Social and Financial Incentives for Overcoming a Collective Action Problem

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Abstract

Addressing public health externalities often requires community-level collective action. Due to social norms, each person's sanitation investment decisions may depend on the decisions of neighbors. We report on a cluster randomized controlled trial conducted with 19,000 households in rural Bangladesh where we grouped neighboring households and introduced (either financial or social recognition) rewards with a joint liability component for the group, or asked each group member to make a private or public pledge to maintain a hygienic latrine. The group financial reward has the strongest impact in the short term (3 months), inducing a 7.5-12.5 percentage point increase in hygienic latrine ownership, but this effect dissipates in the medium term (15 months). In contrast, the public commitment induced a 4.2-6.3 percentage point increase in hygienic latrine ownership in the short term, but this effect persists in the medium term. Non-financial social recognition or a private pledge has no detectable effect on sanitation investments.

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1 Introduction

One billion people, or about 15% of the world's population, currently practice open defecation (OD) in spite of the existence of simple, affordable pour flush latrines that effectively confine fecal matter in sealed pits (WHO and UNICEF 2017). Open defecation spreads bacterial, viral, and parasitic infections, and has been identified as a leading cause of child stunting (Spears 2013; Chambers and Von Medeazza 2013; Augsburg and Rodríguez-Lesmes 2018) and infant death (Hathi et al. 2017). Diarrheal diseases kill nearly one million people per year (Prüss-Ustün et al. 2014), and cause nearly 20% of deaths of children under five in low income countries (Mara et al. 2010).

Since these pathogens are communicable, a large portion of the health gains from a household's use of a hygienic latrine likely accrue to other households in the community (Fuller et al. 2016; Andrés et al. 2017). This creates a divergence between the incidence of benefits and costs, and with it, a classic collective action problem – while it may be in all households' interests collectively for all households to use and maintain hygienic latrines, any individual household may not find these behaviors privately optimal. With strong institutions, regulation mandating adoption and enforcing use can solve this problem. However, in the absence of such institutions, other tools are required.

In this paper, we test several such tools designed to overcome this collective action problem in rural Bangladesh, a setting where social and financial incentives to encourage sanitation adoption and maintenance are a promising alternative to command-and-control approaches. The interventions were designed to help groups of households overcome collective action failures impeding investment and maintenance of hygienic latrines. All participating households are grouped with 15-20 neighbors who jointly participate in monthly meetings for 3 months with a health worker from a well-known NGO to discuss sanitation, OD and disease risk. On top of this common treatment, we randomize four additional treatments and study their effects.

The first treatment, a group "monetary reward", is a slight variation on the standard public finance policy prescription: a subsidy for a well-maintained hygienic latrine. The non-standard component is an element of joint liability: households receive the reward only if both that household's latrine is hygienic *and* a certain share of all households in the group maintain a hygienic latrine. Given the financial sustainability concerns about such payments, we substitute a recognition certificate from the local government instead of money as our second treatment, and call this a "recognition reward". The same element of joint group liability is also present for this treatment, and only the form of the reward is changed. This treatment is more akin to certifications like open-defection-free (ODF) status sometimes conferred by governments to encourage investments in improved sanitation.

Our third treatment, "public commitment," explores whether a simple verbal coordination device between neighbors can sustain a cooperative equilibrium (Schelling 1960). In public commitment groups, all households in the group are asked to make a joint public (but non-binding) commitment in front of each other, stating that they will try to address the OD issue in their neighborhood by using and maintaining hygienic latrines. This public commitment could be operating through two mechanisms. First, the act of making a commitment is an "implementation intention" that can itself spur action (Gollwitzer and Brandstätter 1997). Second, the fact that this commitment is made in public in front of and with others who are making the same commitment simultaneously can help coordinate action. Our fourth treatment, "private commitment," was designed to separate these two mechanisms. In this arm, all group members are asked to make the same pledge as those in the public commitment arm, but this pledge is made in private only to the NGO health worker, so that it activates the implementation intention without offering the direct coordination device for neighbors.

These interventions are implemented between November 2013 and February 2014, covering 19,345 households in 107 villages in rural Tanore, Bangladesh. Note that while our interventions are not household-specific and instead focused on groups and joint liability, the popular

and sensible technology for this context is a *private* household-specific latrine, not a latrine that is shared between unrelated neighbors. We measure short-term (at the time of the assessment for rewards, roughly 5 months after the interventions began) and medium-term (12-15 months after assessment) effects of the treatments on private, household-specific sanitation investments and maintenance. Earlier, between April and June 2012, we had tested a broader set of demand and supply-side interventions to also encourage investment in hygienic latrines in this same location (Guiteras et al. 2015). The group commitments and joint incentives - which are the focus of this study - were implemented around one and a half years after the interventions described in (Guiteras et al. 2015) were completed. We conduct all our analysis controlling for sanitation ownership in June 2013 (which acts as the baseline for this study), which is a full year after the earlier round of interventions were completed, so household exposure to those earlier treatments should not materially affect the comparison between our new treatments reported in this paper.

Another distinguishing characteristic of this study is that while our earlier research primarily focused on the initial sanitation investment decision, we now carefully measure proper use and maintenance beyond the initial adoption. Sustaining intervention effects has been an important challenge for the sanitation sector (Coffey et al. 2014; Orgill-Meyer et al. 2019; Pakhtigian et al. 2021; Deutschmann et al. 2021). Hygienic latrines only produce health benefits if they are consistently used and are kept in good condition so that fecal pathogens are safely isolated from the environment. This requires each household to incur time and materials costs to keep the latrine clean, conduct maintenance and dispose of waste properly.

We find that group-level monetary reward has the strongest impact in the short term, inducing an 7.5 to 12.5 percentage point (pp) increase in the share of households with hygienic latrines. The public commitment treatment caused a 4.2 to 6.3 pp increase in that same period. Neither the non-monetary reward nor the private commitment treatments had statistically significant impacts. In the medium term, the effect of the monetary reward dissipates,

while the effect of the public commitment treatment persists. We find that in the case of both the monetary reward and public commitment treatments, households tended to meet the short-run assessment criteria for hygienic status through small, relatively inexpensive improvements to or repairs of existing latrines, rather than making large investments in major improvements or on entirely new latrines. In the public commitment group, households tended to maintain these small improvements into the medium-term, while those in the monetary reward group tended to let these improvements depreciate.

Our research adds to a vibrant literature on barriers to sanitation adoption. Much of the earlier work explores various determinants of adoption, such as microfinance loans to overcome credit constraints (BenYishay, Fraker, et al. 2017; Smets et al. 2021), education and motivation to overcome information deficiencies (Pattanayak et al. 2009; Gertler et al. 2015), and targeted subsidies to increase affordability (Guiteras et al. 2015; Cameron et al. 2021). Our distinctive contribution is to design and test a new set of interventions inspired by the observation that sanitation adoption decisions are likely inter-linked across households, because they generate public health externalities and because social norms are important drivers of behavior. Under those conditions, it may be possible to induce sanitation investments and maintenance choices that improve community health using creative social and financial interventions that encourage positive interactions with neighbors.

There has been much academic and policy interest in "community led total sanitation" (CLTS) interventions (Kar and Pasteur 2005; Pattanayak et al. 2009; Pickering et al. 2015), which aim to bring the community together to jointly discuss the public health externality problems. Our social and financial interventions are conceptually linked to CLTS, in that they are designed to make most salient the joint-commitment and public-promise aspects of CLTS. CLTS also often contains a large informational component, but that is not the focus of the randomized treatments we test.

Our experimental design is closely tied to theories of social image and reputational concerns

(Benabou and Tirole 2003; Bénabou and Tirole 2006). If a person's utility depends on others' views about her, then having her make a public commitment gives her an opportunity to signal her type to others, and may also act as a disciplining device to ensure that she follows through on that commitment. Karing (2021) shows that giving parents an ability to signal their child's vaccination status improves adherence to vaccine schedules. In our setting, public commitments may be additionally valuable because reputational concerns persist and can produce long-term behavior change in a way that a short-run monetary incentives cannot. This theory also produces a sharper empirical test, in that if social image is important, we would expect households to invest in latrine features that are more easily observable by neighbors, such as pit covers that sit above ground outside the toilet structure, as opposed to ceramic pans and water seals inside the toilets that are not as publicly visible.

Even absent any public health externality, sanitation investments are thought to be privately beneficial for dense populations like in rural South Asia, the setting of our study (Hathi et al. 2017). As such, our research is also linked to the broader literature on the surprisingly low adoption of efficacious technologies with the potential to address important development challenges, such as drinking water disinfectants (Ashraf et al. 2010), agricultural technologies (Duflo et al. 2011; BenYishay and Mobarak 2019; Udry 2010), nutritional supplements (Maluccio et al. 2009), rainfall insurance (Cole et al. 2014), improved cookstoves (Berkouwer and Dean 2022; Mobarak et al. 2012), and migration (Bryan et al. 2014).

The paper proceeds as follows: Section 2 describes the study setting and the sample; Section 3 describes our interventions and experimental design; Section 4 describes our data; Section 5 presents our estimation equations and results, with reduced-form treatment effects in Section 5.1 and mechanisms in Section 5.2; Section 6 concludes.

2 Setting and Sample

This study was conducted with 19,271 households in 107 villages in 4 unions[1] of Tanore upazila (sub-district) of Rajshahi district, Bangladesh. These villages had been the site of a randomized evaluation of a set of interventions designed to study interdependencies in household investment in hygienic latrines (Guiteras et al. 2015). We refer to this first set of interventions as the "first set of interventions" or the "demand study interventions," and the second set, the focus of this paper, as the "second set of interventions" or the "incentives for use interventions." The study area was chosen in part because of its low level of latrine coverage: at the time of the demand study baseline, 30.8% of households reported a regular level of open defecation among adults, 50.4% reported that they had access to a hygienic latrine and 40.1% owned a hygienic latrine. This first set of interventions was conducted February 2012 – August 2012, with baseline data collected December 2011 – February 2012 and four rounds of followup data collected through April 2012 – June 2013. Guiteras et al. (2015) show that subsidies increase adoption of hygienic latrines, both directly – among households winning a subsidy voucher in a public lottery – and indirectly – the share of subsidy winners was randomized at the community level, and as this "saturation" increased, investment increased among both subsidized and unsubsidized households. The current study was intended to understand how to sustain or increase these gains.

In our 107 study villages, we created 1,236 groups of approximately 14-17 neighboring households, roughly 4-16 groups per village, and the incentives-for-use interventions were conducted at this group level. See Section SM1 of the Online Supplementary Materials for details on the group formation process. While the unit of intervention was the group, randomization was at the village level. All households in the four study unions were included in the group formation process.

[1] Union parishads or unions are the smallest rural administrative and local government units in Bangladesh.

3 Interventions and Experimental Design

In this section, we describe the treatments and the randomization. A timeline for a typical village is provided in Figure 1.

3.1 Common Intervention

All 980 treatment groups (in 84 treatment villages) received a basic intervention consisting of monthly meetings for three consecutive months with a Health Motivator to encourage investment in and maintenance and use of hygienic latrines.[2] Health Motivators, trained by and contracted from our implementation partner VERC, discussed the health risks of open defecation and unhygienic sanitation practices, the collective nature of the problem (i.e., the externality in non-technical terms), the types and costs of hygienic latrines, and the current level and monthly change in the share of households with or advancing towards a hygienic latrine.[3]

In the common as well as in the cross-cutting interventions, the Health Motivator provided both a general, conceptual definition of a hygienic latrine and a specific, technical definition. The conceptual definition emphasized that a hygienic latrine was one that:

1. Limits the spread of diseases caused by feces in the water and keeps the environment pollution free;

[2]Different sources define "hygienic" in different ways, and there are also other labels such as "improved" or "sanitary." Conceptually, a hygienic latrine safely confines feces. For pour-flush latrines (the relevant type in our context), this typically requires slab, a water seal to block flies and other insects, and a sealed pit to store fecal matter for safe disposal (Hanchett et al. 2011). See Section SM2 of the Online Supplementary Materials for illustrations of the key components. Our precise definition of *hygienic* is below. A latrine that does not meet the criteria for hygienic is classified as a *non-hygienic* latrine. Households with a bucket, a "hanging latrine" (a platform over open land or water), or an open (uncovered) pit are classified as having no latrine. The detailed mapping from our survey instrument to these categories is provided in our Supplemental Materials, Section SM3.

[3]The intervention protocol is provided in Section SM4 of the Online Supplementary Materials.

2. Confines feces in an enclosed pit so that they cannot be seen or smelled;

3. Prevents flies or other insects from entering the pit.

The specific, technical definition listed the characteristics based on which a latrine was judged to be hygienic, in particular:

1. There must be a slab and it cannot be broken.

2. There must be a water-seal (locally known as 'gooseneck' or 'siphon') and it cannot be broken.

3. Different latrine components such as rings, delivery pipe, Y-junction (whenever applicable), pit cover (whenever applicable), etc. should be functional and without any leaks.

4. There should not be any feces in or around the latrine.

5. The latrine cannot pollute the environment. In particular, the latrine/delivery pipe can only discharge the waste into a sealed pit and not to the external environment (for example, a stream or just out in the open).

These characteristics of a hygienic latrine were relayed to participants at each of the three group meetings.[4] Participants were made aware of the fact that for latrines to be considered hygienic all the above mentioned requirements had to be met by the specified deadline, approximately four months after the intervention began.

[4]Households were also encouraged to ensure that no gaps existed between different latrines component that could compromise the 'sealed' nature of a pit. For single-pit latrines, this meant that there would not be any gap between the cover of the slab and the top-most ring. For offset latrines (involving multiple pits or a pit that is not situated directly below the latrine) there should not be any gap between the top-most ring and the pit cover. Moreover, although not perfectly observed (and therefore, not a strict requirement of a hygienic latrine) households were encouraged to install an adequate number of rings depending on the depth of the latrine pit.

Health Motivators also emphasized that a latrine's hygienic status was not just determined by the collection of parts, but depended on maintenance, repair and sanitary use. Discussions, both with the group and with individual households, emphasized small improvements or repairs that could be made to achieve hygienic status, and how to maintain hygienic status once it was achieved.

3.2 Reward Treatments

There were two reward treatments, monetary and non-monetary, both of which were conditioned on both the household's own status and the share of households in the group achieving hygienic latrine status. This element of "joint liability" was intended to incentivize households to motivate and assist each other. This feature is reminiscent of Grameen Bank-style "group lending" programs with joint liability, in which an applicant receives a microcredit loan only if her group members repay their loans (Ghatak and Guinnane 1999). While the joint liability can motivate new investments in sanitation, it could also create excessive pressure, and RCTs in the microfinance context find null effects overall (Giné and Karlan 2014).

The monetary reward consisted of a cash payment to the household if, at the end of the intervention period, (a) the household owned a hygienic latrine and (b) the share of households in that group with a hygienic latrine was above a designated threshold. Hygienic was defined as described in Section 3.1 above. The reward was BDT 250 (USD 3.33) in groups that surpassed the lower of the two thresholds and BDT 500 (USD 6.67) in groups that surpassed the higher of the two thresholds.[5] For comparison, the cost of building a single-pit hygienic latrine was approximately BDT 2350 (USD 31.33), while common improvements to existing latrines that would be necessary to reach hygienic status cost substantially less, e.g., a new water seal BDT 65 (USD 0.87), delivery pipe BDT 360 (USD 4.8).

[5]US dollar equivalents at 75 BDT/USD, the approximate market exchange rate at the time.

The non-monetary reward consisted of a certificate of hygiene attainment from the local government, presented to qualifying households in a public ceremony.[6] The non-monetary reward used the same standard for "hygienic" as the monetary reward.

Thresholds were determined based on baseline hygienic latrine ownership by union. In three of the four unions, the lower threshold was set at one-third of households and the upper threshold at two-thirds. In one union with significantly lower hygienic latrine ownership at baseline, the lower and upper threshold were set at one-quarter and one-half, respectively. A lower threshold was set such that even low baseline-ownership groups would feel they could attain something, while high baseline-ownership groups would have something to reach for. We also chose thresholds that were simple and easy to explain at a group meeting: a phrase like "two out of every three households" is easier to understand than a phrase like "sixty-six percent of all households."

The assessment was conducted approximately four months after the intervention began, after three group meetings with the Health Motivator. Health Motivators did not conduct assessments in villages where they had worked. See Section 4.3 for a discussion of the assessment process. The full survey instrument is provided in Section SM5 of the Supplementary Materials. Households knew the deadline for achieving hygienic status, and that the assessment would occur within one-two weeks after the deadline, but did not know the specific day of the assessment.

3.3 Commitment Treatments

There were two commitment treatments, public and private.

In the public commitment arm, during each group meeting, members from all the households

[6]This certificate was printed on thick glossy paper, so it could be displayed on an interior wall. However, no weatherproof frame was provided. As a result, it would be difficult for a household to display the certificate outdoors where it would be publicly visible.

of a group were encouraged to make a public pledge that those who did not yet have hygienic latrines would meet hygienic latrine standards as set by the project. Those with hygienic latrines pledged to help others reach the goal within the time limit set by the project. The script of the pledge, in English translation, was: "I hereby promise before everyone present that I will do my best to set up hygienic latrines or improve existing ones into hygienic latrines for myself and for my neighbors by [end date]." In the public commitment arm, this pledge was repeated at the end of each monthly group meeting.

In the private commitment arm, health motivators visited each household in the group after each group meeting. The member of the household attending the meeting would be encouraged by the Health Motivator to make a commitment before the health motivator that he/she would transform their unhygienic latrines to hygienic ones within the time limit set by the project. The script of the pledge was identical to that in the public commitment arm.

3.4 Experimental Design

The reward and commitment treatments lead to a 3x3 design, plus a pure control group. The design is summarized in Table 1. Although the treatments were implemented at the group level, randomization was conducted at the village level because of the potential for spillovers within village. We allocated approximately 25% of villages to pure control, and then the remaining villages were intended to be allocated equally across the commitment and reward treatments. With 107 villages (84 treatment villages), we did not expect to have adequate power to detect interaction effects. The randomization was stratified by union. Because of a coding error, there is some imbalance in the number of villages per cell. Most significantly, the basic treatment only cell was under-populated (8 villages), so we use Wild bootstrap standard errors for inference in our group-level analyses (MacKinnon and Webb 2017; Roodman et al. 2019). Descriptive statistics and balancing tests for key baseline observables are provided in Table 2.

4 Data

The full timeline of all data-collection activities for a typical village is presented in Figure 1.

4.1 Previous Surveys

As noted above, several rounds of surveys had been conducted for the previous demand study. Specifically, these were: a census, a baseline (conducted on a 50% subsample, stratified by village) and four monitoring rounds focused on latrine improvements and condition. In this study, we primarily use: the census data on landless status, social networks, in particular who households identify as local leaders; the third followup monitoring round, in which we collected location data to assist in creating groups and to construct density measures.

4.2 Baseline Latrine Coverage

A few months before beginning the interventions in this study, we conducted what we will refer to as the "baseline" survey for this study.[7] We collected data from all households on latrine ownership, including detailed information on the condition of each household's latrine. This allowed us to classify each household's latrine as "none," "non-hygienic," or "hygienic." We include hanging latrines (an exposed platform over a marsh or stream) and uncovered pits in the "none" category, since these are effectively the same as open defecation in terms of disease, and cannot possibly be transformed into a hygienic latrine through simple improvements. This provided our baseline measures of our outcome variables. We used these data to determine union-specific thresholds for the reward treatments when designing the interventions.

[7]This was the fourth round of followup data-collection for the project as a whole. We will refer to the baseline survey for the overall project as the "demand study baseline." See Figure 1 for the full project timeline.

4.3 Short-term Outcomes

At the end of the intervention, we collected data from all households on latrine investment, use and maintenance. In reward and recognition groups, these data were collected as part of the reward determination process. These data were collected 1-2 weeks after the program's end date; households knew the general time frame but not the specific date. For budgetary reasons and because Health Motivators already had the training to assess latrine conditions, we used Health Motivators to collect these data, but no Health Motivator collected data in a village where he or she had led an intervention. The Health Motivators that collected data were not informed of the village's treatment status, nor which Health Motivators had led the intervention in that village. Similarly, Health Motivators were not told which of their peers had collected the evaluation data in villages where they had led the intervention. In addition, to understand the mechanisms for the success or failure of the intervention, households were asked whether they received any assistance (financial, labor, advice) from community members, and whether they were pressured or encouraged by others in their group.

The criteria by which a household's latrine was judged "hygienic" for the purpose of the reward are given in Section 3.2. See the Supplementary Materials for precise definitions for coding the outcome variables of interest (Section SM3) and the survey instrument (Section SM5). Data were collected following the same protocol in all villages, regardless of treatment status.

4.4 Medium-term Outcomes

Medium-term outcome data were collected 12-15 months after the assessment (June 2015 – August 2015). This round served as an endline survey for the project as a whole, and so included several lengthy socio-economic and demographic modules. Because of budget

constraints, we conducted this survey with the 50% subsample surveyed at baseline in the demand study (see Sec. 4.1 above). The baseline subsampling was stratified by village, and since the sub-village groups for this study had not been created yet, our endline subsample was unbalanced across groups. To avoid under-sampling groups, we identified any groups with fewer than six households included in the endline sample, determined how many households would be needed to have endline data for six households in the group, and randomly sampled that many additional households in the group. With this "top-up" sample, we conducted a brief endline survey on latrine status only, using the same modules on latrine status, use and maintenance as with those households receiving the full endline survey.

