0.113
	(0.0971)	(0.119)
SL+A	0.0548	-0.0619
	(0.142)	(0.144)
Strata FE	Yes	Yes
F_stat	0.282	0.693
controlmean	-0.600	-0.445
N	4200	4201

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Household size

Table 141: Impacts on Range of Expected Durations (Logs)

	(1)	(2)	(3)
	Toilet 1	Toilet 2	Toilet3
SL only	0.0304	0.0472	0.0330
	(0.0446)	(0.0450)	(0.0437)
SL+A	-0.00633	0.0400	0.0251
	(0.0400)	(0.0448)	(0.0421)
Strata FE	Yes	Yes	Yes
F_stat	0.383	0.871	0.856
controlmean	7.423	8.272	8.757
N	4201	4197	4202

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Covariates: Household size

Perceived Benefits of Sanitation

Table 142: Impacts on costs - picture A only

	(1) Component 1	(2) Component 2
SL only	-0.0286	-0.00238
	(0.135)	(0.0698)
SL+A	-0.0832	0.00157
	(0.136)	(0.0727)
Strata FE	Yes	Yes
F_stat	0.715	0.952
controlmean	6.872	-0.491
N	4056	4056

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Table 143: Impacts on expected health expenditure after toilet construction

	(1) Lower exp.	(2) Log(Expect. Expend.)
SL only	-0.0138	-0.0229
	(0.0298)	(0.0347)
SL+A	-0.00283	-0.00288
	(0.0275)	(0.0329)
Strata FE	Yes	Yes
F_stat	0.685	0.505
controlmean	0.760	7.571
N	4056	3950

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Table 144: Impacts on benefits - picture A only

	(1) Component 1
SL only	0.0543
	(0.0625)
SL+A	-0.0198
	(0.0639)
Strata FE	Yes
F_stat	0.258
controlmean	10.88
N	4056

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Heterogeneity in the impacts

Toilet uptake status at baseline

Table 145: Impacts on loan uptake, toilet uptake and usage - toilet ownership at baseline

	(1)	(2)	(3)	(4)
	San. loan uptake	Own toilet	Toilet in use	All OD
SL only - toilet at BL	0.175***	-0.0109	0.0153	-0.0375*
	(0.0443)	(0.0179)	(0.0235)	(0.0206)
SL only - no toilet at BL	0.184***	0.127***	0.130***	-0.138***
	(0.0367)	(0.0377)	(0.0340)	(0.0343)
SL + A - toilet at BL	0.243***	0.00278	0.00808	-0.0227
	(0.0374)	(0.0172)	(0.0227)	(0.0210)
SL + A - no toilet at BL	0.205***	0.0574	0.0349	-0.0348
	(0.0301)	(0.0392)	(0.0340)	(0.0355)
HH owns a toilet at BL	-0.00964	0.725***	0.737***	-0.710***
	(0.0101)	(0.0304)	(0.0287)	(0.0270)
Strata FE	Yes	Yes	Yes	Yes
F_SL_only	0.795	0.00174	0.00728	0.0119
F_SL_A	0.200	0.232	0.512	0.763
controlmean_BL	0.0100	1	0.945	0.0675
controlmean_noBL	0.0142	0.268	0.203	0.782
N	4222	4222	4222	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Table 146: Impacts on OD practice - toilet ownership at baseline

	(1)	(2)	(3)	(4)	(5)
	Female > 16	Male > 16	Girls 6-15	Boys 6-15	Kids 3-6
SL only - toilet at BL	-0.0270	-0.0405	-0.0324	-0.0540	-0.0177
	(0.0320)	(0.0331)	(0.0434)	(0.0472)	(0.0118)
SL only - no toilet at BL	-0.128**	-0.155**	-0.159***	-0.119***	-0.0425**
	(0.0585)	(0.0603)	(0.0426)	(0.0431)	(0.0191)
SL + A - toilet at BL	0.00599	-0.00493	-0.00796	-0.0655*	-0.0110
	(0.0399)	(0.0392)	(0.0382)	(0.0391)	(0.0129)
SL + A - no toilet at BL	-0.0575	-0.0445	-0.0276	-0.0310	-0.0214
	(0.0570)	(0.0506)	(0.0403)	(0.0431)	(0.0191)
HH owns a toilet at BL	-0.687***	-0.658***	-0.712***	-0.686***	-0.164***
	(0.0449)	(0.0431)	(0.0358)	(0.0470)	(0.0170)
Strata FE	Yes	Yes	Yes	Yes	Yes
F_SL_only	0.115	0.0772	0.0413	0.343	0.240
F_SL_A	0.378	0.528	0.714	0.556	0.645
controlmean_BL	0.0787	0.0787	0.0804	0.110	0.0350
controlmean_noBL	0.762	0.749	0.796	0.795	0.204
N	868	865	1414	1634	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Table 147: Impacts on toilet quality and cleanliness - toilet ownership at baseline