5 Estimation and Results

5.1 Program Effects

To measure reduced-form effects of our treatments, we estimate

$$\begin{aligned} y_{gv} = {} & \beta_1 \text{Incent}_v + \beta_2 \text{Cert}_v + \beta_3 \text{Priv}_v + \beta_4 \text{Publ}_v \\ & + \delta y_{0gv} + \gamma \text{ShareLandless}_{gv} + \beta_0 \text{PureControl}_v + \varphi_u + \varepsilon_{gv} \end{aligned} \tag{1}$$

where y_{gv} is the outcome variable of interest (e.g., share of households owning a hygienic latrine) for group g in village v, Incent_v and Cert_v are indicators for village v's reward treatment assignment (financial incentive and social incentive, respectively), Priv_v and Publ_v are indicators for village v's commitment treatment assignment (private commitment and public commitment, respectively), y_{0gv} is the pre-intervention level of the outcome variable, so estimates with this control are an ANCOVA specification (McKenzie 2012), $\text{ShareLandless}_{gv}$ is the share of landless households in the group, which proxies for the financial resources available to the group as a whole, φ_u is a set of union fixed effects, and ε_{gv} is an error term

which may be correlated at the village level (the level of randomization).[8]

The coefficients β_1 and β_2 represent the effects of the reward treatments, controlling for potential imbalances in the commitment treatment, while coefficients β_3 and β_4 represent the effects of the commitment treatment, controlling for potential imbalances in the reward treatment.[9] The omitted category in our main specifications consists of villages receiving the common, "meetings-only" treatment, but no other treatment (cell A in Table 1), and our estimates should be interpreted as effects relative to this basic, common treatment. We include the pure control villages in the regressions to enhance precision, and the "effect" of being in the pure control group relative to the meetings-only treatment is captured by β_0. In other words, the effect of the meetings-only treatment relative to the pure control group is $-\beta_0$. In the main text, we focus on the effects of the incentive and commitment treatments relative to the common treatment. We present and discuss the largely null effects of the common treatment compared to pure control in Appendix A.

Our main outcome of interest is the share of households in the group household owning a hygienic latrine. As discussed in Sections 3.1 and 4, "hygienic" refers not just to the physical components (especially, water seal and sealed pit), but also the condition of these components

[8]As a robustness check, we add interactions with (de-meaned) values of the control variables. Following Lin (2013) and Gibbons et al. (2019), the level (non-interacted) terms are a more robust estimator of the average treatment effect in the presence of heterogeneity with respect to the control variables. The estimated level effects are similar to those we find in our main specification. See Appendix B for details.

[9]As discussed in Muralidharan et al. (2020), in a factorial (interacted) design, the interpretation of coefficients in this "short" regression depends on priors about interaction effects. In the presence of interactions between treatments, Incent_v, for example, should be interpreted as the average effect of the incentive treatment in a context where some groups are receiving no other treatment, some the public commitment treatment, and some the private commitment treatment.

It is important to note that the "short" regression was our pre-specified analysis. That is, Muralidharan et al. (2020) emphasize the incorrect inference that will result from a two-step analysis that first tests for the presence of interaction effects and then, if significant interaction effects are not detected, proceeds to the short regression. That was not our mode of analysis. Still, in retrospect, given our sample size constraints, it would have been preferable to design the experiment without treatment interactions.

In Section F.1 of the Appendix, we present estimates using only the "single-treatment" villages, i.e., receiving only monetary reward, reward certificate, etc. The pattern of results is generally similar to those of our preferred specification, although the magnitude is somewhat reduced, suggesting the possibility of positive interaction between treatments. Similarly, when we estimate fully interacted factorial models in Section F.2 of the Appendix, we see some evidence of positive interactions, especially in the short term. However, as Muralidharan et al. (2020) point out, these tests have low power, so we view these results only as suggestive.

(e.g., no leaks). Ideally, we would like to estimate effects on actual use and open defecation but these are difficult to measure objectively. Households may overstate the condition of their latrine and understate their rate of open defecation because of social desirability bias, and this is especially likely when a reward or their reputation may be at stake. In contrast, whether a household owns a hygienic latrine and whether that latrine is being kept clean can be assessed in a fairly objective manner. Our evaluation visits were unannounced so households could not meet our criteria by rushing to complete a repair or a major cleaning, although we cannot rule out that news of the assessment team's arrival in the village would spread in time to allow a household to conduct some minor cleaning.

Short-term results

Table 3 reports the short-term effects of the different treatment arms. We estimate equation (1) without controls in column 1, then add union fixed effects, the baseline value of the outcome variable, and the share of households in the group that are landless in columns 2, 3 and 4, respectively. The last of these is our pre-specified preferred model. The unit of observation is the group, and groups are weighted by the number of households in the group, although results are not sensitive to weighting (see Appendix Table B1). In parentheses, we report standard errors robust to clustering at the village level (the level of randomization). In brackets we report 95% confidence intervals from wild cluster bootstrapping for our coefficients of interest (MacKinnon and Webb 2017; Roodman et al. 2019). Estimated coefficients from column 4, with 95% confidence intervals, are plotted in Figure 2. Estimated differences between key pairs of treatments are presented, with p-values, at the bottom of the table.

As shown in Table 3, the monetary reward treatment is most effective at increasing hygienic latrine ownership in the short term. The point estimate ranges from +7.5 to +12.5 percentage points (pp) depending on the specification, relative to an omitted category mean of 45.1%. The public commitment treatment increases ownership by 4.2 to 6.3 pp. The difference between the

monetary reward treatment and the public commitment treatment is 3.3 percentage points in the pre-specified model, significant at the 10% level. The effects of the reward certificate and the private commitment are both economically small and statistically insignificant. Including interactions with the (de-meaned) control variables leaves the results virtually unchanged (Appendix Table B3).

To begin to understand how communities responded to these interventions, we present short-term effects on secondary outcomes in Figure 3.[10] It is possible that the impact of these interventions on the overall health environment could be greater than just the effect on ownership if households allow others to use their hygienic latrine. However, when we use *access* to a hygienic latrine as the outcome variable rather than *ownership*, as in Figure 3a, we see little evidence of this. In Figure 3b, we see that households appear to pay attention to the specific requirement built into our intervention: unlike hygienic latrine ownership, '*any* latrine ownership' (including non-hygienic) is not affected except in the monetary reward treatment, and the effect there is small (+2.8 pp) and only marginally statistically significant ($p < 0.10$).

We prioritize our direct observation of the latrine condition as our preferred outcome rather than self-reported open defecation, because data on these short-term outcomes were collected as part of the end-of-intervention assessment and therefore even more prone to bias than usual. We see little impact on open defecation, as shown in Figure 3d. This implies that the successful interventions appear to be inducing households already using latrines to continue to do so while upgrading their existing latrines, rather than persuading open defecators to build new latrines or use existing latrines.

[10]For full regression results, see Tables C1-C4 in Appendix C. The estimates plotted here correspond to our preferred specification, i.e., column (4) of the regression tables.

Medium-term results

To measure effects in the medium-term, we again estimate equation (1) using endline ownership (12-15 months after the intervention) as the outcome variable. The results are reported in Table 4, with estimated coefficients and 95% confidence intervals from the pre-specified preferred specification (column (4) in the table) plotted in Figure 4. The effect of the monetary reward has faded (+0.9 to +4.7 pp, insignificant at conventional levels across all four specifications), while the effect of the public commitment treatment persists (+5.7 to +7.5 pp, $p < 0.05$ in all specifications). The difference between the monetary reward treatment and the public commitment treatment is just short of statistical significance in our preferred specification (point estimate −4.5 pp, $p = 0.14$). As in the short term, neither the reward certificate nor the private commitment have statistically significant effects. Again, these results are not sensitive to weighting (Appendix Table B2) nor to including interactions with the (de-meaned) control variables (Appendix Table B4). This positive effect of the public commitment treatment is accompanied by a reduction of 0.6 pp reduction in conflicts with neighbors over sanitation issues ($p < 0.05$), relative to a control group mean of 1.1%, indicating that these improvements do not come at a cost of increased community tension.

When we examine medium-term effects on our secondary outcomes of interest,[11] we find that there may be some enhancement of the effect of the public commitment treatment on the community environment beyond ownership, as its effect on access (+7.5 pp, Figure 5a) is slightly greater than the effect on hygienic latrine ownership (+5.7 pp). While this is plausible given that the public commitment treatment placed greater emphasis on collective responsibility than the other treatments, we consider this only suggestive, since the marginal gain in 'access' over 'ownership' is only an extra 2 pp and this difference is not statistically significant. As with the short-term results, the ownership effects are concentrated on 'hygienic latrines' (the target of our intervention design), not 'any latrine' (Figure 5b). Similarly, the

[11] Full regression results reported in Tables C5-C9 of Appendix C.

effects of the interventions on open defecation remain null (Figure 5d).

5.2 Mechanisms

5.2.1 Household investments and behavior

The clear pattern that emerges is that monetary rewards produce the largest short-term gains in hygienic latrine ownership, but this effect dissipates over the following 12-15 months; in contrast, the public commitment treatment produces a steady increase which persists for at least a year or more. In this section, we delve into our detailed data on latrine components to understand the specific investment decisions households made under different treatments that could produce these patterns.

The basic program effects we show in Tables 3 and 4 could have been produced by either households investing in entirely new hygienic latrines, or making smaller investments to maintain or improve their existing latrines. We directly asked all households these questions - and find no significant effect of any treatment on "construction of a new latrine since Nov 1, 2013" (which is the start of our intervention period). In contrast, we find significant effects on "purchased/installed specific latrine components since Nov 1, 2013".

In Tables 5 and 6, we investigate the specific latrine components the households prioritized for investment. We show effects on the three most important components that – properly installed, functional and unbroken – are necessary for a latrine to be classified as hygienic. These components are a concrete slab (on which the ceramic pan is placed, where the user squats), a water seal (to prevent bad smells and flies from moving in and out of the pit where the waste is stored), and the cover for the latrine pit and rings that safely confine the accumulated waste and prevent any leakages. Consistent with the results on our main outcome (ownership of a hygienic latrine), we see the largest short-term effect in the monetary reward

treatment, with statistically significant gains in each of the three components individually as well as an indicator for all three. However, these gains dissipate in the medium term.

In contrast, the public commitment treatment has a more modest effect in the short term (statistically different from zero only for pit cover and rings, as well as all three), but this effect persists into the medium term, where we observe a statistically significant +2.4 pp increase in the probability that a household owns a latrine with all three key components functional and intact. It is of interest that this medium-term effect is concentrated in the functional, intact pit cover and rings (+4.4 pp, $p < 0.05$). One characteristic that distinguishes the pit cover from the other components is that it sits outside the toilet and the toilet's superstructure (since the pits have to be emptied periodically, and are designed to be 'offset' from the toilet and not directly underneath), and therefore more easily visible to neighbors. Under the 'public commitment' treatment, we therefore detect investments in the component that neighbors can more easily monitor. This is consistent with the formulation of theories of social image and reputational concerns (Benabou and Tirole 2003). Under this formulation, the fact that the public commitment treatment produces lasting effects may indicate that concerns about reputation outlast the monetary incentives provided at the outset. People become uninterested when the incentives disappear, but they continue to care about saving face in front of neighbors.

Some analogous patterns emerge in Tables 7 and 8, where we examine outcomes related to latrine maintenance. We orient all variables so that one corresponds to better condition and zero to worse. We assign one to households that own a latrine with the specified desirable characteristic, and zero to households that either own a latrine without the desired characteristic or do not own a latrine. The proxies analyzed are no bad smell noticed, no leaks observed, and whether water and soap for hand-washing are present at or near the latrine. Again, there are improvements in all dimensions in the short-run under the monetary reward treatment, which dissipate after a year. In contrast, there are statistically significant

effects on avoiding bad smells and leaks in the medium terms under the public commitment treatment.

Again, smells and pit leaks are the most visible components of maintenance, as opposed to water, soap and flies inside the toilet, which are aspects that neighbors cannot easily monitor. Avoiding leaks and smells requires the household to invest in fixing broken pit covers and rings, which are precisely the components for which we observed statistically significant improvements in Table 6. In summary, the data suggest that households who were asked to make a public commitment to maintain hygienic latrines, choose to make the (relatively cheap) investments in latrine components and make maintenance choices that avoid the most obvious, visible failures that can create slippage into a 'non-hygienic' sanitation territory.

In Table 9, we study the nature of interactions between households within the same treatment group, to investigate whether the interventions generated any conversations, cooperation, advice, or reciprocity that ultimately produced the changes in investment behavior. We show effects of the treatments on indicators for whether the household reports receiving different types of assistance or information from their neighbors, or pressure from others in the group. These were only collected in our short-term survey. Generally speaking, all treatments led to greater assistance, advice and information sharing, so our interventions were successful in achieving the immediate, proximate goal. Households in the monetary reward treatment felt the most pressure from others in their group. But we don't observe any clear pattern that helps explain why those conversations and assistance converted into persistent hygienic latrine maintenance effects in the 'public commitment' treatment.

5.2.2 Household Characteristics

To examine the extent to which program effects vary with respect to household characteristics, we modify equation (1) in two ways: by using household-level data and by interacting

household characteristics with treatments. Specifically, we estimate

$$
\begin{aligned}
y_{hgv} = \alpha_0 + \alpha_1 D_{hgv} & \\
+ \sum_{p=0}^{4} \beta_p \cdot 1\left\{\text{Treat}_v = p\right\} + \sum_{p=0}^{4} \theta_p \cdot 1\left\{\text{Treat}_v = p\right\} \times D_{hgv} & \\
+ \delta y_{0gv} + \gamma \text{ShareLandless}_{gv} + \varphi_u + \varepsilon_{hgv} &
\end{aligned}
\tag{2}
$$

where y_{hgv} is the outcome variable of interest for household h in group g in village v, D_{hgv} is a characteristic of household h, $1\left\{\text{Treat}_v = p\right\}$ is an indicator for the treatment status of village v, i.e., $p = 0, 1, 2, 3, 4$ refer to pure control, financial incentive, social incentive, private commitment and public commitment, respectively, and all other variables are as defined in equation (1). The coefficient α_1 represents the level effect of characteristic D, i.e., the association of D with the outcome variable y_{gv} in the comparison group, the coefficient β_p represents the level effect of treatment p, i.e., the effect of treatment p on households with $D = 0$, and the coefficient θ_p is the interaction between treatment p and characteristic D.[12] We will focus on the primary outcome of hygienic latrine ownership unless otherwise noted, and will present results for the monetary reward and public commitment treatments, with full regression results for all treatments in Appendix tables.

We first examine whether households' responsiveness differ by poverty, which we proxy by landlessness. We hypothesized that landless households would be less able to respond to the non-monetary arms but might benefit from cross-subsidization in the monetary arms. In fact, in the short term, landless households responded nearly identically, as shown in Figure 6a. (Regression results reported in Appendix Table D3.) In the medium term (Figure 6b), point estimates suggest some heterogeneity in response: both the fading of the effect of the monetary treatment and the sustained effect of the public commitment treatment is among *landed* households, although in neither case do the estimated interaction terms reach

[12]For comparison with the group-level results, we estimate equation (2) with no household characteristics or interactions in Appendix Tables D1 (short-term) and D2 (medium-term). The results are very close to the corresponding group-level estimates in Tables 3 and 4, respectively.

statistical significance (Appendix Table D4).

We also investigate heterogeneity by the household's baseline ownership status. Households are classified as owning none (the base category), owning a non-hygienic latrine, or owning a hygienic latrine. We hypothesized that households owning a non-hygienic or hygienic latrine at baseline would be relatively more responsive to the non-monetary treatments than households owning no latrine at baseline, since these households might need only minor improvements to reach or sustain hygienic status.

In the short term (Figure 7a, Appendix Table D5), the effects of both the monetary reward and public commitment treatment are similar across baseline ownership status categories. In the medium term (Figure 7b, Appendix Table D6), the point estimates indicate larger impacts among households owning a non-hygienic latrine at baseline, with borderline statistical significance for the public commitment treatment. That the public commitment treatment's effect is sustained into the medium term suggests that modest improvements to existing latrines were more sustainable than major efforts to build a new, hygienic latrine quickly.

5.2.3 Group Characteristics

Ex ante, we proposed that the strength of the response to the reward treatment could vary with the group's distance to the reward threshold at baseline. To test this hypothesis, we estimate

$$\begin{aligned} y_{gv} = {} & \beta_1 \text{Incent}_v + \theta_1 \left(\text{Incent}_v \times \text{Dist}_{gv}\right) \\ & + \beta_2 \text{Cert}_v + \theta_2 \left(\text{Cert}_v \times \text{Dist}_{gv}\right) \\ & + \beta_3 \text{Priv}_v + \beta_4 \text{Publ}_v \\ & + \theta_0 \text{Dist}_{gv} + \delta y_{0gv} + \gamma \text{ShareLandless}_{gv} \\ & + \beta_0 \text{PureControl}_v + \varphi_u + \varepsilon_{gv}, \end{aligned} \tag{3}$$

where Dist_{gv} represents the distance between the group's hygienic latrine ownership share at baseline and the next threshold above. For example, in any of Unions 2, 3, and 4, where the lower reward threshold was 33% and the upper reward threshold was 66%, a group with 20% hygienic latrine ownership at baseline would have $\text{Dist}_{gv} = 0.13$, while a group with 50% hygienic latrine ownership at baseline would have $\text{Dist}_{gv} = 0.16$. All other variables are as defined in Equation 1 in the main text.

These interactions are only estimated for the reward groups (monetary reward, reward certificate) because the thresholds were not relevant for the commitment treatments. The results are presented in Tables 10 and 11. In no case is the estimated interaction term statistically significant, although all estimates are imprecise.

The parsimonious linear specification of Equation 3 could mask a theoretically plausible nonlinear effect. For example, groups very near the threshold might respond only enough to get over the threshold, groups far from the threshold could be discouraged and respond very little, and the strongest effect on groups could be observed among groups at an intermediate distance from the threshold.

To allow for such nonlinearities, we estimate a semiparametric version of Equation 3, as in

$$\begin{aligned} y_{gv} = {} & \beta_1 \text{Incent}_v + f_1\left(\text{Incent}_v \times \text{Dist}_{gv}\right) \\ & + \beta_2 \text{Cert}_v + f_2\left(\text{Cert}_v \times \text{Dist}_{gv}\right) \\ & + \beta_3 \text{Priv}_v + \beta_4 \text{Publ}_v \\ & + \theta_0 \text{Dist}_{gv} + \delta y_{0gv} + \gamma \text{ShareLandless}_{gv} \\ & + \beta_0 \text{PureControl}_v + \varphi_u + \varepsilon_{gv}, \end{aligned} \tag{4}$$

where, following Robinson (1988), the response functions f_1 and f_2 are estimated nonparametrically.[13] Figures 8a and 8b plot results for short term hygienic latrine ownership and

[13]We gratefully acknowledge the implementation of the Robinson estimator in Stata by Verardi and

Figures 9a and 9b for medium term hygienic latrine ownership. In neither case do we see evidence of heterogeneous treatment effects.

Our second ex-ante hypothesis with respect to group-level characteristics was that treatment effects could vary with the baseline level of hygienic latrine ownership, especially if norms for sanitation that lead a group to have higher baseline hygienic latrine ownership enhance the effectiveness of treatments. An alternative possibility is that "holdout" households – i.e., households that do not own a hygienic latrine – in groups with high baseline ownership levels are especially set in their ways and unlikely to change their behavior. In this case, baseline ownership levels would be negatively associated with treatment effects.

To test this hypothesis, we estimate

$$\begin{aligned} y_{gv} = {} & \alpha_0 + \alpha_1 y_{0gv} \\ & + \sum_{p=0}^{4} \beta_p \cdot 1\left\{1\text{Treat}_v = p\right\} + \sum_{p=0}^{4} \theta_p \cdot 1\left\{\text{Treat}_v = p\right\} \times y_{0gv} \\ & + \gamma \text{ShareLandless}_{gv} + \varphi_u + \varepsilon_{gv}, \end{aligned} \tag{5}$$

where y_{gv} is the outcome variable of interest for group g in village v, y_{0gv} is the baseline level of the outcome variable for group g and all other variables are as defined in equation (2).[14] The coefficient α_1 represents the level effect of y_{0gv}, i.e., the association of y_{0gv} with the outcome variable y_{gv} in the comparison group, the coefficient β_p represents the level effect of treatment p, i.e., the effect of treatment p on groups at the mean level of y_{0gv}, and the coefficient θ_p is the interaction between treatment p and characteristic y_{0gv}. We control for $\text{ShareLandless}_{gv}$ as a proxy for the overall economic resources of the group to attempt to isolate the norm-based mechanisms posited above.

The results are presented in Table 12 (short term) and Table 13 (medium term). In the short

Debarsy (2012).

[14]We de-mean y_{0gv}, so β_p represents the effect of treatment p on groups with the mean level of y_{0gv} (Wainer 2000).

term, there is some evidence in favor of a positive association, in that the point estimate of the interaction effect is positive across all four treatments, but this evidence is fairly weak in the estimates are imprecise and that no single estimate rises to statistical significance. The estimates are similarly imprecise in the medium term, and in this case there is no pattern in the sign of the point estimates.

Ex post, we conducted an exploratory analysis of the association between other group-level characteristics and the magnitude of treatment effects. Similar to equation 5, we estimate

$$\begin{aligned} y_{gv} &= \alpha_0 + \alpha_1 D_{gv} \\ &+ \sum_{p=0}^{4} \beta_p \cdot 1\left\{1\text{Treat}_v = p\right\} + \sum_{p=0}^{4} \theta_p \cdot 1\left\{\text{Treat}_v = p\right\} \times D_{gv} \\ &+ \delta y_{0gv} + \gamma \text{ShareLandless}_{gv} + \varphi_u + \varepsilon_{gv} \end{aligned} \tag{6}$$

where D_{gv} is a characteristic of group g and all other variables are as defined in equation (5). As in equation (5), α_1 represents the level effect of characteristic D, the coefficient β_p represents the level effect of treatment p,[15] and the coefficient θ_p is the interaction between treatment p and characteristic D.

We considered the following characteristics, which were relevant as proxies for resources available to the group, baseline sanitation status beyond hygienic latrine ownership, strength of potential epidemiological externalities, or group social cohesion:

- Share of landless households in the group
- Baseline ownership of non-hygienic latrines
- Baseline ownership of any latrine
- Whether the group contained an individual considered by others in the village to be a village leader

[15]For discrete D, this is the effect of treatment p on groups in the reference category, i.e., with $D = 0$. For continuous D, as in in equation (5), we de-mean the interaction variable so β_p represents the effect of treatment p on groups with the mean level of D (Wainer 2000).

- Group size (number of households)
- Group density (the average number of households within 50m of each household in the group)
- Two social network statistics calculated using baseline data on household relationships within the village
  - Maximum eigenvalue of adjacency matrix, interpretable as the speed at which information will spread within the group
  - The second eigenvalue of the stochastized adjacency matrix, interpretable as how segregated a network is, i.e., negatively related to the extent to which information will spread within the group

Overall, we do not find strong evidence of an association between these variables and the size of our estimated treatment effects. There is a weak negative association between the share of landless household in the group and the effectiveness of the monetary reward treatment, although only in the short term (Tables E1-E2). Contrary to our expectation, the presence of a village leader in a group is negatively associated with the effectiveness of the monetary reward and reward certificate treatments, although again only in the short term (Tables E7-E8). The effectiveness of the monetary reward treatment is negatively associated with the network segregation measure, once again in the short term only (Tables E15-E16). Given the large number of hypotheses tested and the relatively low power to detect interactions, we view these results as suggestive only.

6 Conclusion

Our research contributes to the technology adoption literature in development economics by drawing attention to the importance of inter-dependencies in decision-making. When each household's investment decisions depends on others, that can lead to failures of collective action. We explore whether we can address an important public health externality by creating coordination schemes through simple social and financial group incentives that

help communities overcome collective action failures. The two specific strategies we tested were creating joint liability by offering a joint monetary or non-monetary reward, and by encouraging community members to publicly commit to pursuing behaviors that would benefit community health in front of their neighbors.

We find that the monetary reward has the largest effect in the short term (3 months), increasing the share of households with hygienic latrines by 7.5 to 12.5 percentage points. The public commitment treatment leads to a 4.2 to 6.3 pp increase in the same period. The effect of the monetary reward faded in the medium term (15 months), while the effect of the public commitment treatment persisted. We find that this difference is explained by households in the public commitment treatment maintaining improvements in publicly visible components of the latrine. We find little evidence of heterogeneity in impacts with respect to group characteristics.

The persistent increase in hygienic latrine ownership generated by our public commitment intervention is comparable in magnitude to the 6 percentage point increase in safely managed sanitation coverage in all of rural Bangladesh between 2015 and 2020 (WHO and UNICEF 2022). The effect size is therefore large relative to observed improvements in sanitation in a country that has invested heavily in this sector. Providing direct latrine subsidies (Guiteras et al. 2015) increases the ownership of hygienic latrines by 14 - 15 percentage points, but those subsidies are much more expensive than encouraging public commitments and group interactions.

Our results are immediately relevant for policymakers in South Asia and other developing countries struggling with the stubborn problem of low investment in improved sanitation and hygiene. They are also more broadly relevant for development economists studying the under-investment in a broader range of (seemingly beneficial) products, technologies and behaviors, including hand-washing and masks (Abaluck et al. 2021) that became especially relevant during the COVID-19 pandemic. We highlight decision inter-dependencies as a

driving factor for adoption of product categories that may impose externalities on other members of society, or are strategic complements in investment. Our direct comparison of incentives and rewards (both monetary and in-kind) against public commitments contribute to an even broader literature in public economics on how personal and social incentives are shaped.

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Table 1: Randomization

	Commitment		
Reward	None	Private	Public
None	A: 8 villages; 121 groups 1,898 households (9.8%)	B: 11 villages; 177 groups 2,626 households (13.6%)	C: 11 villages; 69 groups 1,088 households (5.6%)
Monetary	D: 10 villages; 79 groups 1,159 households (6.0%)	E: 5 villages; 58 groups 885 households (4.6%)	F: 9 villages; 97 groups 1,568 households (8.1%)
Certificate	G: 12 villages; 145 groups 2,314 households (12.0%)	H: 9 villages; 110 groups 1,694 households (8.8%)	I: 9 villages; 124 groups 1,970 households (10.2%)

Pure Control	J: 23 villages; 256 groups 4,069 households (21.1%)

Table 2: Descriptive Statistics and Balance Tests

Treatment:	All	Pure Control	Basic Only	Reward		Commitment		Joint
				Monetary	Certificate	Private	Public	
	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Diff [S.E.]	Diff [S.E.]	Diff [S.E.]	Diff [S.E.]	p-val.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Group characteristics:								
Group size (num. HH)	15.59	15.89	15.69	−0.25	0.09	−0.60	0.27	0.286
	(2.74)	(2.78)	(2.48)	[0.51]	[0.46]	[0.47]	[0.48]	
Share landless	0.350	0.363	0.312	0.054	0.025	0.031	0.027	0.852
	(0.243)	(0.251)	(0.208)	[0.042]	[0.033]	[0.034]	[0.036]	
Regular open defecation by adults (HH self-report)	0.263	0.270	0.199	0.082*	0.035	0.073	0.049	0.675
	(0.250)	(0.251)	(0.224)	[0.045]	[0.045]	[0.049]	[0.044]	
Density (mean num. HH within 50m)	12.33	11.69	13.67	−1.81	−1.03	−0.87	−1.18	0.884
	(6.07)	(5.74)	(6.58)	[1.39]	[1.43]	[1.43]	[1.55]	
Village leader in group	0.153	0.156	0.116	0.072**	0.032	0.009	0.060*	0.376
	(0.360)	(0.364)	(0.321)	[0.035]	[0.032]	[0.032]	[0.032]	
Baseline latrine ownership:								
Owns no latrine	0.403	0.394	0.377	0.014	0.012	0.040	0.008	0.187
	(0.202)	(0.195)	(0.188)	[0.026]	[0.029]	[0.033]	[0.029]	
Owns any latrine	0.597	0.606	0.623	−0.014	−0.012	−0.040	−0.008	0.187
	(0.202)	(0.195)	(0.188)	[0.026]	[0.029]	[0.033]	[0.029]	
Owns non-hygienic latrine	0.214	0.244	0.212	0.000	−0.015	−0.007	0.001	0.903
	(0.154)	(0.155)	(0.151)	[0.024]	[0.025]	[0.025]	[0.026]	
Owns hygienic latrine	0.397	0.374	0.435	−0.023	−0.006	−0.043	−0.016	0.625
	(0.218)	(0.201)	(0.203)	[0.040]	[0.044]	[0.050]	[0.041]	
Baseline latrine access:								
No latrine access	0.211	0.196	0.170	0.042	0.024	0.061	0.028	0.525
	(0.223)	(0.205)	(0.209)	[0.039]	[0.039]	[0.043]	[0.040]	
Access to any latrine	0.789	0.804	0.830	−0.042	−0.024	−0.061	−0.028	0.525
	(0.223)	(0.205)	(0.209)	[0.039]	[0.039]	[0.043]	[0.040]	
Access to hygienic latrine	0.491	0.466	0.533	−0.031	0.001	−0.053	−0.015	0.496
	(0.257)	(0.242)	(0.232)	[0.046]	[0.052]	[0.056]	[0.048]	
Sample sizes:								
Villages	107	23	8	24	30	25	29	
Groups	1,236	256	121	234	379	345	290	
Households	19,271	4,069	1,898	3,612	5,978	5,205	4,626	

Notes: this table presents summary statistics (means and standard deviations) of key baseline variables for all villages (Column 1), pure control villages (Column 2) and villages where groups received only the basic health messaging treatment (Column 3). Standard deviations are in parentheses. Columns 4-7 show estimated coefficients for indicators for the village-level treatments (monetary reward, reward certificate, private commitment, public commitment) in regressions where the baseline variable is the dependent variable, and the basic health messaging treatment is the omitted category. Estimated standard errors robust to clustering at the village level are in brackets. Column 8 shows the p-value on a joint F-test of significance of the treatment indicators. Sample sizes do not sum because villages may be assigned to one reward treatment, one commitment treatment, one from each category, or neither. (See discussion of experimental design in the text.) * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3: Short-term Effects: Hygienic Latrine Ownership

	(1)	(2)	(3)	(4)
Monetary Reward	0.100**	0.125***	0.075***	0.078***
	(0.045)	(0.034)	(0.016)	(0.015)
	[0.005, 0.196]	[0.052, 0.200]	[0.041, 0.107]	[0.045, 0.110]
Reward Certificate	0.051	0.044	0.009	0.011
	(0.044)	(0.037)	(0.012)	(0.012)
	[-0.051, 0.153]	[-0.047, 0.130]	[-0.018, 0.036]	[-0.016, 0.037]
Private Commitment	0.002	0.008	0.010	0.009
	(0.044)	(0.038)	(0.012)	(0.012)
	[-0.098, 0.103]	[-0.076, 0.098]	[-0.018, 0.037]	[-0.019, 0.036]
Public Commitment	0.056	0.063*	0.045***	0.045***
	(0.041)	(0.036)	(0.015)	(0.015)
	[-0.031, 0.142]	[-0.018, 0.144]	[0.012, 0.080]	[0.012, 0.078]
Baseline share owning hyg. lat.			0.745***	0.709***
			(0.022)	(0.022)
Share of households landless				-0.083***
				(0.017)
Union FEs	No	Yes	Yes	Yes
Diff.: Monetary – Public	0.044	0.062	0.029	0.033
	(0.061)	(0.046)	(0.019)	(0.020)
p-value	0.469	0.182	0.131	0.089
Diff.: Monetary – Certificate	0.049	0.081	0.065	0.067
	(0.047)	(0.039)	(0.015)	(0.015)
p-value	0.304	0.038	0.000	0.000
Diff.: Public – Private	0.054	0.055	0.036	0.036
	(0.050)	(0.038)	(0.015)	(0.014)
p-value	0.286	0.156	0.018	0.014
Number of groups	1,236	1,236	1,235	1,235
Number of villages	107	107	107	107
Omitted category mean	0.451	0.451	0.451	0.451
Omitted category S.D.	(0.189)	(0.189)	(0.189)	(0.189)

Notes: the dependent variable is the share of households in the group with a hygienic latrine in the short term (at the time of assessment). Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. Wild cluster bootstrap (9,999 repetitions, Webb weights) 95% confidence intervals, resampling at the village level, in brackets for the coefficients of interest. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4: Medium-term Effects: Hygienic Latrine Ownership

	(1)	(2)	(3)	(4)
Monetary Reward	0.041	0.047	0.009	0.012
	(0.036)	(0.030)	(0.020)	(0.020)
	[-0.035, 0.117]	[-0.018, 0.111]	[-0.034, 0.051]	[-0.031, 0.054]
Reward Certificate	0.045	0.043	0.017	0.019
	(0.038)	(0.035)	(0.023)	(0.022)
	[-0.042, 0.131]	[-0.041, 0.124]	[-0.034, 0.066]	[-0.032, 0.067]
Private Commitment	0.011	0.013	0.013	0.013
	(0.040)	(0.039)	(0.025)	(0.025)
	[-0.083, 0.102]	[-0.079, 0.102]	[-0.047, 0.069]	[-0.047, 0.068]
Public Commitment	0.075**	0.072**	0.058***	0.057***
	(0.032)	(0.028)	(0.017)	(0.017)
	[0.007, 0.143]	[0.012, 0.132]	[0.025, 0.092]	[0.023, 0.091]
Baseline share owning hyg. lat.			0.552***	0.513***
			(0.033)	(0.036)
Share of households landless				-0.089***
				(0.032)
Union FEs	No	Yes	Yes	Yes
Diff.: Monetary – Public	-0.035	-0.025	-0.050	-0.045
	(0.050)	(0.042)	(0.030)	(0.030)
p-value	0.490	0.544	0.104	0.140
Diff.: Monetary – Certificate	-0.004	0.004	-0.009	-0.007
	(0.039)	(0.032)	(0.019)	(0.019)
p-value	0.916	0.899	0.656	0.732
Diff.: Public – Private	0.064	0.059	0.045	0.045
	(0.041)	(0.036)	(0.023)	(0.022)
p-value	0.122	0.098	0.052	0.047
Number of groups	1,235	1,235	1,234	1,234
Number of villages	107	107	107	107
Omitted category mean	0.544	0.544	0.544	0.544
Omitted category S.D.	(0.255)	(0.255)	(0.255)	(0.255)

Notes: the dependent variable is the share of households in the group with a hygienic latrine in the medium term (12-15 months after assessment). Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. Wild cluster bootstrap (9,999 repetitions, Webb weights) 95% confidence intervals, resampling at the village level, in brackets for the coefficients of interest. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: Short-term Effects: Latrine Components Functional and Unbroken

	(1) Slab	(2) Seal	(3) Pit Cover and Rings	(4) All components
Monetary Reward	0.033*	0.063***	0.074***	0.109***
	(0.017)	(0.014)	(0.021)	(0.016)
Reward Certificate	0.012	0.009	0.028	0.034**
	(0.016)	(0.011)	(0.019)	(0.013)
Private Commitment	-0.007	0.002	0.004	0.014
	(0.015)	(0.011)	(0.020)	(0.013)
Public Commitment	0.007	0.022	0.043**	0.042***
	(0.018)	(0.013)	(0.020)	(0.015)
Baseline share owning hyg. lat.	0.531***	0.758***	0.467***	0.538***
	(0.034)	(0.021)	(0.038)	(0.031)
Share of households landless	-0.081***	-0.085***	-0.045*	-0.046**
	(0.022)	(0.019)	(0.025)	(0.018)
Union FEs	Yes	Yes	Yes	Yes
Diff.: Monetary – Public	0.027	0.041	0.031	0.067
	(0.029)	(0.019)	(0.028)	(0.020)
p-value	0.355	0.028	0.269	0.001
Diff.: Monetary – Certificate	0.021	0.054	0.046	0.074
	(0.015)	(0.014)	(0.019)	(0.018)
p-value	0.146	0.000	0.017	0.000
Diff.: Public – Private	0.014	0.020	0.039	0.028
	(0.020)	(0.012)	(0.022)	(0.015)
p-value	0.496	0.090	0.075	0.070
Number of households	16,322	15,948	16,323	19,260
Number of groups	1,235	1,235	1,235	1,235
Number of villages	107	107	107	107
Omitted category mean	0.664	0.484	0.522	0.339

Notes: this table shows estimated treatment effects on indicators for whether the household owns a latrine with the component indicated in the column header functional and unbroken in the short term (at the time of assessment). The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 6: Medium-term Effects: Latrine Components Functional and Unbroken

	(1) Slab	(2) Seal	(3) Pit Cover and Rings	(4) All components
Monetary Reward	-0.008	0.025	-0.002	0.000
	(0.017)	(0.023)	(0.023)	(0.014)
Reward Certificate	0.016	0.025	0.024	0.018
	(0.019)	(0.023)	(0.027)	(0.016)
Private Commitment	0.003	0.000	-0.000	0.010
	(0.020)	(0.025)	(0.030)	(0.017)
Public Commitment	0.012	0.015	0.044**	0.024**
	(0.013)	(0.019)	(0.020)	(0.012)
Baseline share owning hyg. lat.	0.407***	0.602***	0.330***	0.195***
	(0.038)	(0.032)	(0.040)	(0.020)
Share of households landless	-0.126***	-0.126***	-0.116***	-0.043***
	(0.026)	(0.030)	(0.028)	(0.016)
Union FEs	Yes	Yes	Yes	Yes
Diff.: Monetary – Public	-0.020	0.010	-0.046	-0.024
	(0.022)	(0.034)	(0.029)	(0.020)
p-value	0.363	0.777	0.116	0.235
Diff.: Monetary – Certificate	-0.024	-0.000	-0.025	-0.018
	(0.015)	(0.021)	(0.021)	(0.013)
p-value	0.117	0.996	0.231	0.157
Diff.: Public – Private	0.009	0.015	0.044	0.014
	(0.019)	(0.023)	(0.026)	(0.016)
p-value	0.634	0.515	0.095	0.378
Number of households	7,972	7,884	7,954	19,260
Number of groups	1,234	1,234	1,234	1,235
Number of villages	107	107	107	107
Omitted category mean	0.734	0.604	0.642	0.199

Notes: this table shows estimated treatment effects on indicators for whether the household owns a latrine with the component indicated in the column header functional and unbroken in the medium term (12-15 months after assessment). The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 7: Short-term Effects: Latrine Condition

	(1) No Bad Smell	(2) No Leaks	(3) No Flies	(4) Water	(5) Soap
Monetary Reward	0.088***	0.054***	0.180***	0.096***	0.079***
	(0.023)	(0.018)	(0.024)	(0.019)	(0.019)
Reward Certificate	-0.021	0.010	0.054***	-0.000	-0.000
	(0.026)	(0.018)	(0.019)	(0.017)	(0.022)
Private Commitment	-0.028	0.003	0.022	0.017	0.025
	(0.026)	(0.018)	(0.019)	(0.018)	(0.024)
Public Commitment	0.041*	0.036*	0.033	-0.030	0.012
	(0.023)	(0.019)	(0.022)	(0.018)	(0.017)
Baseline share owning hyg. lat.	0.480***	0.448***	0.589***	0.533***	0.475***
	(0.029)	(0.030)	(0.030)	(0.028)	(0.034)
Share of households landless	-0.036	-0.030	-0.032	-0.108***	-0.125***
	(0.022)	(0.026)	(0.023)	(0.021)	(0.021)
Union FEs	Yes	Yes	Yes	Yes	Yes
Diff.: Monetary – Public	0.046	0.018	0.147	0.126	0.067
	(0.034)	(0.026)	(0.034)	(0.025)	(0.022)
p-value	0.171	0.495	0.000	0.000	0.002
Diff.: Monetary – Certificate	0.109	0.044	0.126	0.096	0.079
	(0.026)	(0.015)	(0.026)	(0.018)	(0.018)
p-value	0.000	0.005	0.000	0.000	0.000
Diff.: Public – Private	0.069	0.033	0.012	-0.047	-0.012
	(0.030)	(0.018)	(0.023)	(0.017)	(0.020)
p-value	0.024	0.072	0.606	0.007	0.529
Number of households	16,322	16,320	16,307	16,013	16,009
Number of groups	1,235	1,235	1,235	1,235	1,235
Number of villages	107	107	107	107	107
Omitted category mean	0.323	0.614	0.340	0.398	0.299

Notes: this table shows estimated treatment effects on indicators of the household latrine condition noted in the column header. in the short term (at the time of assessment). The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 8: Medium-term Effects: Latrine Condition

	(1) No Bad Smell	(2) No Leaks	(3) No Flies	(4) Water	(5) Soap
Monetary Reward	-0.046	0.014	-0.011	0.013	0.020
	(0.040)	(0.019)	(0.039)	(0.028)	(0.030)
Reward Certificate	-0.065*	0.013	-0.093*	0.011	0.045*
	(0.033)	(0.021)	(0.054)	(0.030)	(0.025)
Private Commitment	-0.001	0.005	-0.068	-0.002	0.030
	(0.033)	(0.023)	(0.057)	(0.032)	(0.028)
Public Commitment	0.089**	0.033*	0.016	0.007	0.019
	(0.039)	(0.017)	(0.041)	(0.025)	(0.026)
Baseline share owning hyg. lat.	0.189***	0.311***	0.236***	0.442***	0.400***
	(0.045)	(0.035)	(0.048)	(0.048)	(0.043)
Share of households landless	-0.088***	-0.116***	-0.100***	-0.144***	-0.151***
	(0.028)	(0.028)	(0.035)	(0.033)	(0.036)
Union FEs	Yes	Yes	Yes	Yes	Yes
Diff.: Monetary – Public	-0.135	-0.019	-0.028	0.006	0.001
	(0.055)	(0.026)	(0.059)	(0.032)	(0.038)
p-value	0.016	0.480	0.642	0.844	0.971
Diff.: Monetary – Certificate	0.019	0.001	0.082	0.002	-0.025
	(0.041)	(0.019)	(0.038)	(0.022)	(0.029)
p-value	0.640	0.954	0.033	0.920	0.385
Diff.: Public – Private	0.090	0.028	0.085	0.009	-0.012
	(0.039)	(0.022)	(0.053)	(0.027)	(0.026)
p-value	0.024	0.201	0.116	0.746	0.658
Number of households	7,974	7,972	7,970	7,618	7,972
Number of groups	1,234	1,234	1,234	1,234	1,234
Number of villages	107	107	107	107	107
Omitted category mean	0.314	0.700	0.417	0.534	0.387

Notes: this table shows estimated treatment effects on indicators of the household latrine condition noted in the column header. in the medium term (12-15 months after assessment). The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 9: Short-term Effects: Assistance from others in group