	(1) Underground	(2) Overground 1	(3) Overground 2	(4) Cleanliness 1	(5) Cleanliness 2
SL only - toilet at BL	0.000177	0.0568	0.0903*	-0.0146	0.00130
	(0.0353)	(0.0558)	(0.0500)	(0.0634)	(0.0313)
SL only - no toilet at BL	0.00515	0.0542	0.00779	0.0184	0.0149
	(0.0321)	(0.0613)	(0.0523)	(0.0757)	(0.0374)
SL + A - toilet at BL	-0.0391	0.0486	0.0393	0.0335	-0.0645*
	(0.0356)	(0.0585)	(0.0523)	(0.0642)	(0.0356)
SL + A - no toilet at BL	-0.00444	0.00518	0.0188	-0.00342	0.00428
	(0.0316)	(0.0575)	(0.0492)	(0.0669)	(0.0353)
HH owns a toilet at BL	0.0147	0.00886	-0.0548	0.0474	0.0270
	(0.0325)	(0.0569)	(0.0488)	(0.0590)	(0.0316)
Strata FE	Yes	Yes	Yes	Yes	Yes
F_SL_only	0.910	0.973	0.231	0.709	0.764
F_SL_A	0.464	0.543	0.760	0.603	0.147
controlmean_BL	1.184	2.465	0.273	1.368	1.300
controlmean_noBL	1.168	2.461	0.338	1.323	1.270
N	1926	1926	1926	1926	1926

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Female headed households

Table 148: Impacts on loan uptake, toilet uptake and usage - Female headed households

	(1) San. loan uptake	(2) Own toilet	(3) Toilet in use	(4) All OD
SL only - female headed households	0.189***	0.140**	0.148**	-0.130*
	(0.0525)	(0.0682)	(0.0670)	(0.0693)
SL only - male headed households	0.180***	0.107***	0.118***	-0.131***
	(0.0354)	(0.0362)	(0.0354)	(0.0356)
SL + A - female headed households	0.223***	0.144**	0.153**	-0.154**
	(0.0584)	(0.0700)	(0.0680)	(0.0700)
SL only - female headed households	0.214***	0.0617	0.0460	-0.0490
	(0.0294)	(0.0412)	(0.0420)	(0.0431)
HH head is female	-0.0296**	-0.0972**	-0.0736*	0.0840**
	(0.0147)	(0.0418)	(0.0422)	(0.0418)
Strata FE	Yes	Yes	Yes	Yes
F_SL_only	0.805	0.590	0.635	0.992
F_SL_A	0.866	0.209	0.112	0.124
controlmean_female	0	0.360	0.311	0.689
controlmean_male	0.0146	0.462	0.397	0.593
N	4222	4222	4222	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