	(1) Any	(2) Advice or info.	(3) Materials, cash, labor	(4) Privately	(5) Publicly	(6) Pressure
Monetary Reward	0.149***	0.143***	0.005***	0.044*	0.138***	0.118***
	(0.032)	(0.033)	(0.002)	(0.026)	(0.030)	(0.031)
Reward Certificate	0.080**	0.078**	-0.000	0.038	0.081**	0.034*
	(0.037)	(0.037)	(0.001)	(0.027)	(0.040)	(0.019)
Private Commitment	0.085**	0.084**	-0.000	0.017	0.079*	0.019
	(0.040)	(0.040)	(0.001)	(0.028)	(0.043)	(0.020)
Public Commitment	0.073**	0.071**	0.003*	0.029	0.056*	0.048*
	(0.035)	(0.035)	(0.002)	(0.034)	(0.030)	(0.025)
Baseline share owning hyg. lat.	0.191***	0.192***	-0.003	0.079**	0.174***	0.148***
	(0.040)	(0.041)	(0.002)	(0.033)	(0.041)	(0.027)
Share of households landless	0.013	0.014	-0.002	0.009	0.030	0.021
	(0.030)	(0.030)	(0.001)	(0.027)	(0.024)	(0.023)
Union FEs	Yes	Yes	Yes	Yes	Yes	Yes
Diff.: Monetary – Public	0.076	0.072	0.002	0.015	0.082	0.070
	(0.046)	(0.046)	(0.003)	(0.040)	(0.042)	(0.040)
p-value	0.097	0.123	0.368	0.702	0.053	0.082
Diff.: Monetary – Certificate	0.069	0.065	0.006	0.007	0.056	0.084
	(0.036)	(0.037)	(0.002)	(0.031)	(0.034)	(0.030)
p-value	0.061	0.082	0.001	0.829	0.103	0.006
Diff.: Public – Private	-0.012	-0.012	0.003	0.012	-0.023	0.029
	(0.039)	(0.040)	(0.002)	(0.027)	(0.043)	(0.027)
p-value	0.761	0.759	0.063	0.651	0.595	0.280
Number of households	15,950	15,889	15,889	15,931	15,931	15,936
Number of groups	1,235	1,235	1,235	1,235	1,235	1,235
Number of villages	107	107	107	107	107	107
Omitted category mean	0.258	0.259	0.001	0.187	0.183	0.153

Notes: this table shows estimated treatment effects on indicators of indicators for different types of assistance (noted in the column header) the household reports receiving from others in the group. Outcomes are in the short term (at the time of assessment). The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 10: Treatment Effect Heterogeneity by Distance to Reward Threshold
Short Term Effects: Hygienic Latrine Ownership

	(1)	(2)	(3)	(4)
Monetary Reward	0.082*	0.110***	0.081***	0.086***
	(0.048)	(0.031)	(0.019)	(0.019)
Monetary Reward × Distance to nearest threshold above	-0.366	-0.198	0.004	0.007
	(0.239)	(0.206)	(0.144)	(0.137)
Reward Certificate	0.024	0.016	0.008	0.010
	(0.036)	(0.027)	(0.013)	(0.013)
Reward Certificate × Distance to nearest threshold above	0.092	0.127	0.009	0.004
	(0.171)	(0.154)	(0.104)	(0.100)
Private Commitment	-0.015	-0.004	0.009	0.009
	(0.034)	(0.026)	(0.013)	(0.013)
Public Commitment	0.046	0.061**	0.048**	0.048***
	(0.041)	(0.030)	(0.018)	(0.018)
Distance to nearest threshold above	-0.502***	-0.624***	0.015	0.024
	(0.107)	(0.106)	(0.081)	(0.080)
Baseline share owning hyg. lat.			0.788***	0.742***
			(0.035)	(0.039)
Share of households landless				-0.089***
				(0.018)
Union FEs	No	Yes	Yes	Yes
Number of groups	1,028	1,028	1,028	1,028
Number of villages	106	106	106	106
Omitted category mean	0.421	0.421	0.421	0.421
Omitted category S.D.	(0.175)	(0.175)	(0.175)	(0.175)

Notes: the dependent variable is the share of households in the group with a hygienic latrine in the short term (at the time of assessment). Interactions with distance to threshold are estimated for the reward treatments (monetary reward, recognition reward). The thresholds were not relevant for the commitment treatments, so no interaction is estimated. Distance to threshold is de-meaned, so the level terms represent the effect of treatment at the mean value of distance to threshold (15.8 percentage points). Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 11: Treatment Effect Heterogeneity by Distance to Reward Threshold
Medium Term Effects: Hygienic Latrine Ownership

	(1)	(2)	(3)	(4)
Monetary Reward	0.022	0.029	0.005	0.010
	(0.038)	(0.028)	(0.022)	(0.022)
Monetary Reward × Distance to nearest threshold above	-0.241	-0.117	0.046	0.047
	(0.227)	(0.224)	(0.181)	(0.172)
Reward Certificate	0.012	0.009	0.002	0.004
	(0.034)	(0.030)	(0.024)	(0.023)
Reward Certificate × Distance to nearest threshold above	-0.012	0.013	-0.085	-0.090
	(0.206)	(0.195)	(0.168)	(0.164)
Private Commitment	-0.009	-0.005	0.005	0.005
	(0.035)	(0.032)	(0.027)	(0.027)
Public Commitment	0.065*	0.067**	0.055***	0.056***
	(0.033)	(0.027)	(0.019)	(0.020)
Distance to nearest threshold above	-0.287**	-0.371***	0.164	0.173
	(0.136)	(0.135)	(0.124)	(0.121)
Baseline share owning hyg. lat.			0.659***	0.609***
			(0.049)	(0.053)
Share of households landless				-0.098***
				(0.035)
Union FEs	No	Yes	Yes	Yes
Number of groups	1,027	1,027	1,027	1,027
Number of villages	106	106	106	106
Omitted category mean	0.535	0.535	0.535	0.535
Omitted category S.D.	(0.258)	(0.258)	(0.258)	(0.258)

Notes: the dependent variable is the share of households in the group with a hygienic latrine in the medium term (12-15 months after assessment). Interactions with distance to threshold are estimated for the reward treatments (monetary reward, recognition reward). The thresholds were not relevant for the commitment treatments, so no interaction is estimated. Distance to threshold is de-meaned, so the level terms represent the effect of treatment at the mean value of distance to threshold (15.8 percentage points). Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 12: Treatment Effect Heterogeneity by Baseline Hygienic Latrine Ownership Share
Short Term Effects: Hygienic Latrine Ownership

	(1)	(2)	(3)
Monetary Reward	0.065***	0.072***	0.076***
	(0.021)	(0.016)	(0.016)
Monetary Reward X Baseline share owning hyg. latr.	0.094	0.067	0.058
	(0.082)	(0.070)	(0.065)
Reward Certificate	0.009	0.008	0.009
	(0.013)	(0.012)	(0.012)
Reward Certificate X Baseline share owning hyg. latr.	-0.001	0.022	0.023
	(0.057)	(0.053)	(0.050)
Private Commitment	0.005	0.009	0.008
	(0.014)	(0.012)	(0.012)
Private Commitment X Baseline share owning hyg. latr.	0.069	0.056	0.056
	(0.052)	(0.054)	(0.051)
Public Commitment	0.046***	0.043***	0.042***
	(0.017)	(0.016)	(0.015)
Public Commitment X Baseline share owning hyg. latr.	0.091	0.043	0.049
	(0.072)	(0.065)	(0.062)
Baseline share owning hyg. latr.	0.720***	0.696***	0.661***
	(0.057)	(0.057)	(0.054)
Share of households landless			-0.084***
			(0.018)
Union FEs	No	Yes	Yes
Number of groups	1,235	1,235	1,235
Number of villages	107	107	107
Omitted category mean	0.451	0.451	0.451
Omitted category S.D.	(0.189)	(0.189)	(0.189)

Notes: the dependent variable is the share of households in the group with a hygienic latrine in the short term (at the time of assessment). Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 13: Treatment Effect Heterogeneity by Baseline Hygienic Latrine Ownership Share
Medium Term Effects: Hygienic Latrine Ownership

	(1)	(2)	(3)
Monetary Reward	0.017	0.008	0.011
	(0.025)	(0.021)	(0.020)
Monetary Reward X Baseline share owning hyg. latr.	0.034	0.007	-0.002
	(0.082)	(0.079)	(0.075)
Reward Certificate	0.012	0.013	0.014
	(0.023)	(0.022)	(0.022)
Reward Certificate X Baseline share owning hyg. latr.	0.089	0.107	0.108
	(0.078)	(0.076)	(0.074)
Private Commitment	0.010	0.009	0.008
	(0.025)	(0.025)	(0.024)
Private Commitment X Baseline share owning hyg. latr.	0.046	0.080	0.080
	(0.082)	(0.079)	(0.076)
Public Commitment	0.067***	0.056***	0.055***
	(0.020)	(0.018)	(0.018)
Public Commitment X Baseline share owning hyg. latr.	-0.009	-0.033	-0.025
	(0.081)	(0.082)	(0.079)
Baseline share owning hyg. latr.	0.538***	0.516***	0.477***
	(0.076)	(0.076)	(0.074)
Share of households landless			-0.092***
			(0.031)
Union FEs	No	Yes	Yes
Number of groups	1,234	1,234	1,234
Number of villages	107	107	107
Omitted category mean	0.544	0.544	0.544
Omitted category S.D.	(0.255)	(0.255)	(0.255)

Notes: the dependent variable is the share of households in the group with a hygienic latrine in the medium term (12-15 months after assessment). Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure 1: Timeline for a typical village

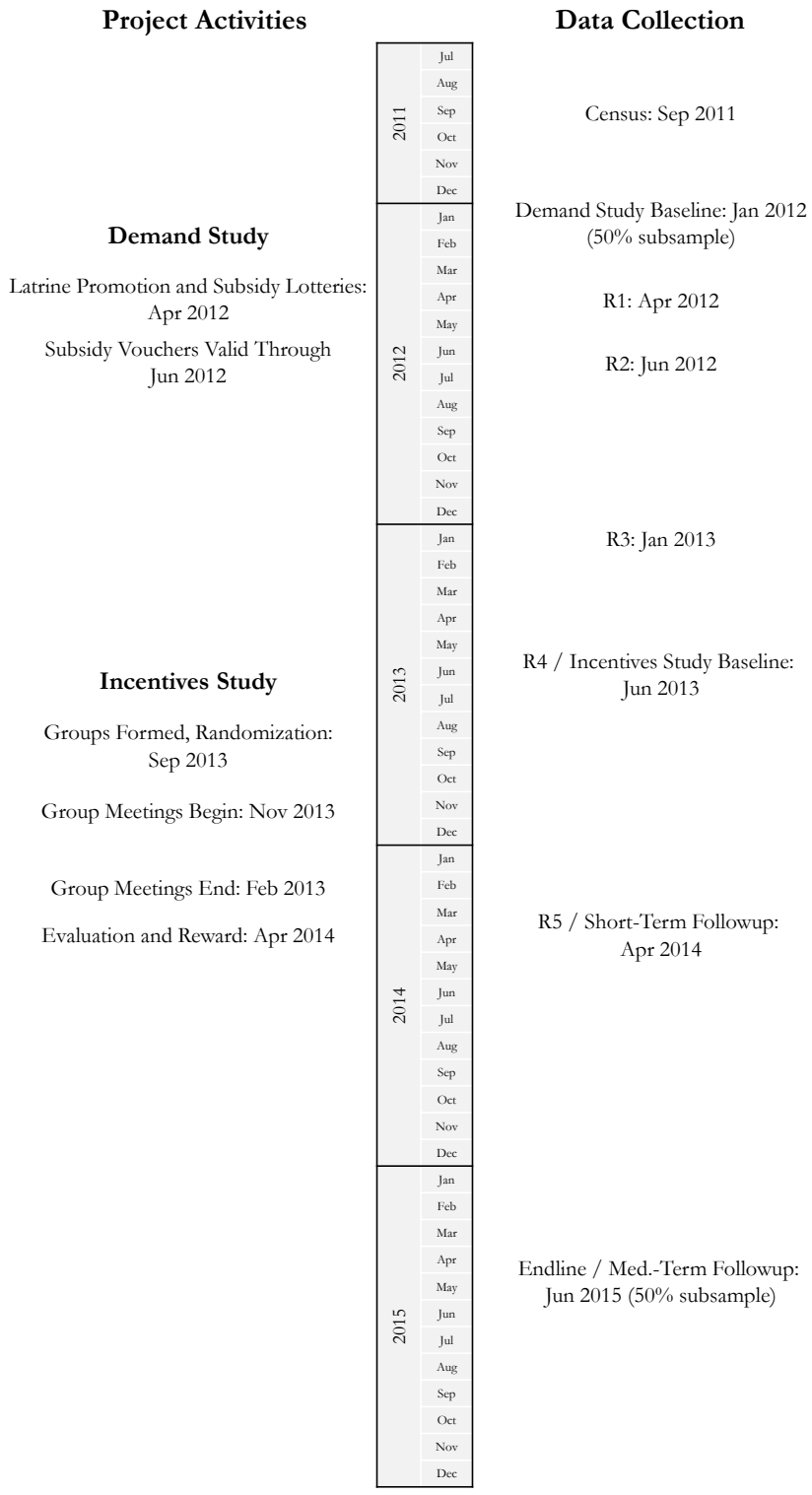
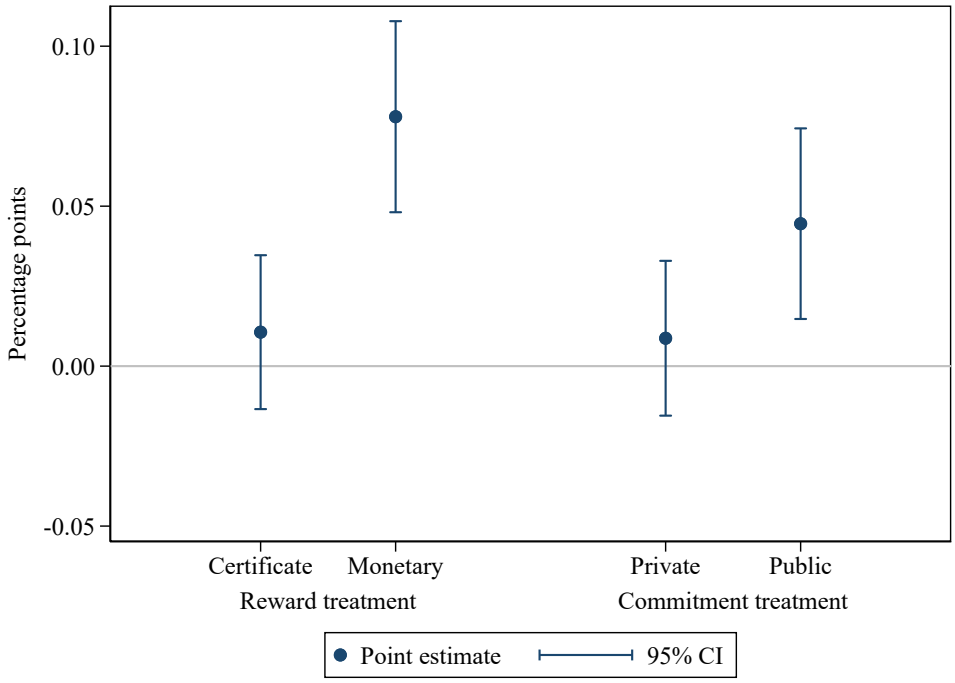
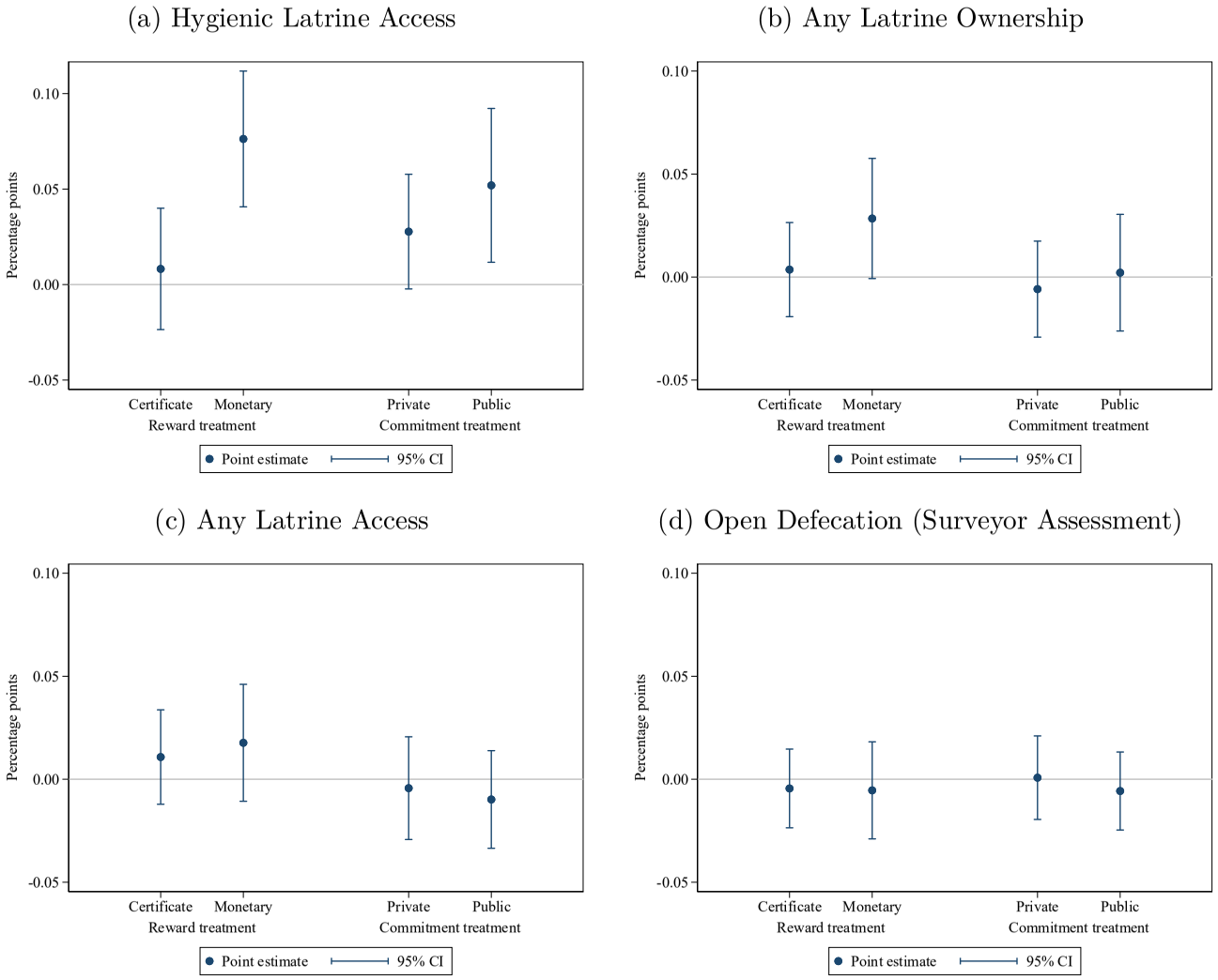


Figure 2: Short-term Effects: Hygienic Latrine Ownership



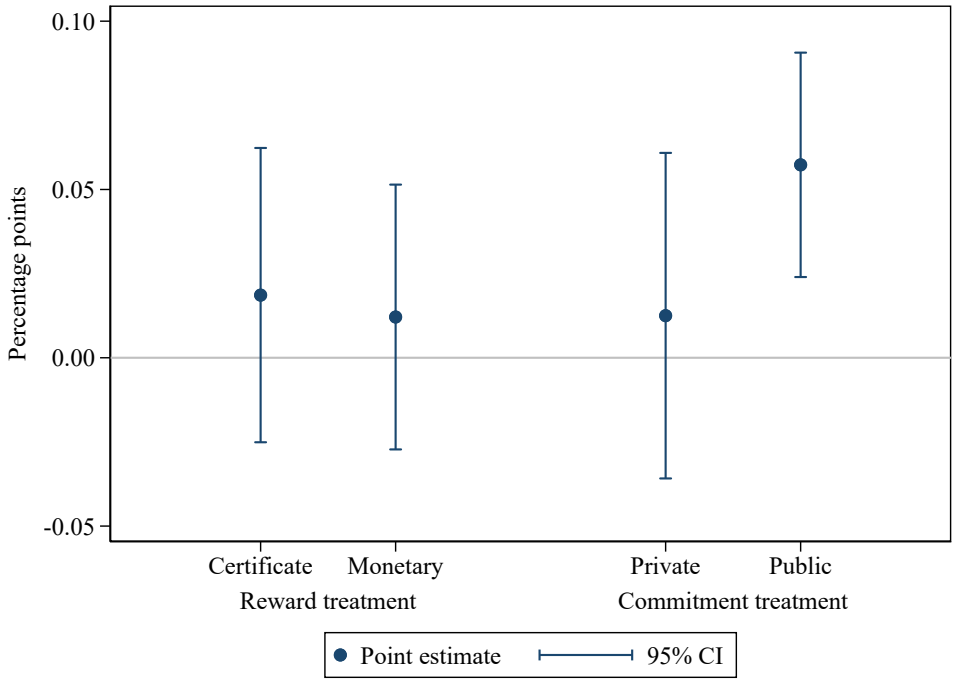
Notes: this graph presents estimated treatment effects of the interventions on the share of households in the group with a hygienic latrine in the short term (at the time of assessment). The regression controls for the baseline level of the outcome variable, the share of households in the group that are landless, and union fixed effects. Observations (groups) are unweighted. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. 95% confidence intervals use standard errors clustered at the village level (the level of randomization).

Figure 3: Treatment Effects on Secondary Outcomes – Short Term



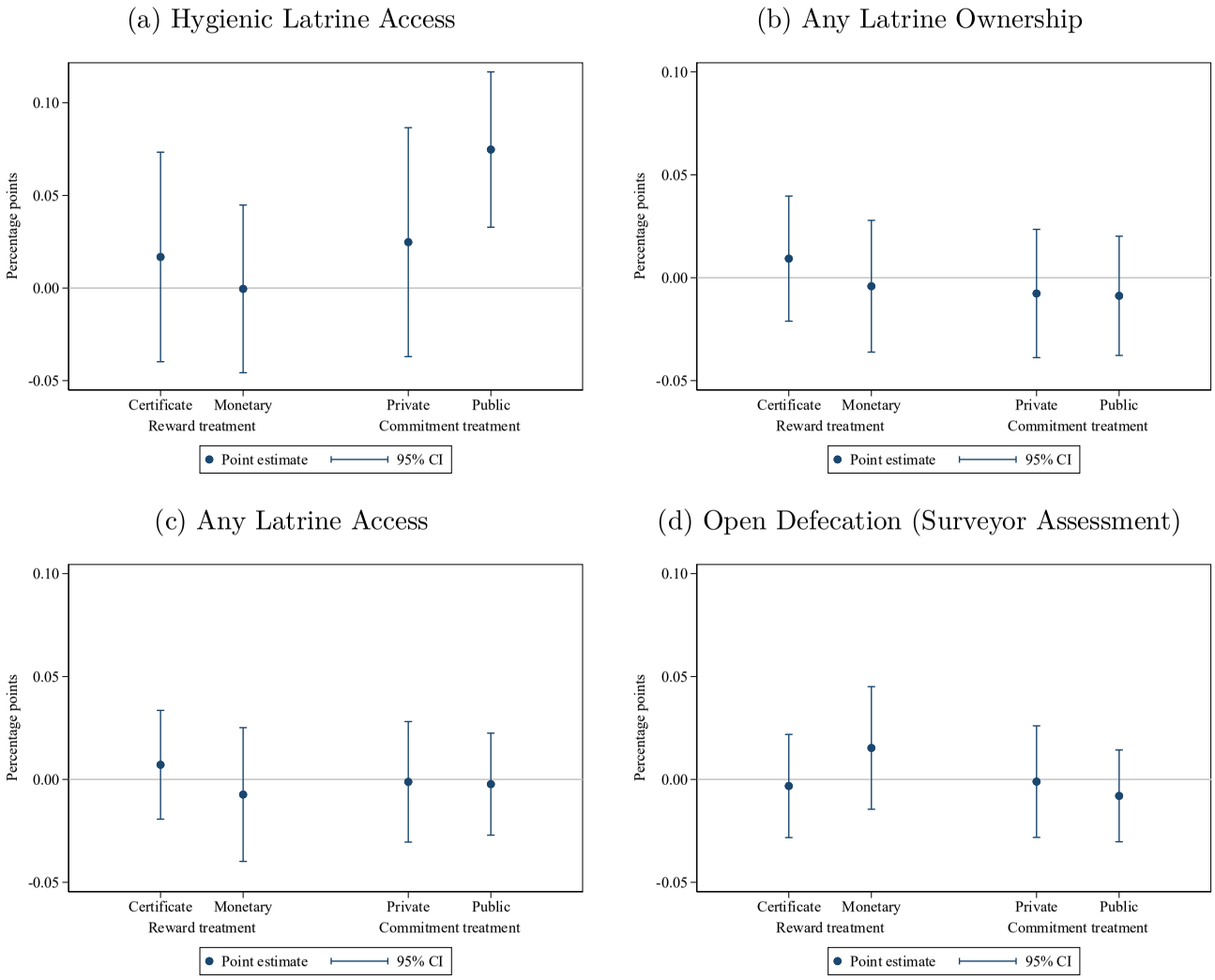
Notes: these graphs present estimated short-term effects of the interventions on the outcome variable indicated in the figure caption. The regression controls for the baseline level of the outcome variable, the share of households in the group that are landless, and union fixed effects. Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. 95% confidence intervals use standard errors clustered at the village level (the level of randomization).

Figure 4: Medium-term Effects: Hygienic Latrine Ownership



Notes: this graph presents estimated treatment effects of the interventions on the share of households in the group with a hygienic latrine in the medium term (12-15 months after assessment). The regression controls for the baseline level of the outcome variable, the share of households in the group that are landless, and union fixed effects. Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. 95% confidence intervals use standard errors clustered at the village level (the level of randomization).

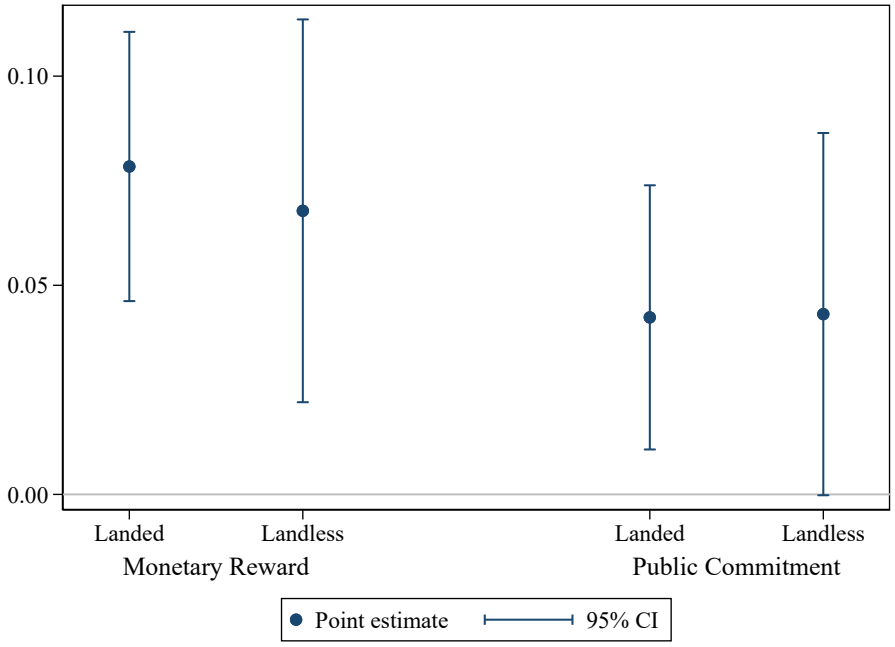
Figure 5: Treatment Effects on Secondary Outcomes – Medium Term



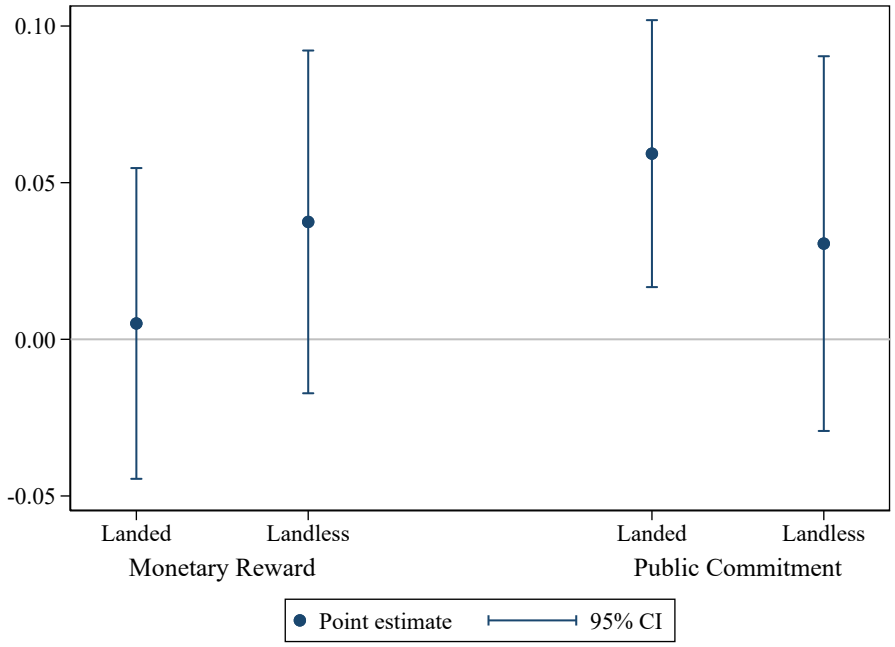
Notes: these graphs present estimated medium-term effects of the interventions on the outcome variable indicated in the figure caption. The regression controls for the baseline level of the outcome variable, the share of households in the group that are landless, and union fixed effects. Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. 95% confidence intervals use standard errors clustered at the village level (the level of randomization).

Figure 6: Effect on Hygienic Latrine Ownership
By Household's Landless Status

(a) Short-term



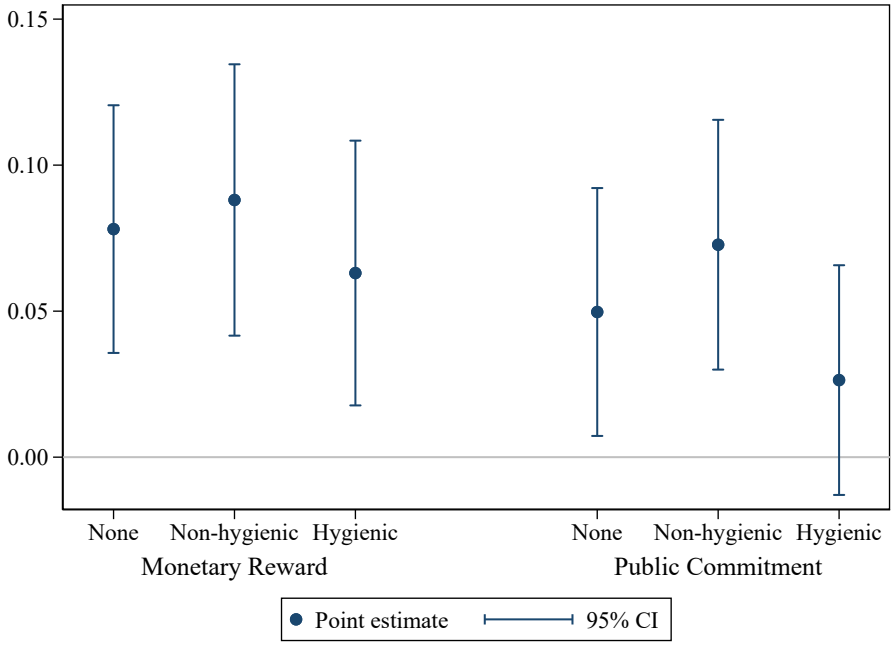
(b) Medium-term



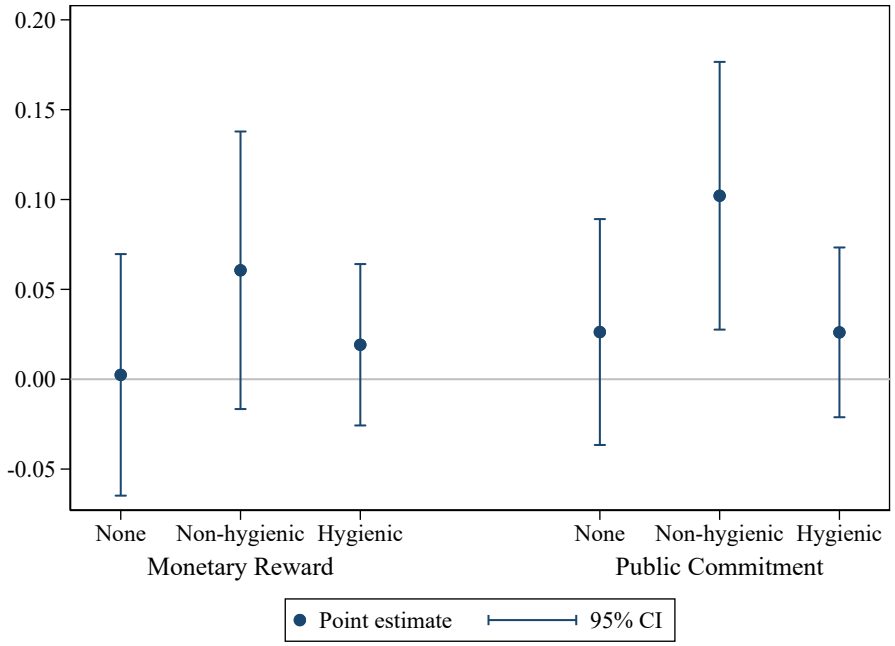
Notes: these graphs present estimated treatment effects of the Monetary Reward and Public Commitment treatments on ownership of a hygienic latrine by household land ownership status. The top panel shows short-term effects and the bottom panel shows medium-term effects. The comparison group consists of households in villages receiving only the basic health intervention. Households in pure control villages are included to increase precision. The regression controls for group-level baseline hygienic latrine ownership, group share of landless households, and union fixed effects. 95% confidence intervals use standard errors clustered at the village level (the level of randomization).

Figure 7: Effect on Hygienic Latrine Ownership
By Household's Baseline Latrine Ownership Category

(a) Short-term



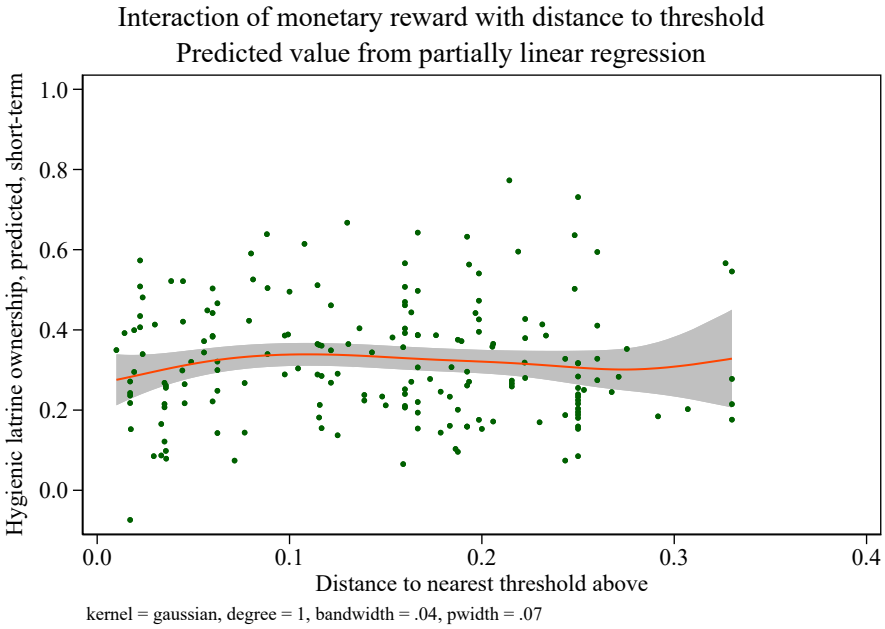
(b) Medium-term



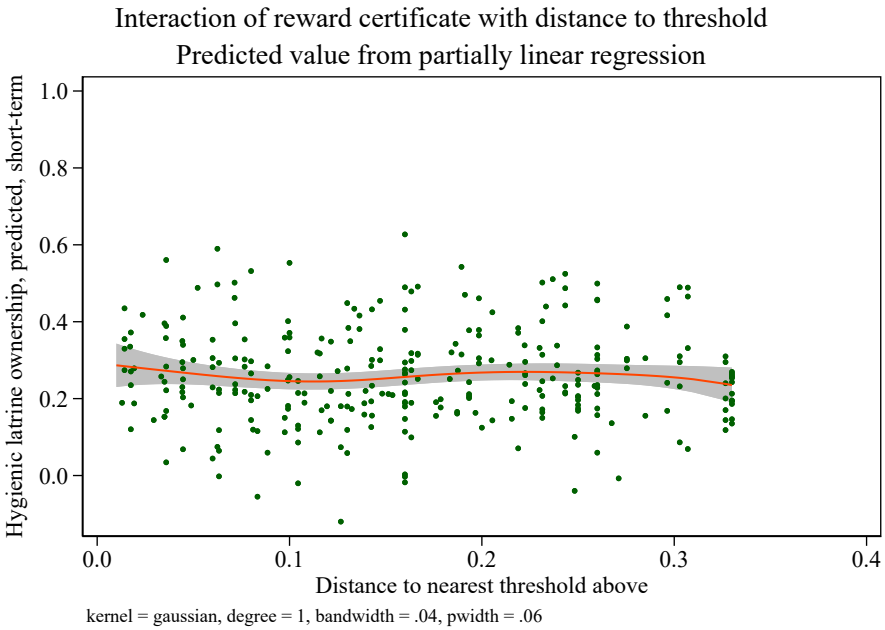
Notes: these graphs present estimated treatment effects of the Monetary Reward and Public Commitment treatments on ownership of a hygienic latrine by category of baseline latrine ownership. The top panel shows short-term effects and the bottom panel shows medium-term effects. The comparison group consists of households in villages receiving only the basic health intervention. Households in pure control villages are included to increase precision (estimates not reported). The regression controls for group-level baseline hygienic latrine ownership, group share of landless households, and union fixed effects. 95% confidence intervals use standard errors clustered at the village level (the level of randomization).

Figure 8: Interaction of Reward Treatments with Distance to Threshold
Short-term effects

(a) Monetary Reward



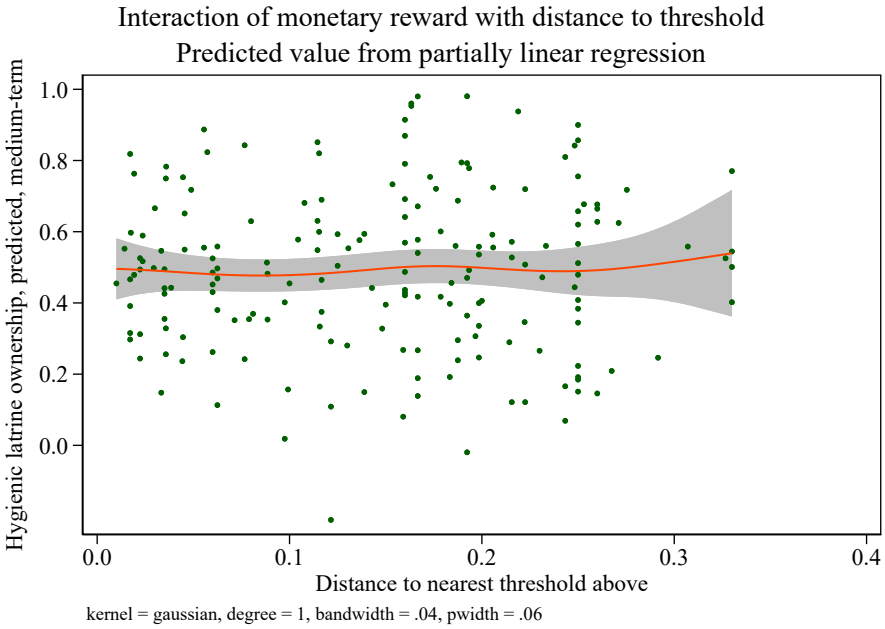
(b) Reward Certificate



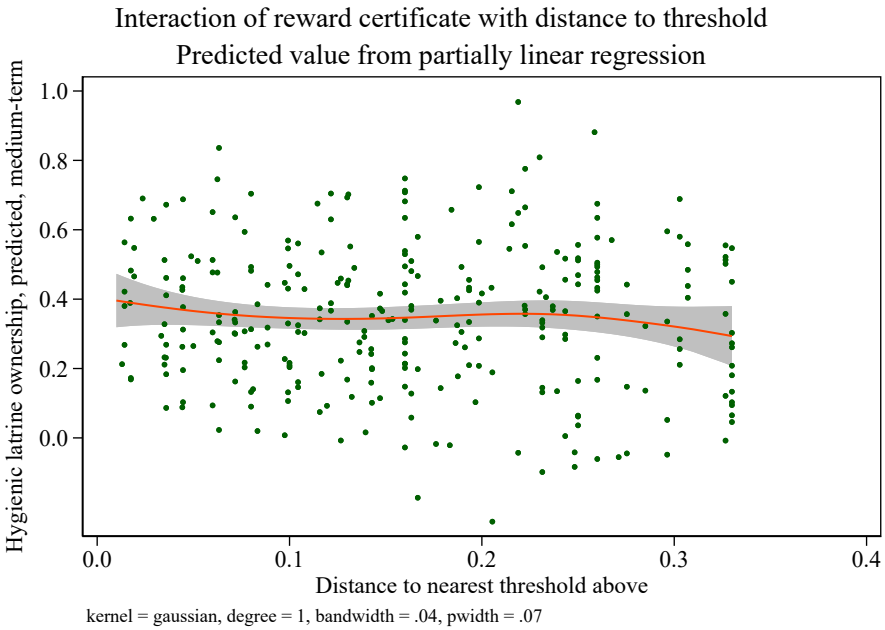
Notes: these figures show the interaction between the treatment indicated with the group's distance to the nearest threshold above at baseline, i.e., the response functions f_1 and f_2 in Equation 4. The outcome variable is hygienic latrine ownership in the short term.

Figure 9: Interaction of Reward Treatments with Distance to Threshold
Medium-term effects

(a) Monetary Reward



(b) Reward Certificate



Notes: these figures show the interaction between the treatment indicated with the group's distance to the nearest threshold above at baseline, i.e., the response functions f_1 and f_2 in Equation 4. The outcome variable is hygienic latrine ownership in the medium term.

Social and Financial Incentives for Overcoming a Collective Action Problem

Appendix Tables and Figures

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A Effect of Common, Meetings-Only Treatment

This appendix provides estimates of the effect of the basic information treatment relative to the pure control group. This effect is captured by $-\beta_0$ in Equation 1 in the main text, reproduced here for convenience:

$$y_{gv} = \beta_1 \text{Incent}_v + \beta_2 \text{Cert}_v + \beta_3 \text{Priv}_v + \beta_4 \text{Publ}_v \tag{1}$$
$$+ \delta y_{0gv} + \gamma \text{ShareLandless}_{gv} + \beta_0 \text{PureControl}_v + \varphi_u + \varepsilon_{gv}$$

The meetings-only treatment has null effects on nearly all of our main outcomes of interest in both the short and medium term. The one exception is the economically large and borderline statistically significant ($p < 0.10$) effect on household self-reported open defecation in the medium term (Table A11). However, note that this is not reflected in the surveyor assessment of open defecation in the same period (Table A10), nor in any of the endline measures of access or ownership (Tables A2, A4, A6, A8), and so this seems likely to be the result of social desirability bias rather than a true change in behavior.