BPL households

Table 149: Impacts on OD practice - Female headed households

	(1) Female > 16	(2) Male > 16	(3) Girls 6-15	(4) Boys 6-15	(5) Kids 3-6
SL only - female headed households	0.00649	-0.190	-0.182	-0.139	-0.0600
	(0.132)	(0.399)	(0.123)	(0.111)	(0.0511)
SL only - male headed households	-0.132***	-0.119**	-0.148***	-0.128***	-0.0380**
	(0.0494)	(0.0493)	(0.0442)	(0.0459)	(0.0164)
SL + A - female headed households	-0.0333	-0.378*	-0.180	-0.0893	-0.0818*
	(0.136)	(0.222)	(0.133)	(0.122)	(0.0429)
SL only - female headed households	-0.0622	0.00894	-0.0502	-0.0814	-0.0186
	(0.0528)	(0.0541)	(0.0488)	(0.0542)	(0.0171)
HH head is female	0.0297	0.163	0.0759	0.0440	0.0470
	(0.0820)	(0.161)	(0.0813)	(0.0825)	(0.0369)
Strata FE	Yes	Yes	Yes	Yes	Yes
F_SL_only	0.277	0.860	0.778	0.927	0.676
F_SL_A	0.823	0.0978	0.357	0.948	0.187
controlmean_female	0.590	0.667	0.735	0.689	0.207
controlmean_male	0.564	0.539	0.637	0.624	0.156
N	868	865	1414	1634	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Table 150: Impacts on toilet quality and cleanliness - Female headed households

	(1) Underground	(2) Overground 1	(3) Overground 2	(4) Cleanliness 1	(5) Cleanliness 2
SL only - female headed households	-0.0146	0.0729	0.288**	0.0742	-0.0276
	(0.0796)	(0.106)	(0.119)	(0.136)	(0.0812)
SL only - male headed households	0.00308	0.0543	0.0350	-0.00870	0.00907
	(0.0283)	(0.0451)	(0.0382)	(0.0554)	(0.0280)
SL + A - female headed households	0.0182	0.0101	0.173*	-0.000307	-0.00251
	(0.0776)	(0.0924)	(0.0906)	(0.139)	(0.0729)
SL only - female headed households	-0.0295	0.0331	0.0169	0.0220	-0.0405
	(0.0274)	(0.0483)	(0.0409)	(0.0594)	(0.0296)
HH head is female	0.0206	0.0540	-0.0677	-0.0661	0.0449
	(0.0686)	(0.0814)	(0.0604)	(0.117)	(0.0679)
Strata FE	Yes	Yes	Yes	Yes	Yes
F_SL_only	0.839	0.866	0.0317	0.556	0.679
F_SL_A	0.580	0.813	0.0956	0.881	0.642
controlmean_female	1.194	2.523	0.250	1.299	1.322
controlmean_male	1.176	2.458	0.304	1.354	1.284
N	1926	1926	1926	1926	1926

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Table 151: Impacts on loan uptake, toilet uptake and usage - BPL households

	(1) San. loan uptake	(2) Own toilet	(3) Toilet in use	(4) All OD
SL only - BPL households	0.180***	0.103***	0.108***	-0.124***
	(0.0364)	(0.0388)	(0.0384)	(0.0393)
SL only - no BPL households	0.183***	0.122***	0.141***	-0.143***
	(0.0398)	(0.0403)	(0.0395)	(0.0393)
SL + A - BPL households	0.220***	0.0707*	0.0552	-0.0693
	(0.0295)	(0.0421)	(0.0433)	(0.0445)
SL + A - no BPL households	0.206***	0.0697	0.0582	-0.0440
	(0.0329)	(0.0464)	(0.0472)	(0.0476)
HH owns BPL card	0.00140	0.00520	0.00667	0.00725
	(0.00783)	(0.0202)	(0.0232)	(0.0221)
Strata FE	Yes	Yes	Yes	Yes
F_SL_only	0.902	0.561	0.353	0.598
F_SL_A	0.455	0.976	0.942	0.522
controlmean_bpl	0.0127	0.454	0.393	0.604
controlmean_nobpl	0.0137	0.447	0.382	0.602
N	4222	4222	4222	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Table 152: Impacts on OD practice - BPL households