Hygienic Ownership

Table A1: Short Term Hygienic Ownership

	(1)	(2)	(3)	(4)
Meetings Only	-0.033	-0.015	-0.012	-0.014
	(0.043)	(0.041)	(0.024)	(0.023)
	[-0.056, 0.132]	[-0.075, 0.113]	[-0.045, 0.072]	[-0.041, 0.071]
Baseline share owning hyg. lat.			0.745***	0.709***
			(0.022)	(0.022)
Share of households landless				-0.083***
				(0.017)
Union FEs	No	Yes	Yes	Yes
Number of groups	377	377	376	376
Number of villages	31	31	31	31
Omitted category mean	0.399	0.399	0.401	0.401
Omitted category S.D.	(0.240)	(0.240)	(0.240)	(0.240)

Notes: the dependent variable is the share of households in the group with a hygienic latrine in the short term (at the time of assessment). Observations (groups) are weighted by the number of households. The sample consists of all villages. This table presents only the effect of the meetings-only treatment relative to pure controls; effects of the other treatments are reported in the main text. The sample sizes reported here are groups and villages in the meetings-only treatment and pure controls. The omitted category consists of groups in pure control villages. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. Wild cluster bootstrap (9,999 repetitions, Webb weights) 95% confidence intervals, resampling at the village level, in brackets for the coefficients of interest. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A2: Medium Term Hygienic Ownership

	(1)	(2)	(3)	(4)
Meetings Only	-0.043	-0.025	-0.023	-0.025
	(0.036)	(0.034)	(0.022)	(0.021)
	[-0.032, 0.120]	[-0.047, 0.103]	[-0.024, 0.070]	[-0.020, 0.071]
Baseline share owning hyg. lat.			0.552***	0.513***
			(0.033)	(0.036)
Share of households landless				-0.089***
				(0.032)
Union FEs	No	Yes	Yes	Yes
Number of groups	377	377	376	376
Number of villages	31	31	31	31
Omitted category mean	0.540	0.540	0.543	0.543
Omitted category S.D.	(0.249)	(0.249)	(0.247)	(0.247)

Notes: the dependent variable is the share of households in the group with a hygienic latrine in the medium term (12-15 months after assessment). Observations (groups) are weighted by the number of households. The sample consists of all villages. This table presents only the effect of the meetings-only treatment relative to pure controls; effects of the other treatments are reported in the main text. The sample sizes reported here are groups and villages in the meetings-only treatment and pure controls. The omitted category consists of groups in pure control villages. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. Wild cluster bootstrap (9,999 repetitions, Webb weights) 95% confidence intervals, resampling at the village level, in brackets for the coefficients of interest. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Hygienic Access

Table A3: Short Term Hygienic Access

	(1)	(2)	(3)	(4)
Meetings Only	-0.045	-0.023	-0.025	-0.027
	(0.047)	(0.045)	(0.027)	(0.026)
	[-0.052, 0.152]	[-0.072, 0.129]	[-0.038, 0.088]	[-0.035, 0.089]
Hygienic latrine access (group share, R4)			0.724***	0.691***
			(0.024)	(0.025)
Share of households landless				-0.096***
				(0.022)
Union FEs	No	Yes	Yes	Yes
Number of groups	377	377	377	377
Number of villages	31	31	31	31
Omitted category mean	0.484	0.484	0.484	0.484
Omitted category S.D.	(0.268)	(0.268)	(0.268)	(0.268)

Notes: the dependent variable is the share of households in the group with access to a hygienic latrine in the short term (at the time of assessment). Observations (groups) are weighted by the number of households. The sample consists of all villages. This table presents only the effect of the meetings-only treatment relative to pure controls; effects of the other treatments are reported in the main text. The sample sizes reported here are groups and villages in the meetings-only treatment and pure controls. The omitted category consists of groups in pure control villages. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. Wild cluster bootstrap (9,999 repetitions, Webb weights) 95% confidence intervals, resampling at the village level, in brackets for the coefficients of interest. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A4: Medium Term Hygienic Access

	(1)	(2)	(3)	(4)
Meetings Only	-0.055	-0.034	-0.035	-0.037
	(0.039)	(0.037)	(0.026)	(0.025)
	[-0.028, 0.139]	[-0.044, 0.118]	[-0.019, 0.092]	[-0.018, 0.093]
Hygienic latrine access (group share, R4)			0.471***	0.443***
			(0.036)	(0.038)
Share of households landless				-0.083**
				(0.033)
Union FEs	No	Yes	Yes	Yes
Number of groups	377	377	377	377
Number of villages	31	31	31	31
Omitted category mean	0.636	0.636	0.636	0.636
Omitted category S.D.	(0.253)	(0.253)	(0.253)	(0.253)

Notes: the dependent variable is the share of households in the group with access to a hygienic latrine in the medium term (12-15 months after assessment). Observations (groups) are weighted by the number of households. The sample consists of all villages. This table presents only the effect of the meetings-only treatment relative to pure controls; effects of the other treatments are reported in the main text. The sample sizes reported here are groups and villages in the meetings-only treatment and pure controls. The omitted category consists of groups in pure control villages. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. Wild cluster bootstrap (9,999 repetitions, Webb weights) 95% confidence intervals, resampling at the village level, in brackets for the coefficients of interest. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Any Ownership

Table A5: Short Term Any Ownership

	(1)	(2)	(3)	(4)
Meetings Only	-0.021	-0.005	0.023	0.019
	(0.032)	(0.031)	(0.021)	(0.020)
	[-0.045, 0.089]	[-0.061, 0.073]	[-0.067, 0.027]	[-0.061, 0.029]
Any latrine ownership (group share, R4)			0.718***	0.682***
			(0.032)	(0.031)
Share of households landless				-0.096***
				(0.021)
Union FEs	No	Yes	Yes	Yes
Number of groups	377	377	376	376
Number of villages	31	31	31	31
Omitted category mean	0.666	0.666	0.669	0.669
Omitted category S.D.	(0.229)	(0.229)	(0.225)	(0.225)

Notes: the dependent variable is the share of households in the group with any latrine in the short term (at the time of assessment). Observations (groups) are weighted by the number of households. The sample consists of all villages. This table presents only the effect of the meetings-only treatment relative to pure controls; effects of the other treatments are reported in the main text. The sample sizes reported here are groups and villages in the meetings-only treatment and pure controls. The omitted category consists of groups in pure control villages. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. Wild cluster bootstrap (9,999 repetitions, Webb weights) 95% confidence intervals, resampling at the village level, in brackets for the coefficients of interest. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A6: Medium Term Any Ownership

	(1)	(2)	(3)	(4)
Meetings Only	-0.018	0.001	0.022	0.017
	(0.027)	(0.024)	(0.019)	(0.020)
	[-0.042, 0.076]	[-0.052, 0.052]	[-0.064, 0.022]	[-0.060, 0.026]
Any latrine ownership (group share, R4)			0.562***	0.513***
			(0.041)	(0.043)
Share of households landless				-0.129***
				(0.026)
Union FEs	No	Yes	Yes	Yes
Number of groups	377	377	376	376
Number of villages	31	31	31	31
Omitted category mean	0.768	0.768	0.771	0.771
Omitted category S.D.	(0.203)	(0.203)	(0.198)	(0.198)

Notes: the dependent variable is the share of households in the group with any latrine in the medium term (12-15 months after assessment). Observations (groups) are weighted by the number of households. The sample consists of all villages. This table presents only the effect of the meetings-only treatment relative to pure controls; effects of the other treatments are reported in the main text. The sample sizes reported here are groups and villages in the meetings-only treatment and pure controls. The omitted category consists of groups in pure control villages. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. Wild cluster bootstrap (9,999 repetitions, Webb weights) 95% confidence intervals, resampling at the village level, in brackets for the coefficients of interest. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Any Access

Table A7: Short Term Any Access

	(1)	(2)	(3)	(4)
Meetings Only	-0.037	-0.018	-0.001	-0.004
	(0.032)	(0.030)	(0.015)	(0.014)
	[-0.031, 0.104]	[-0.044, 0.081]	[-0.030, 0.031]	[-0.027, 0.035]
Any latrine access (group share, R4)			0.713***	0.680***
			(0.032)	(0.032)
Share of households landless				-0.102***
				(0.022)
Union FEs	No	Yes	Yes	Yes
Number of groups	377	377	377	377
Number of villages	31	31	31	31
Omitted category mean	0.850	0.850	0.850	0.850
Omitted category S.D.	(0.208)	(0.208)	(0.208)	(0.208)

Notes: the dependent variable is the share of households in the group with access to any hygienic latrine in the short term (at the time of assessment). Observations (groups) are weighted by the number of households. The sample consists of all villages. This table presents only the effect of the meetings-only treatment relative to pure controls; effects of the other treatments are reported in the main text. The sample sizes reported here are groups and villages in the meetings-only treatment and pure controls. The omitted category consists of groups in pure control villages. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. Wild cluster bootstrap (9,999 repetitions, Webb weights) 95% confidence intervals, resampling at the village level, in brackets for the coefficients of interest. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A8: Medium Term Any Access

	(1)	(2)	(3)	(4)
Meetings Only	-0.027	-0.009	0.002	-0.000
	(0.024)	(0.023)	(0.015)	(0.015)
	[-0.026, 0.079]	[-0.042, 0.058]	[-0.036, 0.031]	[-0.035, 0.033]
Any latrine access (group share, R4)			0.482***	0.456***
			(0.044)	(0.045)
Share of households landless				-0.078***
				(0.025)
Union FEs	No	Yes	Yes	Yes
Number of groups	377	377	377	377
Number of villages	31	31	31	31
Omitted category mean	0.916	0.916	0.916	0.916
Omitted category S.D.	(0.153)	(0.153)	(0.153)	(0.153)

Notes: the dependent variable is the share of households in the group with access to any hygienic latrine in the medium term (12-15 months after assessment). Observations (groups) are weighted by the number of households. The sample consists of all villages. This table presents only the effect of the meetings-only treatment relative to pure controls; effects of the other treatments are reported in the main text. The sample sizes reported here are groups and villages in the meetings-only treatment and pure controls. The omitted category consists of groups in pure control villages. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. Wild cluster bootstrap (9,999 repetitions, Webb weights) 95% confidence intervals, resampling at the village level, in brackets for the coefficients of interest. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Open Defecation (Surveyor Assessment)

Table A9: Short Term OD – Surveyor Assessment

	(1)	(2)	(3)	(4)
Meetings Only	0.037	0.018	-0.002	-0.000
	(0.032)	(0.030)	(0.012)	(0.012)
	[-0.105, 0.031]	[-0.081, 0.045]	[-0.022, 0.026]	[-0.024, 0.025]
Open defecation (group share, R4)			0.780***	0.760***
			(0.028)	(0.028)
Share of households landless				0.050**
				(0.019)
Union FEs	No	Yes	Yes	Yes
Number of groups	377	377	377	377
Number of villages	31	31	31	31
Omitted category mean	0.150	0.150	0.150	0.150
Omitted category S.D.	(0.208)	(0.208)	(0.208)	(0.208)

Notes: the dependent variable is the share of households primarily practicing OD in the short term (at the time of assessment). Observations (groups) are weighted by the number of households. The sample consists of all villages. This table presents only the effect of the meetings-only treatment relative to pure controls; effects of the other treatments are reported in the main text. The sample sizes reported here are groups and villages in the meetings-only treatment and pure controls. The omitted category consists of groups in pure control villages. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. Wild cluster bootstrap (9,999 repetitions, Webb weights) 95% confidence intervals, resampling at the village level, in brackets for the coefficients of interest. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A10: Medium Term OD – Surveyor Assessment

	(1)	(2)	(3)	(4)
Meetings Only	0.027	0.009	-0.004	-0.003
	(0.024)	(0.023)	(0.014)	(0.014)
	[-0.078, 0.026]	[-0.058, 0.043]	[-0.027, 0.036]	[-0.029, 0.034]
Open defecation (group share, R4)			0.522***	0.504***
			(0.044)	(0.046)
Share of households landless				0.046*
				(0.025)
Union FEs	No	Yes	Yes	Yes
Number of groups	377	377	377	377
Number of villages	31	31	31	31
Omitted category mean	0.084	0.084	0.084	0.084
Omitted category S.D.	(0.153)	(0.153)	(0.153)	(0.153)

Notes: the dependent variable is the share of households primarily practicing OD in the medium term (12-15 months after assessment). Observations (groups) are weighted by the number of households. The sample consists of all villages. This table presents only the effect of the meetings-only treatment relative to pure controls; effects of the other treatments are reported in the main text. The sample sizes reported here are groups and villages in the meetings-only treatment and pure controls. The omitted category consists of groups in pure control villages. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. Wild cluster bootstrap (9,999 repetitions, Webb weights) 95% confidence intervals, resampling at the village level, in brackets for the coefficients of interest. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Open Defecation (Household Self-Report, Endline Only)

Table A11: Medium Term OD – Household Self-Report

	(1)	(2)	(3)	(4)
Meetings Only	-0.087	-0.171*	-0.165*	-0.162*
	(0.100)	(0.089)	(0.088)	(0.087)
	[-0.140, 0.303]	[-0.050, 0.368]	[-0.053, 0.360]	[-0.051, 0.353]
Open defecation (group share, R4)			0.458***	0.414***
			(0.052)	(0.052)
Share of households landless				0.143***
				(0.040)
Union FEs	No	Yes	Yes	Yes
Number of groups	377	377	377	377
Number of villages	31	31	31	31
Omitted category mean	0.469	0.469	0.469	0.469
Omitted category S.D.	(0.355)	(0.355)	(0.355)	(0.355)

Notes: the dependent variable is the share of households regularly practicing OD in the medium term (12-15 months after assessment). Observations (groups) are weighted by the number of households. The sample consists of all villages. This table presents only the effect of the meetings-only treatment relative to pure controls; effects of the other treatments are reported in the main text. The sample sizes reported here are groups and villages in the meetings-only treatment and pure controls. The omitted category consists of groups in pure control villages. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. Wild cluster bootstrap (9,999 repetitions, Webb weights) 95% confidence intervals, resampling at the village level, in brackets for the coefficients of interest. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

B Robustness Checks for Main Outcomes of Interest

This appendix reports two sets of robustness checks for our estimates of treatment effects on the main outcomes of interest: hygienic latrine ownership in the short and medium term.

The first robustness check consists of re-estimating Equation 1 from the main text, but assigning each group equal weight (i.e., without weighting groups by the number of households). The estimates, reported in Tables B1 and B2, are virtually unchanged from those of the main text (Tables 3 and 4, respectively).

The second robustness check consists of specifications augmenting Equation 1 from the main text by interacting the treatment dummies with demeaned values of the control variables. As argued by Lin (2013) and Gibbons et al. (2019), the level (non-interacted) terms are a more robust estimator of the average treatment effect in the presence of heterogeneity with respect to the control variables. Specifically, we estimate

$$\begin{aligned} y_{gv} = & \sum_{t=0}^{4} \beta_t \left\{\text{Treatment}_v = t\right\} \\ & + \sum_{t=0}^{4} \delta_t \left\{\text{Treatment}_v = t\right\} \times y_{0gv} + \sum_{t=0}^{4} \gamma_t \left\{\text{Treatment}_v = t\right\} \times \text{ShareLandless}_{gv} \\ & + \delta_L y_{0gv} + \gamma_L \text{ShareLandless}_{gv} \\ & + \varphi_u + \varepsilon_{gv}, \end{aligned} \tag{B-1}$$

where $t = 0, \ldots, 4$ indexes treatments (PureControl, Incent, Cert, Priv, Publ), and each treatment is interacted with (demeaned values of) the control variables y_{0gv} and $\text{ShareLandless}_{gv}$. The coefficients β_t on the non-interacted treatment term represent average treatment effects. As in the main text, the common, meetings-only treatment is the omitted category so estimates are relative to that group.

We present results for our main outcome of interest, hygienic latrine ownership, for the short term in Table B3 and Figure B1 and for the medium term in Table B4 and Figure B2. Here, we report the non-interacted coefficients (i.e., $\{\beta_t\}$ from Equation B-1), representing the average treatment effects; we discuss interactions in Section 5.2. The results are generally similar to those in the main text. The main difference to note is that the estimated difference between the short-run effects of the monetary reward and private commitment treatments has the same magnitude but is no longer significant at the 10% level ($p = 0.101$).

Table B1: Short-term Effects: Hygienic Latrine Ownership
Unweighted Regressions

	(1)	(2)	(3)	(4)
Monetary Reward	0.098**	0.125***	0.075***	0.079***
	(0.046)	(0.035)	(0.016)	(0.016)
	[0.002, 0.197]	[0.046, 0.203]	[0.039, 0.109]	[0.044, 0.111]
Reward Certificate	0.056	0.048	0.011	0.012
	(0.046)	(0.040)	(0.012)	(0.012)
	[-0.053, 0.162]	[-0.050, 0.142]	[-0.017, 0.038]	[-0.015, 0.039]
Private Commitment	0.007	0.012	0.011	0.010
	(0.046)	(0.040)	(0.012)	(0.012)
	[-0.096, 0.113]	[-0.078, 0.106]	[-0.017, 0.038]	[-0.018, 0.037]
Public Commitment	0.057	0.067*	0.046***	0.045***
	(0.043)	(0.037)	(0.016)	(0.016)
	[-0.033, 0.148]	[-0.016, 0.150]	[0.012, 0.080]	[0.010, 0.080]
Baseline share owning hyg. lat.			0.749***	0.712***
			(0.021)	(0.022)
Share of households landless				-0.083***
				(0.018)
Union FEs	No	Yes	Yes	Yes
Diff.: Monetary – Public	0.041	0.058	0.030	0.034
	(0.064)	(0.047)	(0.020)	(0.020)
p-value	0.522	0.216	0.135	0.097
Diff.: Monetary – Certificate	0.042	0.076	0.065	0.067
	(0.049)	(0.040)	(0.016)	(0.016)
p-value	0.398	0.058	0.000	0.000
Diff.: Public – Private	0.050	0.055	0.034	0.035
	(0.053)	(0.041)	(0.016)	(0.015)
p-value	0.341	0.180	0.030	0.023
Number of groups	1,236	1,236	1,235	1,235
Number of villages	107	107	107	107
Omitted category mean	0.451	0.451	0.451	0.451
Omitted category S.D.	(0.189)	(0.189)	(0.189)	(0.189)

Notes: the dependent variable is the share of households in the group with a hygienic latrine in the short term (at the time of assessment). Observations (groups) are unweighted. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. Wild cluster bootstrap (9,999 repetitions, Webb weights) 95% confidence intervals, resampling at the village level, in brackets for the coefficients of interest. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B2: Medium-term Effects: Hygienic Latrine Ownership
Unweighted Regressions

	(1)	(2)	(3)	(4)
Monetary Reward	0.039	0.048	0.010	0.013
	(0.036)	(0.031)	(0.021)	(0.020)
	[-0.036, 0.115]	[-0.019, 0.116]	[-0.034, 0.053]	[-0.030, 0.056]
Reward Certificate	0.048	0.045	0.017	0.018
	(0.040)	(0.038)	(0.023)	(0.023)
	[-0.045, 0.139]	[-0.044, 0.132]	[-0.036, 0.067]	[-0.033, 0.068]
Private Commitment	0.016	0.017	0.017	0.016
	(0.042)	(0.041)	(0.025)	(0.025)
	[-0.083, 0.111]	[-0.082, 0.113]	[-0.046, 0.073]	[-0.046, 0.071]
Public Commitment	0.081**	0.080***	0.063***	0.062***
	(0.032)	(0.029)	(0.017)	(0.017)
	[0.014, 0.148]	[0.019, 0.140]	[0.029, 0.098]	[0.027, 0.098]
Baseline share owning hyg. lat.			0.557***	0.518***
			(0.034)	(0.037)
Share of households landless				-0.090***
				(0.033)
Union FEs	No	Yes	Yes	Yes
Diff.: Monetary – Public	-0.042	-0.032	-0.053	-0.049
	(0.050)	(0.042)	(0.031)	(0.031)
p-value	0.407	0.448	0.089	0.121
Diff.: Monetary – Certificate	-0.009	0.003	-0.007	-0.005
	(0.040)	(0.033)	(0.019)	(0.019)
p-value	0.831	0.935	0.722	0.795
Diff.: Public – Private	0.065	0.063	0.047	0.047
	(0.043)	(0.037)	(0.023)	(0.022)
p-value	0.132	0.095	0.046	0.040
Number of groups	1,235	1,235	1,234	1,234
Number of villages	107	107	107	107
Omitted category mean	0.544	0.544	0.544	0.544
Omitted category S.D.	(0.255)	(0.255)	(0.255)	(0.255)