	(1) Female > 16	(2) Male > 16	(3) Girls 6-15	(4) Boys 6-15	(5) Kids 3-6
SL only - BPL households	-0.110*	-0.0650	-0.0922*	-0.131***	-0.0345*
	(0.0610)	(0.0527)	(0.0503)	(0.0486)	(0.0198)
SL only - no BPL households	-0.126*	-0.212***	-0.231***	-0.126**	-0.0505**
	(0.0686)	(0.0727)	(0.0587)	(0.0525)	(0.0202)
SL + A - BPL households	-0.0406	0.0525	-0.0547	-0.108*	-0.0123
	(0.0603)	(0.0630)	(0.0519)	(0.0612)	(0.0196)
SL + A - no BPL households	-0.0840	-0.0859	-0.0648	-0.0466	-0.0425*
	(0.0811)	(0.0669)	(0.0596)	(0.0585)	(0.0227)
HH owns BPL card	-0.0406	-0.107*	-0.0560	0.0295	-0.0341*
	(0.0612)	(0.0553)	(0.0371)	(0.0304)	(0.0178)
Strata FE	Yes	Yes	Yes	Yes	Yes
F_SL_only	0.851	0.0631	0.0300	0.925	0.522
F_SL_A	0.630	0.0845	0.871	0.328	0.288
controlmean_bpl	0.546	0.494	0.619	0.641	0.146
controlmean_nobpl	0.597	0.614	0.677	0.614	0.183
N	868	865	1414	1634	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

SC/ST/OBC versus general caste

Table 153: Impacts on toilet quality and cleanliness - BPL households

	(1) Underground	(2) Overground 1	(3) Overground 2	(4) Cleanliness 1	(5) Cleanliness 2
SL only - BPL households	0.0276	0.103*	0.0180	0.0604	0.0287
	(0.0338)	(0.0535)	(0.0505)	(0.0691)	(0.0341)
SL only - no BPL households	-0.0332	-0.00483	0.105*	-0.0780	-0.0261
	(0.0393)	(0.0594)	(0.0589)	(0.0759)	(0.0390)
SL + A - BPL households	-0.0310	0.00426	0.00923	-0.0437	-0.0268
	(0.0297)	(0.0579)	(0.0521)	(0.0670)	(0.0339)
SL + A - no BPL households	-0.0122	0.0751	0.0589	0.122	-0.0482
	(0.0397)	(0.0615)	(0.0465)	(0.0862)	(0.0422)
HH owns BPL card	-0.0211	0.0427	0.0672	0.0686	-0.0473
	(0.0354)	(0.0501)	(0.0529)	(0.0689)	(0.0363)
Strata FE	Yes	Yes	Yes	Yes	Yes
F_SL_only	0.237	0.140	0.267	0.162	0.286
F_SL_A	0.690	0.353	0.424	0.115	0.677
controlmean_bpl	1.173	2.481	0.320	1.382	1.274
controlmean_nobpl	1.185	2.437	0.269	1.302	1.307
N	1926	1926	1926	1926	1926

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Table 154: Impacts on loan uptake, toilet uptake and usage - Caste Household Head

	(1) San. loan uptake	(2) Own toilet	(3) Toilet in use	(4) All OD
SL only - general castes	0.267***	0.135**	0.144***	-0.155***
	(0.0540)	(0.0528)	(0.0497)	(0.0479)
SL only - other castes	0.152***	0.0979**	0.106***	-0.116***
	(0.0348)	(0.0381)	(0.0379)	(0.0384)
SL + A - general castes	0.283***	0.140***	0.112**	-0.117**
	(0.0422)	(0.0507)	(0.0535)	(0.0507)
SL + A - other castes	0.193***	0.0407	0.0292	-0.0311
	(0.0299)	(0.0412)	(0.0406)	(0.0422)
General caste	-0.0597***	0.0452	0.0859**	-0.0888**
	(0.0178)	(0.0343)	(0.0362)	(0.0344)
Strata FE	Yes	Yes	Yes	Yes
F_SL_only	0.0155	0.487	0.492	0.461
F_SL_A	0.0298	0.0522	0.124	0.0915
controlmean_gen	0.00519	0.512	0.470	0.519
controlmean_oth	0.0157	0.432	0.363	0.630
N	4222	4222	4222	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Table 155: Impacts on OD practice - Caste Household Head