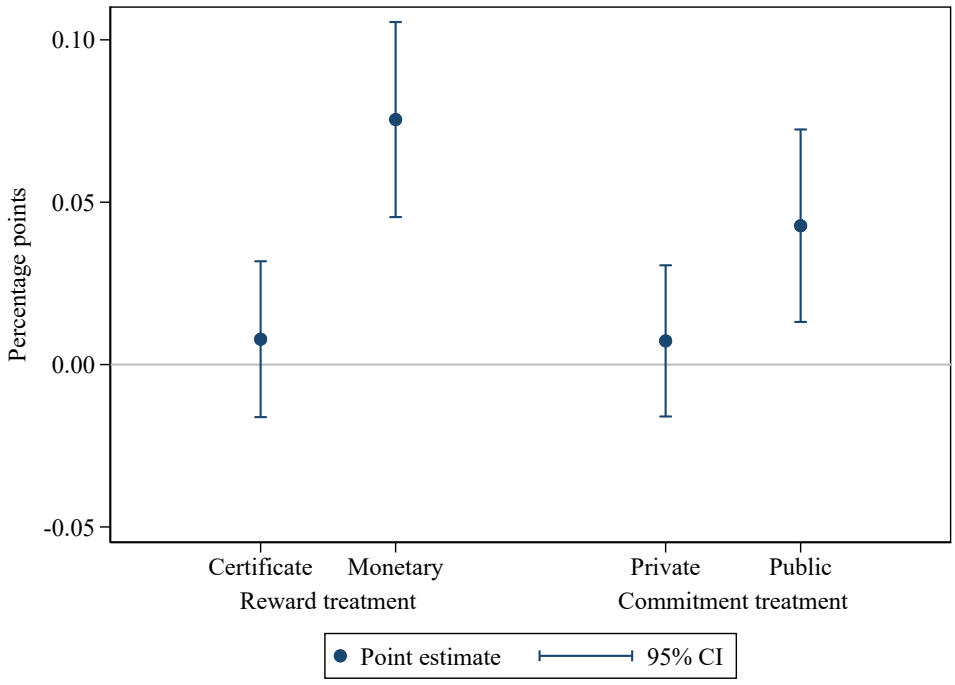
Notes: the dependent variable is the share of households in the group with a hygienic latrine in the medium term (12-15 months after assessment). Observations (groups) are unweighted. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. Wild cluster bootstrap (9,999 repetitions, Webb weights) 95% confidence intervals, resampling at the village level, in brackets for the coefficients of interest. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B3: Short-term Effects: Hygienic Latrine Ownership
Interact Treatment with De-Meaned Control Variables

	(1)	(2)	(3)	(4)
Monetary Reward	0.100**	0.125***	0.072***	0.075***
	(0.045)	(0.034)	(0.016)	(0.015)
	[0.006, 0.196]	[0.052, 0.200]	[0.037, 0.107]	[0.042, 0.108]
Reward Certificate	0.051	0.044	0.008	0.008
	(0.044)	(0.037)	(0.012)	(0.012)
	[-0.049, 0.151]	[-0.047, 0.130]	[-0.019, 0.035]	[-0.019, 0.035]
Private Commitment	0.002	0.008	0.009	0.007
	(0.044)	(0.038)	(0.012)	(0.012)
	[-0.098, 0.103]	[-0.076, 0.098]	[-0.018, 0.035]	[-0.019, 0.034]
Public Commitment	0.056	0.063*	0.043***	0.043***
	(0.041)	(0.036)	(0.016)	(0.015)
	[-0.031, 0.143]	[-0.017, 0.143]	[0.009, 0.079]	[0.009, 0.078]
Baseline share owning hyg. lat.			0.696***	0.694***
			(0.057)	(0.053)
Share of households landless				-0.016
				(0.040)
Union FEs	No	Yes	Yes	Yes
Diff.: Monetary – Public	0.044	0.062	0.029	0.033
	(0.061)	(0.046)	(0.019)	(0.020)
p-value	0.469	0.182	0.138	0.101
Diff.: Monetary – Certificate	0.049	0.081	0.065	0.068
	(0.047)	(0.039)	(0.016)	(0.015)
p-value	0.304	0.038	0.000	0.000
Diff.: Public – Private	0.054	0.055	0.035	0.035
	(0.050)	(0.038)	(0.015)	(0.014)
p-value	0.286	0.156	0.020	0.013
Number of groups	1,236	1,236	1,235	1,235
Number of villages	107	107	107	107
Omitted category mean	0.451	0.451	0.451	0.451
Omitted category S.D.	(0.189)	(0.189)	(0.189)	(0.189)

Notes: the dependent variable is the share of households in the group with a hygienic latrine in the short term (at the time of assessment). Following Lin (2013), in columns (3) and (4), the control variables are de-meaned and interacted with the treatment indicators. The non-interacted coefficients reported here represent the average treatment effects. Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. Wild cluster bootstrap (9,999 repetitions, Webb weights) 95% confidence intervals, resampling at the village level, in brackets for the coefficients of interest. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure B1: Short-term Effects: Hygienic Latrine Ownership
Interact Treatment with De-Meaned Control Variables



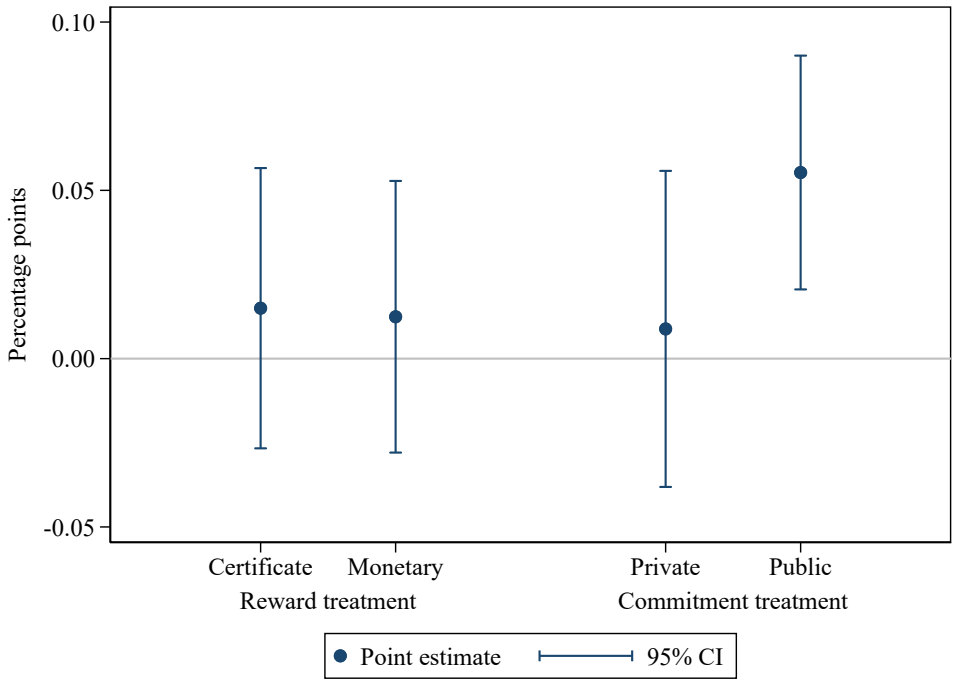
Notes: this graph presents estimated treatment effects of the interventions on the share of households in the group with a hygienic latrine in the short term (at the time of assessment). The regression includes for the baseline level of the outcome variable, the share of households in the group that are landless, and union fixed effects. Observations (groups) are unweighted. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. 95% confidence intervals use standard errors clustered at the village level (the level of randomization).

Table B4: Medium-term Effects: Hygienic Latrine Ownership
Interact Treatment with De-Meaned Control Variables

	(1)	(2)	(3)	(4)
Monetary Reward	0.041	0.047	0.008	0.012
	(0.036)	(0.030)	(0.021)	(0.021)
	[-0.035, 0.116]	[-0.017, 0.111]	[-0.037, 0.052]	[-0.031, 0.056]
Reward Certificate	0.045	0.043	0.013	0.015
	(0.038)	(0.035)	(0.022)	(0.021)
	[-0.044, 0.130]	[-0.040, 0.124]	[-0.038, 0.059]	[-0.033, 0.061]
Private Commitment	0.011	0.013	0.009	0.009
	(0.040)	(0.039)	(0.025)	(0.024)
	[-0.083, 0.101]	[-0.079, 0.103]	[-0.045, 0.065]	[-0.046, 0.063]
Public Commitment	0.075**	0.072**	0.056***	0.055***
	(0.032)	(0.028)	(0.018)	(0.018)
	[0.007, 0.143]	[0.012, 0.132]	[0.020, 0.092]	[0.018, 0.093]
Baseline share owning hyg. lat.			0.516***	0.451***
			(0.076)	(0.084)
Share of households landless				-0.152**
				(0.066)
Union FEs	No	Yes	Yes	Yes
Diff.: Monetary – Public	-0.035	-0.025	-0.048	-0.043
	(0.050)	(0.042)	(0.030)	(0.030)
p-value	0.490	0.544	0.118	0.161
Diff.: Monetary – Certificate	-0.004	0.004	-0.005	-0.003
	(0.039)	(0.032)	(0.019)	(0.019)
p-value	0.916	0.899	0.806	0.892
Diff.: Public – Private	0.064	0.059	0.046	0.046
	(0.041)	(0.036)	(0.022)	(0.021)
p-value	0.122	0.098	0.037	0.030
Number of groups	1,235	1,235	1,234	1,234
Number of villages	107	107	107	107
Omitted category mean	0.544	0.544	0.544	0.544
Omitted category S.D.	(0.255)	(0.255)	(0.255)	(0.255)

Notes: the dependent variable is the share of households in the group with a hygienic latrine in the medium term (12-15 months after assessment). Following Lin (2013), in columns (3) and (4), the control variables are de-meaned and interacted with the treatment indicators. The non-interacted coefficients reported here represent the average treatment effects. Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. Wild cluster bootstrap (9,999 repetitions, Webb weights) 95% confidence intervals, resampling at the village level, in brackets for the coefficients of interest. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure B2: Medium-term Effects: Hygienic Latrine Ownership
Interact Treatment with De-Meaned Control Variables



Notes: this graph presents estimated treatment effects of the interventions on the share of households in the group with a hygienic latrine in the medium term (12-15 months after assessment). The regression includes for the baseline level of the outcome variable, the share of households in the group that are landless, and union fixed effects. Observations (groups) are unweighted. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. 95% confidence intervals use standard errors clustered at the village level (the level of randomization).

C Estimated Effects on Secondary Outcomes

This appendix presents estimated treatment effects in the short- and medium-term on secondary outcomes of interest, namely:

- Hygienic Latrine Access (Tables C1 and C5)
- Any Latrine Ownership (Tables C2 and C6)
- Any Latrine Access (Tables C3 and C7)
- Open Defecation – Surveyor Assessment (Tables C4 and C8)
- Open Defecation – Household Self-Report (Table C9)

The estimation equation is given by Equation 1 in the main text.

Short-Term Effects

Table C1: Short-term Effects: Hygienic Latrine Access

	(1)	(2)	(3)	(4)
Monetary Reward	0.098**	0.123***	0.073***	0.076***
	(0.049)	(0.037)	(0.019)	(0.018)
	[-0.004, 0.204]	[0.045, 0.202]	[0.033, 0.112]	[0.037, 0.114]
Reward Certificate	0.060	0.052	0.006	0.008
	(0.050)	(0.044)	(0.016)	(0.016)
	[-0.059, 0.171]	[-0.057, 0.152]	[-0.029, 0.042]	[-0.028, 0.045]
Private Commitment	0.014	0.021	0.029*	0.028*
	(0.050)	(0.045)	(0.015)	(0.015)
	[-0.101, 0.128]	[-0.076, 0.124]	[-0.005, 0.062]	[-0.006, 0.060]
Public Commitment	0.065	0.071	0.053**	0.052**
	(0.048)	(0.043)	(0.021)	(0.021)
	[-0.037, 0.167]	[-0.024, 0.167]	[0.006, 0.101]	[0.005, 0.100]
Hygienic latrine access (group share, R4)			0.724***	0.691***
			(0.024)	(0.025)
Share of households landless				-0.096***
				(0.022)
Union FEs	No	Yes	Yes	Yes
Diff.: Monetary – Public	0.033	0.052	0.020	0.024
	(0.069)	(0.055)	(0.025)	(0.026)
p-value	0.634	0.343	0.436	0.348
Diff.: Monetary – Certificate	0.038	0.071	0.066	0.068
	(0.054)	(0.045)	(0.020)	(0.020)
p-value	0.482	0.116	0.002	0.001
Diff.: Public – Private	0.051	0.049	0.024	0.024
	(0.056)	(0.043)	(0.020)	(0.020)
p-value	0.362	0.253	0.242	0.225
Number of groups	1,236	1,236	1,236	1,236
Number of villages	107	107	107	107
Omitted category mean	0.528	0.528	0.528	0.528
Omitted category S.D.	(0.218)	(0.218)	(0.218)	(0.218)

Notes: the dependent variable is the share of households in the group with access to a hygienic latrine in the short term (at the time of assessment). Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. Wild cluster bootstrap (9,999 repetitions, Webb weights) 95% confidence intervals, resampling at the village level, in brackets for the coefficients of interest. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C2: Short-term Effects: Any Latrine Ownership

	(1)	(2)	(3)	(4)
Monetary Reward	0.059**	0.065***	0.025*	0.028*
	(0.030)	(0.023)	(0.015)	(0.015)
	[-0.003, 0.123]	[0.017, 0.113]	[-0.006, 0.060]	[-0.002, 0.061]
Reward Certificate	0.030	0.029	0.003	0.004
	(0.029)	(0.025)	(0.012)	(0.012)
	[-0.037, 0.093]	[-0.031, 0.087]	[-0.023, 0.027]	[-0.021, 0.028]
Private Commitment	-0.006	-0.007	-0.005	-0.006
	(0.029)	(0.027)	(0.012)	(0.012)
	[-0.070, 0.055]	[-0.066, 0.053]	[-0.031, 0.020]	[-0.031, 0.019]
Public Commitment	0.026	0.023	0.003	0.002
	(0.027)	(0.023)	(0.015)	(0.014)
	[-0.032, 0.083]	[-0.027, 0.073]	[-0.030, 0.034]	[-0.030, 0.033]
Any latrine ownership (group share, R4)			0.718***	0.682***
			(0.032)	(0.031)
Share of households landless				-0.096***
				(0.021)
Union FEs	No	Yes	Yes	Yes
Diff.: Monetary – Public	0.034	0.042	0.022	0.026
	(0.042)	(0.033)	(0.020)	(0.020)
p-value	0.426	0.209	0.264	0.201
Diff.: Monetary – Certificate	0.030	0.035	0.023	0.025
	(0.029)	(0.024)	(0.014)	(0.014)
p-value	0.305	0.142	0.115	0.076
Diff.: Public – Private	0.031	0.030	0.008	0.008
	(0.032)	(0.026)	(0.015)	(0.014)
p-value	0.337	0.254	0.596	0.581
Number of groups	1,236	1,236	1,235	1,235
Number of villages	107	107	107	107
Omitted category mean	0.713	0.713	0.713	0.713
Omitted category S.D.	(0.204)	(0.204)	(0.204)	(0.204)

Notes: the dependent variable is the share of households in the group with any latrine in the short term (at the time of assessment). Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. Wild cluster bootstrap (9,999 repetitions, Webb weights) 95% confidence intervals, resampling at the village level, in brackets for the coefficients of interest. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C3: Short-term Effects: Any Latrine Access

	(1)	(2)	(3)	(4)
Monetary Reward	0.037	0.038	0.015	0.018
	(0.033)	(0.026)	(0.015)	(0.014)
	[-0.033, 0.107]	[-0.016, 0.094]	[-0.017, 0.048]	[-0.014, 0.051]
Reward Certificate	0.041	0.042	0.010	0.011
	(0.031)	(0.026)	(0.011)	(0.012)
	[-0.028, 0.104]	[-0.019, 0.098]	[-0.013, 0.034]	[-0.014, 0.036]
Private Commitment	-0.015	-0.016	-0.003	-0.004
	(0.030)	(0.027)	(0.012)	(0.013)
	[-0.083, 0.048]	[-0.077, 0.042]	[-0.027, 0.024]	[-0.031, 0.025]
Public Commitment	0.004	-0.002	-0.008	-0.010
	(0.030)	(0.025)	(0.012)	(0.012)
	[-0.061, 0.066]	[-0.055, 0.050]	[-0.034, 0.018]	[-0.035, 0.016]
Any latrine access (group share, R4)			0.713***	0.680***
			(0.032)	(0.032)
Share of households landless				-0.102***
				(0.022)
Union FEs	No	Yes	Yes	Yes
Diff.: Monetary – Public	0.033	0.040	0.024	0.028
	(0.048)	(0.039)	(0.019)	(0.019)
p-value	0.491	0.299	0.211	0.159
Diff.: Monetary – Certificate	-0.004	-0.003	0.006	0.007
	(0.030)	(0.027)	(0.016)	(0.015)
p-value	0.885	0.905	0.713	0.655
Diff.: Public – Private	0.018	0.014	-0.005	-0.006
	(0.033)	(0.027)	(0.013)	(0.013)
p-value	0.576	0.606	0.667	0.674
Number of groups	1,236	1,236	1,236	1,236
Number of villages	107	107	107	107
Omitted category mean	0.868	0.868	0.868	0.868
Omitted category S.D.	(0.195)	(0.195)	(0.195)	(0.195)

Notes: the dependent variable is the share of households in the group with access to any hygienic latrine in the short term (at the time of assessment). Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. Wild cluster bootstrap (9,999 repetitions, Webb weights) 95% confidence intervals, resampling at the village level, in brackets for the coefficients of interest. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C4: Short-term Effects: Open Defecation
Based on surveyor assessment of household's primary latrine

	(1)	(2)	(3)	(4)
Monetary Reward	-0.037	-0.038	-0.004	-0.005
	(0.033)	(0.026)	(0.012)	(0.012)
	[-0.106, 0.032]	[-0.092, 0.015]	[-0.031, 0.023]	[-0.032, 0.021]
Reward Certificate	-0.041	-0.042	-0.004	-0.004
	(0.031)	(0.026)	(0.009)	(0.010)
	[-0.105, 0.027]	[-0.097, 0.019]	[-0.024, 0.016]	[-0.026, 0.015]
Private Commitment	0.015	0.016	-0.000	0.001
	(0.030)	(0.027)	(0.010)	(0.010)
	[-0.048, 0.082]	[-0.043, 0.077]	[-0.022, 0.021]	[-0.023, 0.023]
Public Commitment	-0.004	0.002	-0.007	-0.006
	(0.030)	(0.025)	(0.010)	(0.010)
	[-0.066, 0.059]	[-0.050, 0.056]	[-0.027, 0.014]	[-0.026, 0.015]
Open defecation (group share, R4)			0.780***	0.760***
			(0.028)	(0.028)
Share of households landless				0.050**
				(0.019)
Union FEs	No	Yes	Yes	Yes
Diff.: Monetary – Public	-0.033	-0.040	0.003	0.000
	(0.048)	(0.039)	(0.016)	(0.016)
p-value	0.491	0.299	0.851	0.985
Diff.: Monetary – Certificate	0.004	0.003	-0.000	-0.001
	(0.030)	(0.027)	(0.012)	(0.012)
p-value	0.885	0.905	0.982	0.940
Diff.: Public – Private	-0.018	-0.014	-0.007	-0.006
	(0.033)	(0.027)	(0.010)	(0.011)
p-value	0.576	0.606	0.515	0.543
Number of groups	1,236	1,236	1,236	1,236
Number of villages	107	107	107	107
Omitted category mean	0.132	0.132	0.132	0.132
Omitted category S.D.	(0.195)	(0.195)	(0.195)	(0.195)

Notes: the dependent variable is the share of households primarily practicing OD in the short term (at the time of assessment). Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. Wild cluster bootstrap (9,999 repetitions, Webb weights) 95% confidence intervals, resampling at the village level, in brackets for the coefficients of interest. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Medium-Term Effects

Table C5: Medium-term Effects: Hygienic Latrine Access

	(1)	(2)	(3)	(4)
Monetary Reward	0.028	0.030	-0.003	-0.000
	(0.039)	(0.034)	(0.024)	(0.023)
	[-0.055, 0.111]	[-0.043, 0.105]	[-0.054, 0.047]	[-0.050, 0.049]
Reward Certificate	0.046	0.045	0.015	0.017
	(0.046)	(0.043)	(0.029)	(0.029)
	[-0.061, 0.150]	[-0.060, 0.145]	[-0.052, 0.081]	[-0.049, 0.081]
Private Commitment	0.019	0.021	0.026	0.025
	(0.048)	(0.047)	(0.032)	(0.032)
	[-0.091, 0.127]	[-0.091, 0.131]	[-0.054, 0.100]	[-0.054, 0.098]
Public Commitment	0.094**	0.088**	0.076***	0.075***
	(0.038)	(0.034)	(0.022)	(0.021)
	[0.013, 0.176]	[0.016, 0.160]	[0.031, 0.123]	[0.030, 0.122]
Hygienic latrine access (group share, R4)			0.471***	0.443***
			(0.036)	(0.038)
Share of households landless				-0.083**
				(0.033)
Union FEs	No	Yes	Yes	Yes
Diff.: Monetary – Public	-0.066	-0.058	-0.079	-0.075
	(0.057)	(0.050)	(0.035)	(0.035)
p-value	0.245	0.245	0.027	0.035
Diff.: Monetary – Certificate	-0.019	-0.015	-0.019	-0.017
	(0.044)	(0.038)	(0.024)	(0.024)
p-value	0.673	0.695	0.443	0.469
Diff.: Public – Private	0.075	0.067	0.050	0.050
	(0.047)	(0.042)	(0.030)	(0.029)
p-value	0.114	0.111	0.095	0.086
Number of groups	1,235	1,235	1,235	1,235
Number of villages	107	107	107	107
Omitted category mean	0.627	0.627	0.627	0.627
Omitted category S.D.	(0.278)	(0.278)	(0.278)	(0.278)

Notes: the dependent variable is the share of households in the group with access to a hygienic latrine in the medium term (12-15 months after assessment). Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. Wild cluster bootstrap (9,999 repetitions, Webb weights) 95% confidence intervals, resampling at the village level, in brackets for the coefficients of interest. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C6: Medium-term Effects: Any Latrine Ownership