	(1) Female > 16	(2) Male > 16	(3) Girls 6-15	(4) Boys 6-15	(5) Kids 3-6
SL only - general castes	-0.0353	-0.0535	-0.128**	-0.203***	-0.0410
	(0.0857)	(0.0853)	(0.0629)	(0.0664)	(0.0298)
SL only - other castes	-0.130**	-0.138***	-0.149***	-0.0927**	-0.0395**
	(0.0536)	(0.0521)	(0.0525)	(0.0448)	(0.0182)
SL + A - general castes	0.00774	-0.0235	-0.0949	-0.190**	-0.0401
	(0.0983)	(0.100)	(0.0603)	(0.0776)	(0.0310)
SL + A - other castes	-0.0713	0.00983	-0.0396	-0.0278	-0.0182
	(0.0532)	(0.0501)	(0.0525)	(0.0509)	(0.0168)
General caste	-0.225***	-0.181***	-0.128**	-0.0579	-0.0128
	(0.0644)	(0.0641)	(0.0547)	(0.0405)	(0.0295)
Strata FE	Yes	Yes	Yes	Yes	Yes
F_SL_only	0.297	0.364	0.787	0.133	0.964
F_SL_A	0.419	0.735	0.451	0.0570	0.524
controlmean_gen	0.368	0.382	0.552	0.582	0.151
controlmean_oth	0.623	0.591	0.674	0.644	0.165
N	868	865	1414	1634	4222

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Table 156: Impacts on toilet quality and cleanliness - Caste Household Head

	(1) Underground	(2) Overground 1	(3) Overground 2	(4) Cleanliness 1	(5) Cleanliness 2
SL only - general castes	-0.0320	-0.0186	0.0119	-0.0990	-0.0173
	(0.0346)	(0.0659)	(0.0774)	(0.0840)	(0.0457)
SL only - other castes	0.0122	0.0816*	0.0684*	0.0332	0.0123
	(0.0316)	(0.0458)	(0.0382)	(0.0603)	(0.0278)
SL + A - general castes	-0.0577**	-0.0457	-0.0633	-0.170**	-0.0353
	(0.0258)	(0.0589)	(0.0651)	(0.0774)	(0.0416)
SL + A - other castes	-0.0150	0.0598	0.0680	0.0976	-0.0421
	(0.0329)	(0.0533)	(0.0443)	(0.0630)	(0.0308)
General caste	0.0706**	0.115**	0.0998*	0.177***	0.0562
	(0.0290)	(0.0487)	(0.0533)	(0.0665)	(0.0385)
Strata FE	Yes	Yes	Yes	Yes	Yes
F_SL_only	0.305	0.150	0.485	0.160	0.539
F_SL_A	0.286	0.119	0.0754	0.00202	0.886
controlmean_gen	1.234	2.529	0.334	1.473	1.348
controlmean_oth	1.156	2.438	0.286	1.302	1.264
N	1926	1926	1926	1926	1926

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Impacts on non-eligible households

Table 157: Awareness of sanitation activities in community - non clients

	(1) Any	(2) Street play	(3) Flyers	(4) Wall painting	(5) GP Info	(6) Participation
SL only	0.00269	0.00879	0.0137	-0.000133	0.00411	-0.0250
	(0.0610)	(0.0446)	(0.0317)	(0.0531)	(0.0550)	(0.0558)
SL+A	-0.0369	-0.0227	0.0435	0.103*	-0.00151	-0.0622
	(0.0562)	(0.0460)	(0.0370)	(0.0539)	(0.0594)	(0.0508)
Strata FE	Yes	Yes	Yes	Yes	Yes	Yes
F_stat	0.447	0.472	0.471	0.0445	0.919	0.469
control_mean	0.706	0.241	0.0875	0.302	0.277	0.318
N	1755	1755	1755	1755	1755	1743

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Variable Wall painting includes reports of wall banners; Variables in columns 2-5 are set to zero if the respondent reported not being aware of any sanitation activities.

Table 158: Impacts on toilet uptake - non clients

	(1) Own (respondent)	(2) Own (interviewer observation)
SL only	0.0116	0.0181
	(0.0412)	(0.0448)
SL+A	0.0249	0.0218
	(0.0410)	(0.0445)
Strata FE	Yes	Yes
F_stat	0.750	0.933
control_mean	0.634	0.601
N	1755	1755

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Table 159: Impacts on toilet usage and open defecation - non clients

	(1) Toilet in use	(2) All OD	(3) Some OD
SL only	0.0563	-0.0484	-0.0471
	(0.0430)	(0.0440)	(0.0445)
SL+A	0.0431	-0.0130	-0.0185
	(0.0437)	(0.0447)	(0.0450)
Strata FE	Yes	Yes	Yes
F_stat	0.760	0.433	0.518
control_mean	0.546	0.419	0.452
N	1755	1755	1755

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Table 160: Impacts on open defecation practice: by age and by gender

	(1) Female > 16	(2) Male > 16	(3) Girls 6-15	(4) Boys 6-15
SL only	-0.00703	-0.0297	0.00606	-0.0608
	(0.0575)	(0.0508)	(0.0585)	(0.0603)
SL+A	0.0372	0.0257	0.00985	-0.0573
	(0.0552)	(0.0528)	(0.0593)	(0.0563)
Strata FE	Yes	Yes	Yes	Yes
F_stat	0.441	0.309	0.951	0.955
controlmean	0.383	0.333	0.408	0.453
N	628	667	554	563

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Table 161: Impacts on toilet quality - non clients

	(1) Underground	(2) Overground 1	(3) Overground 2
SL only	-0.00963	-0.0464	0.00160
	(0.0282)	(0.0553)	(0.0584)
SL+A	-0.0269	0.0526	0.0792
	(0.0261)	(0.0460)	(0.0509)
Strata FE	Yes	Yes	Yes
F_stat	0.583	0.0701	0.155
controlmean	1.370	2.689	-0.504
N	1032	1032	1032

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Table 162: Impacts on toilet cleanliness - non clients

	(1) Cleanliness1	(2) Cleanliness 2
SL only	-0.0300	-0.0206
	(0.0541)	(0.0431)
SL+A	-0.0302	0.000667
	(0.0511)	(0.0414)
Strata FE	Yes	Yes
F_stat	0.998	0.613
controlmean	2.175	-0.536
N	1032	1032

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

Table 163: Impacts on water and soap availability - non clients

	(1) Water	(2) Soap
SL only	0.00752	-0.0282
	(0.0239)	(0.0226)
SL+A	0.0176	-0.00589
	(0.0251)	(0.0196)
Strata FE	Yes	Yes
F_stat	0.560	0.323
controlmean	0.944	0.952
N	1032	1032

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level.

F. Interaction with SBM(G)

Table 164: Impacts on toilet uptake by SBM eligibility status

	(1) All	(2) BPL	(3) APL	(4) Eligible APL	(5) Other APL
SL only	0.126***	0.134***	0.0878*	0.0467	0.137**
	(0.0378)	(0.0421)	(0.0499)	(0.0645)	(0.0589)
SL+A	0.0581	0.0544	0.0314	0.0323	0.0437
	(0.0397)	(0.0395)	(0.0578)	(0.0766)	(0.0598)
Strata FE	Yes	Yes	Yes	Yes	Yes
F_stat	0.0822	0.0605	0.255	0.836	0.123
controlmean	0.268	0.271	0.271	0.283	0.260
N	3076	1852	774	435	339

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. Regression in Columns 2 controls for whether or not BPL status was confirmed by presentation of BPL card. Regression in Column 3 and 5 controls for whether or not APL status was confirmed by presentation of APL card.

References

[1] Thomas Clasen, Sophie Boisson, Parimita Routray, Belen Torondel, Melissa Bell, Oliver Cumming, Jeroen Ensink, Matthew Freeman, Marion Jenkins, Mitsunori Odagiri, et al. Effectiveness of a rural sanitation programme on diarrhoea, soil-transmitted helminth infection, and child malnutrition in odisha, india: a cluster-randomised trial. *The Lancet Global Health*, 2014.

Table 165: Impacts on SBM subsidies

	(1) Applied for subsidy	(2) Received subsidy	(3) Subsidy amount received
SL only	-0.0370	0.0445	1001.0*
	(0.0355)	(0.0516)	(564.1)
SL+A	-0.0487	0.00349	360.1
	(0.0375)	(0.0522)	(496.3)
Strata FE	Yes	Yes	Yes
F_stat	0.769	0.442	0.314
controlmean	0.499	0.536	12249.7
N	2136	1003	541

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. In Column (3) we replace 26 outlier observations > Rs.45,000 of subsidy amount to sample median (5 percent of sample)

Table 166: Impacts on SBM subsidies: for households not owning a toilet at baseline

	(1) Applied for subsidy	(2) Received subsidy	(3) Subsidy amount received
SL only	-0.0156	0.0980*	864.3
	(0.0434)	(0.0589)	(566.7)
SL+A	-0.0573	0.00816	687.1
	(0.0439)	(0.0589)	(850.2)
Strata FE	Yes	Yes	Yes
F_stat	0.371	0.161	0.830
controlmean	0.567	0.533	12474.2
N	990	532	286

Notes: Robust standard errors clustered at the village level are shown in parentheses. *, **, *** indicates significance at the 10, 5 and 1 percent level. In Column (3) we replace 26 outlier observations > Rs.45,000 of subsidy amount to sample median (5 percent of sample)

[2] Diane Coffey and Dean Spears. *Where India Goes: Abandoned Toilets, Stunted Development and the Costs of Caste*. Harper Collins, 2017.

[3] AD Dangour, L Watson, O Cumming, S Boisson, Y Che, Y Velleman, et al. The effect of interventions to improve water quality and supply, provide sanitation and promote handwashing with soap on physical growth in children. *Cochrane Syst Rev*, 8:CD009382, 2013.

[4] Paul Gertler, Manisha Shah, Maria Laura Alzua, Lisa Cameron, Sebastian Martinez, and Sumeet Patil. How does health promotion work? evidence from the dirty business of eliminating open defecation. Technical report, National Bureau of Economic Research, 2015.

[5] Raymond Guiteras, James Levinsohn, and Ahmed Mushfiq Mobarak. Encouraging sanitation investment in the developing world: a cluster-randomized trial. *Science*, 348(6237):903–906, 2015.

[6] Jean H Humphrey. Child undernutrition, tropical enteropathy, toilets, and handwashing. *The Lancet*, 374(9694):1032–1035, 2009.

[7] Marion W Jenkins and Beth Scott. Behavioral indicators of household decision-making and demand for sanitation and potential gains from social marketing in ghana. *Social science & medicine*, 64(12):2427–2442, 2007.

[8] Marion W Jenkins, Steven Sugden, et al. Rethinking sanitation: Lessons and innovation for sustainability and success in the new millennium. Technical report, Human Development Report Office (HDRO), United Nations Development Programme (UNDP), 2006.

[9] Daniel E Keniston. Bargaining and welfare: A dynamic structural analysis. *Report, Massachusetts Institute of Technology*, 2011.

[10] Santosh Kumar and Sebastian Vollmer. Does access to improved sanitation reduce childhood diarrhoea in rural India? *Health Economics*, 22(4):410–427, 2013.

[11] David McKenzie. Beyond baseline and follow-up: The case for more t in experiments. *Journal of development Economics*, 99(2):210–221, 2012.

[12] Subhrendu K Pattanayak, Jui-Chen Yang, Katherine L Dickinson, Christine Poulos, Sumeet R Patil, Ranjan K Mallick, Jonathan L Blitsteinb, and Purujit Praharajf. Shame or subsidy revisited: social mobilization for sanitation in orissa, india. *Bulletin of the World Health Organization*, 87:580–587, 2009.

[13] Annette Pruess-Uestuen, Robert Bos, Fiona Gore, Jamie Bartram, et al. *Safer water, better health: costs, benefits and sustainability of interventions to protect and promote health*. World Health Organization, 2008.

[14] D. Spears and S. Lamba. Effects of early-life exposure to rural sanitation on childhood cognitive skills: Evidence from india's total sanitation campaign. *Journal of Human Resources*, 2016.

[15] Dean Spears. Effects of rural sanitation on infant mortality and human capital: Evidence from india's total sanitation campaign, 2012. Princeton.

[16] Dean Spears. How much international variation in child height can sanitation explain? 2013.

[17] World Health Organization WHO. Poor sanitation threatens public health, March 2008.

[18] WHO-Unicef. *Progress on drinking water, sanitation and hygiene: 2017 update and SDG baselines*. World Health Organization, 2017.