	(1)	(2)	(3)	(4)
Monetary Reward	0.023	0.023	-0.008	-0.004
	(0.026)	(0.021)	(0.017)	(0.016)
	[-0.033, 0.080]	[-0.022, 0.068]	[-0.043, 0.030]	[-0.038, 0.032]
Reward Certificate	0.029	0.029	0.008	0.009
	(0.022)	(0.020)	(0.016)	(0.016)
	[-0.021, 0.074]	[-0.017, 0.071]	[-0.026, 0.042]	[-0.024, 0.043]
Private Commitment	-0.008	-0.008	-0.006	-0.008
	(0.024)	(0.022)	(0.016)	(0.016)
	[-0.062, 0.041]	[-0.060, 0.039]	[-0.040, 0.030]	[-0.041, 0.028]
Public Commitment	0.015	0.008	-0.007	-0.009
	(0.021)	(0.017)	(0.015)	(0.015)
	[-0.029, 0.059]	[-0.028, 0.044]	[-0.039, 0.023]	[-0.041, 0.022]
Any latrine ownership (group share, R4)			0.562***	0.513***
			(0.041)	(0.043)
Share of households landless				-0.129***
				(0.026)
Union FEs	No	Yes	Yes	Yes
Diff.: Monetary – Public	0.008	0.015	-0.001	0.005
	(0.034)	(0.025)	(0.024)	(0.023)
p-value	0.824	0.560	0.978	0.842
Diff.: Monetary – Certificate	-0.006	-0.006	-0.016	-0.013
	(0.025)	(0.021)	(0.015)	(0.014)
p-value	0.806	0.774	0.292	0.353
Diff.: Public – Private	0.023	0.016	-0.001	-0.001
	(0.026)	(0.021)	(0.016)	(0.016)
p-value	0.364	0.447	0.938	0.944
Number of groups	1,235	1,235	1,234	1,234
Number of villages	107	107	107	107
Omitted category mean	0.782	0.782	0.782	0.782
Omitted category S.D.	(0.217)	(0.217)	(0.217)	(0.217)

Notes: the dependent variable is the share of households in the group with any latrine in the medium term (12-15 months after assessment). Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. Wild cluster bootstrap (9,999 repetitions, Webb weights) 95% confidence intervals, resampling at the village level, in brackets for the coefficients of interest. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C7: Medium-term Effects: Any Latrine Access

	(1)	(2)	(3)	(4)
Monetary Reward	0.011	0.006	-0.009	-0.007
	(0.027)	(0.022)	(0.017)	(0.017)
	[-0.048, 0.069]	[-0.043, 0.055]	[-0.046, 0.029]	[-0.044, 0.030]
Reward Certificate	0.028	0.028	0.006	0.007
	(0.023)	(0.022)	(0.014)	(0.013)
	[-0.026, 0.076]	[-0.023, 0.075]	[-0.025, 0.035]	[-0.022, 0.036]
Private Commitment	-0.009	-0.009	0.000	-0.001
	(0.026)	(0.024)	(0.015)	(0.015)
	[-0.070, 0.044]	[-0.067, 0.044]	[-0.034, 0.033]	[-0.034, 0.031]
Public Commitment	0.012	0.003	-0.001	-0.002
	(0.022)	(0.018)	(0.013)	(0.013)
	[-0.034, 0.057]	[-0.035, 0.041]	[-0.028, 0.027]	[-0.029, 0.025]
Any latrine access (group share, R4)			0.482***	0.456***
			(0.044)	(0.045)
Share of households landless				-0.078***
				(0.025)
Union FEs	No	Yes	Yes	Yes
Diff.: Monetary – Public	-0.002	0.003	-0.008	-0.005
	(0.036)	(0.030)	(0.024)	(0.024)
p-value	0.962	0.914	0.741	0.833
Diff.: Monetary – Certificate	-0.017	-0.021	-0.015	-0.014
	(0.027)	(0.025)	(0.017)	(0.017)
p-value	0.527	0.398	0.386	0.390
Diff.: Public – Private	0.021	0.012	-0.001	-0.001
	(0.025)	(0.023)	(0.014)	(0.014)
p-value	0.404	0.597	0.945	0.934
Number of groups	1,235	1,235	1,235	1,235
Number of villages	107	107	107	107
Omitted category mean	0.918	0.918	0.918	0.918
Omitted category S.D.	(0.188)	(0.188)	(0.188)	(0.188)

Notes: the dependent variable is the share of households in the group with access to any hygienic latrine in the medium term (12-15 months after assessment). Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. Wild cluster bootstrap (9,999 repetitions, Webb weights) 95% confidence intervals, resampling at the village level, in brackets for the coefficients of interest. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C8: Medium-term Effects: Open Defecation
Based on surveyor assessment of household's primary latrine

	(1)	(2)	(3)	(4)
Monetary Reward	-0.011	-0.006	0.017	0.015
	(0.027)	(0.022)	(0.016)	(0.015)
	[-0.069, 0.048]	[-0.054, 0.042]	[-0.017, 0.051]	[-0.019, 0.048]
Reward Certificate	-0.028	-0.028	-0.002	-0.003
	(0.023)	(0.022)	(0.013)	(0.013)
	[-0.076, 0.026]	[-0.074, 0.022]	[-0.030, 0.027]	[-0.031, 0.026]
Private Commitment	0.009	0.009	-0.002	-0.001
	(0.026)	(0.024)	(0.014)	(0.014)
	[-0.044, 0.069]	[-0.043, 0.067]	[-0.032, 0.031]	[-0.031, 0.031]
Public Commitment	-0.012	-0.003	-0.009	-0.008
	(0.022)	(0.018)	(0.012)	(0.011)
	[-0.056, 0.033]	[-0.041, 0.035]	[-0.034, 0.015]	[-0.032, 0.017]
Open defecation (group share, R4)			0.522***	0.504***
			(0.044)	(0.046)
Share of households landless				0.046*
				(0.025)
Union FEs	No	Yes	Yes	Yes
Diff.: Monetary – Public	0.002	-0.003	0.026	0.023
	(0.036)	(0.030)	(0.022)	(0.022)
p-value	0.962	0.914	0.251	0.285
Diff.: Monetary – Certificate	0.017	0.021	0.019	0.018
	(0.027)	(0.025)	(0.015)	(0.015)
p-value	0.527	0.398	0.220	0.222
Diff.: Public – Private	-0.021	-0.012	-0.007	-0.007
	(0.025)	(0.023)	(0.013)	(0.013)
p-value	0.404	0.597	0.586	0.598
Number of groups	1,235	1,235	1,235	1,235
Number of villages	107	107	107	107
Omitted category mean	0.082	0.082	0.082	0.082
Omitted category S.D.	(0.188)	(0.188)	(0.188)	(0.188)

Notes: the dependent variable is the share of households primarily practicing OD in the medium term (12-15 months after assessment). Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. Wild cluster bootstrap (9,999 repetitions, Webb weights) 95% confidence intervals, resampling at the village level, in brackets for the coefficients of interest. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C9: Medium-term Effects: Open Defecation
Based on household's self-report

	(1)	(2)	(3)	(4)
Monetary Reward	0.071	0.079	0.085	0.083
	(0.085)	(0.061)	(0.058)	(0.059)
	[-0.126, 0.253]	[-0.069, 0.219]	[-0.052, 0.216]	[-0.055, 0.214]
Reward Certificate	0.054	0.061	0.078	0.077
	(0.069)	(0.058)	(0.054)	(0.054)
	[-0.096, 0.204]	[-0.067, 0.191]	[-0.044, 0.196]	[-0.048, 0.194]
Private Commitment	0.055	0.042	0.037	0.039
	(0.064)	(0.057)	(0.053)	(0.053)
	[-0.088, 0.200]	[-0.091, 0.175]	[-0.089, 0.155]	[-0.088, 0.161]
Public Commitment	-0.029	0.008	0.015	0.017
	(0.085)	(0.065)	(0.059)	(0.060)
	[-0.213, 0.158]	[-0.139, 0.154]	[-0.116, 0.147]	[-0.114, 0.151]
Open defecation (group share, R4)			0.458***	0.414***
			(0.052)	(0.052)
Share of households landless				0.143***
				(0.040)
Union FEs	No	Yes	Yes	Yes
Diff.: Monetary – Public	0.100	0.071	0.070	0.066
	(0.122)	(0.089)	(0.081)	(0.082)
p-value	0.414	0.425	0.387	0.424
Diff.: Monetary – Certificate	0.017	0.017	0.007	0.006
	(0.082)	(0.056)	(0.052)	(0.053)
p-value	0.837	0.755	0.899	0.912
Diff.: Public – Private	-0.084	-0.035	-0.022	-0.022
	(0.077)	(0.055)	(0.051)	(0.051)
p-value	0.276	0.525	0.661	0.666
Number of groups	1,235	1,235	1,235	1,235
Number of villages	107	107	107	107
Omitted category mean	0.346	0.346	0.346	0.346
Omitted category S.D.	(0.318)	(0.318)	(0.318)	(0.318)

Notes: the dependent variable is the share of households regularly practicing OD in the medium term (12-15 months after assessment). Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. Wild cluster bootstrap (9,999 repetitions, Webb weights) 95% confidence intervals, resampling at the village level, in brackets for the coefficients of interest. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

D Interaction with Household Characteristics

In this appendix, we report full regression results for our main outcome of interest (hygienic latrine ownership) interacting treatment indicators with household characteristics, as discussed in Section 5.2 of the main text. The regression equation is given by Equation 2 in the main text, which we reproduce here for convenience:

$$\begin{aligned} y_{hgv} = \alpha_0 + \alpha_1 D_{hgv} & \\ + \sum_{p=0}^{4} \beta_p \cdot 1\left\{1\text{Treat}_v = p\right\} + \sum_{p=0}^{4} \theta_p \cdot 1\left\{\text{Treat}_v = p\right\} \times D_{hgv} & \\ + \delta y_{0gv} + \gamma \text{ShareLandless}_{gv} + \varphi_u + \varepsilon_{hgv} & \end{aligned} \tag{2}$$

Tables D1-D2 do not include any household characteristic D_{hgv}, and are included to show that regressions using household-level data are similar to those using group-level data as reported in the main text.

In Tables D3 and D4, D_{hgv} is an indicator for whether the household is landless, a proxy for poverty. The estimates plotted in Figure 6 of the main text correspond to column (4) of these tables.

In Tables D5 and D6, D_{hgv} is a categorical variable for the household's latrine ownership status at baseline. The omitted category consists of households not owning any latrine at baseline. The estimates plotted in Figure 7 of the main text correspond to column (4) of these tables.

Table D1: Short-term Effects: Hygienic Latrine Ownership
Household-level Data

	(1)	(2)	(3)	(4)
Monetary Reward	0.102**	0.125***	0.075***	0.078***
	(0.044)	(0.033)	(0.015)	(0.014)
Reward Certificate	0.051	0.044	0.011	0.012
	(0.042)	(0.035)	(0.012)	(0.012)
Private Commitment	0.006	0.013	0.014	0.013
	(0.041)	(0.036)	(0.011)	(0.011)
Public Commitment	0.056	0.063*	0.048***	0.047***
	(0.040)	(0.035)	(0.014)	(0.014)
Baseline share owning hyg. lat.			0.719***	0.692***
			(0.020)	(0.020)
Share of households landless				-0.064***
				(0.017)
Union FEs	No	Yes	Yes	Yes
Number of households	16,352	16,352	16,347	16,347
Number of groups	1,236	1,236	1,235	1,235
Number of villages	107	107	107	107
Omitted category mean	0.429	0.429	0.429	0.429

Notes: the dependent variable is an indicator for whether the household owns a hygienic latrine in the short term (at the time of assessment). The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D2: Medium-term Effects: Hygienic Latrine Ownership
Household-level Data

	(1)	(2)	(3)	(4)
Monetary Reward	0.042	0.049	0.013	0.017
	(0.036)	(0.031)	(0.022)	(0.021)
Reward Certificate	0.044	0.044	0.020	0.022
	(0.039)	(0.037)	(0.024)	(0.024)
Private Commitment	0.010	0.014	0.016	0.015
	(0.041)	(0.040)	(0.026)	(0.026)
Public Commitment	0.073**	0.068**	0.052***	0.050***
	(0.032)	(0.029)	(0.018)	(0.018)
Baseline share owning hyg. lat.			0.549***	0.510***
			(0.033)	(0.035)
Share of households landless				-0.094***
				(0.030)
Union FEs	No	Yes	Yes	Yes
Number of households	7,979	7,979	7,974	7,974
Number of groups	1,235	1,235	1,234	1,234
Number of villages	107	107	107	107
Omitted category mean	0.551	0.551	0.551	0.551

Notes: the dependent variable is an indicator for whether the household owns a hygienic latrine in the medium term (12-15 months after assessment). The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D3: Short-term Effects: Hygienic Latrine Ownership
Household-Level Data – By Landlessness

	(1)	(2)	(3)	(4)
Monetary Reward	0.115***	0.131***	0.080***	0.078***
	(0.038)	(0.030)	(0.017)	(0.016)
Monetary Reward X Household landless	-0.029	-0.011	-0.005	-0.011
	(0.041)	(0.040)	(0.025)	(0.025)
Reward Certificate	0.056	0.048	0.016	0.016
	(0.044)	(0.038)	(0.015)	(0.015)
Reward Certificate X Household landless	-0.018	-0.014	-0.015	-0.017
	(0.031)	(0.031)	(0.021)	(0.021)
Private Commitment	-0.001	0.008	0.008	0.009
	(0.045)	(0.039)	(0.015)	(0.015)
Private Commitment X Household landless	-0.002	-0.008	-0.005	-0.004
	(0.034)	(0.035)	(0.024)	(0.024)
Public Commitment	0.049	0.057*	0.043**	0.042***
	(0.037)	(0.032)	(0.017)	(0.016)
Public Commitment X Household landless	-0.000	0.002	-0.002	0.001
	(0.035)	(0.035)	(0.022)	(0.022)
Household landless	-0.215***	-0.203***	-0.149***	-0.163***
	(0.025)	(0.026)	(0.020)	(0.020)
Baseline share owning hyg. lat.			0.678***	0.715***
			(0.020)	(0.021)
Group share landless				0.102***
				(0.018)
Union FEs	No	Yes	Yes	Yes
Number of households	15,204	15,204	15,199	15,199
Number of groups	1,236	1,236	1,235	1,235
Number of villages	107	107	107	107
Omitted category mean	0.452	0.452	0.452	0.452

Notes: the dependent variable is an indicator for whether the household owns a hygienic latrine in the short term (at the time of assessment). The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D4: Medium-term Effects: Hygienic Latrine Ownership
Household-Level Data – By Landlessness

	(1)	(2)	(3)	(4)
Monetary Reward	0.043	0.042	0.006	0.005
	(0.033)	(0.031)	(0.025)	(0.025)
Monetary Reward X Household landless	0.012	0.026	0.034	0.032
	(0.040)	(0.039)	(0.034)	(0.034)
Reward Certificate	0.035	0.036	0.015	0.014
	(0.039)	(0.037)	(0.028)	(0.028)
Reward Certificate X Household landless	0.029	0.027	0.023	0.023
	(0.037)	(0.036)	(0.033)	(0.033)
Private Commitment	0.024	0.028	0.032	0.033
	(0.040)	(0.040)	(0.030)	(0.030)
Private Commitment X Household landless	-0.040	-0.042	-0.047	-0.046
	(0.038)	(0.039)	(0.033)	(0.034)
Public Commitment	0.077**	0.071**	0.059***	0.059***
	(0.030)	(0.028)	(0.022)	(0.022)
Public Commitment X Household landless	-0.031	-0.028	-0.030	-0.029
	(0.043)	(0.043)	(0.037)	(0.037)
Household landless	-0.166***	-0.158***	-0.116***	-0.121***
	(0.031)	(0.030)	(0.029)	(0.030)
Baseline share owning hyg. lat.			0.498***	0.509***
			(0.034)	(0.036)
Group share landless				0.031
				(0.032)
Union FEs	No	Yes	Yes	Yes
Number of households	7,974	7,974	7,969	7,969
Number of groups	1,235	1,235	1,234	1,234
Number of villages	107	107	107	107
Omitted category mean	0.552	0.552	0.552	0.552

Notes: the dependent variable is an indicator for whether the household owns a hygienic latrine in the medium term (12-15 months after assessment). The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D5: Short-term Effects: Hygienic Latrine Ownership
Household-Level Data – By Baseline Ownership Category

	(1)	(2)	(3)	(4)
Monetary Reward	0.077**	0.084***	0.075***	0.078***
	(0.033)	(0.025)	(0.022)	(0.022)
Monetary Reward X Owns non-hygienic latrine	0.007	0.007	0.009	0.010
	(0.024)	(0.023)	(0.023)	(0.023)
Monetary Reward X Owns hygienic latrine	-0.014	-0.017	-0.014	-0.015
	(0.037)	(0.035)	(0.033)	(0.033)
Reward Certificate	0.010	0.004	-0.001	-0.001
	(0.023)	(0.021)	(0.017)	(0.017)
Reward Certificate X Owns non-hygienic latrine	-0.003	0.000	0.002	0.003
	(0.023)	(0.021)	(0.021)	(0.021)
Reward Certificate X Owns hygienic latrine	0.013	0.020	0.021	0.021
	(0.028)	(0.027)	(0.026)	(0.025)
Private Commitment	-0.004	0.001	0.002	0.001
	(0.023)	(0.021)	(0.017)	(0.017)
Private Commitment X Owns non-hygienic latrine	0.026	0.027	0.027	0.026
	(0.023)	(0.022)	(0.022)	(0.022)
Private Commitment X Owns hygienic latrine	0.015	0.013	0.011	0.011
	(0.028)	(0.028)	(0.027)	(0.026)
Public Commitment	0.051*	0.054**	0.051**	0.050**
	(0.029)	(0.025)	(0.022)	(0.022)
Public Commitment X Owns non-hygienic latrine	0.027	0.021	0.022	0.023
	(0.024)	(0.022)	(0.021)	(0.022)
Public Commitment X Owns hygienic latrine	-0.012	-0.025	-0.025	-0.023
	(0.034)	(0.032)	(0.030)	(0.029)
Owns non-hygienic latrine	-0.008	-0.012	-0.014	-0.015
	(0.020)	(0.019)	(0.019)	(0.020)
Owns hygienic latrine	0.651***	0.643***	0.618***	0.618***
	(0.029)	(0.029)	(0.027)	(0.027)
Baseline share owning hyg. lat.			0.133***	0.104***
			(0.020)	(0.021)
Share of households landless				-0.067***
				(0.017)
Union FEs	No	Yes	Yes	Yes
Number of households	15,927	15,927	15,927	15,927
Number of groups	1,235	1,235	1,235	1,235
Number of villages	107	107	107	107
Omitted category mean	0.432	0.432	0.432	0.432

Notes: the dependent variable is an indicator for whether the household owns a hygienic latrine in the short term (at the time of assessment). The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D6: Medium-term Effects: Hygienic Latrine Ownership
Household-Level Data – By Baseline Ownership Category

	(1)	(2)	(3)	(4)
Monetary Reward	0.015	0.010	-0.002	0.002
	(0.043)	(0.037)	(0.036)	(0.034)
Monetary Reward X Owns non-hygienic latrine	0.053	0.056	0.058	0.058
	(0.040)	(0.041)	(0.040)	(0.041)
Monetary Reward X Owns hygienic latrine	0.021	0.014	0.019	0.017
	(0.044)	(0.043)	(0.042)	(0.041)
Reward Certificate	0.020	0.019	0.012	0.013
	(0.040)	(0.038)	(0.036)	(0.035)
Reward Certificate X Owns non-hygienic latrine	0.002	0.008	0.010	0.011
	(0.044)	(0.043)	(0.041)	(0.041)
Reward Certificate X Owns hygienic latrine	0.013	0.018	0.018	0.018
	(0.043)	(0.042)	(0.041)	(0.040)
Private Commitment	0.016	0.014	0.015	0.012
	(0.043)	(0.042)	(0.039)	(0.038)
Private Commitment X Owns non-hygienic latrine	-0.013	-0.014	-0.009	-0.009
	(0.046)	(0.045)	(0.043)	(0.043)
Private Commitment X Owns hygienic latrine	0.013	0.021	0.018	0.020
	(0.047)	(0.046)	(0.044)	(0.043)
Public Commitment	0.045	0.035	0.030	0.026
	(0.040)	(0.036)	(0.032)	(0.032)
Public Commitment X Owns non-hygienic latrine	0.076*	0.070	0.073*	0.076*
	(0.045)	(0.044)	(0.043)	(0.043)
Public Commitment X Owns hygienic latrine	-0.001	-0.006	-0.004	-0.000
	(0.043)	(0.043)	(0.042)	(0.041)
Owns non-hygienic latrine	-0.023	-0.028	-0.036	-0.039
	(0.041)	(0.039)	(0.038)	(0.038)
Owns hygienic latrine	0.421***	0.413***	0.379***	0.377***
	(0.040)	(0.040)	(0.039)	(0.038)
Baseline share owning hyg. lat.			0.174***	0.133***
			(0.031)	(0.033)
Share of households landless				-0.097***
				(0.029)
Union FEs	No	Yes	Yes	Yes
Number of households	7,827	7,827	7,827	7,827
Number of groups	1,234	1,234	1,234	1,234
Number of villages	107	107	107	107
Omitted category mean	0.553	0.553	0.553	0.553

Notes: the dependent variable is an indicator for whether the household owns a hygienic latrine in the medium term (12-15 months after assessment). The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

E Interaction with Group Characteristics

In this appendix, we report full regression results for our main outcome of interest (hygienic latrine ownership) interacting treatment indicators with group characteristics, as discussed in Section 5.2 of the main text. The regression equation is given by Equation 6 in the main text, which we reproduce here for convenience:

$$\begin{aligned} y_{gv} = {} & \alpha_0 + \alpha_1 D_{gv} \\ & + \sum_{p=0}^{4} \beta_p \cdot 1\left\{1\text{Treat}_v = p\right\} + \sum_{p=0}^{4} \theta_p \cdot 1\left\{\text{Treat}_v = p\right\} \times D_{gv} \\ & + \delta y_{0gv} + \gamma \text{ShareLandless}_{gv} + \varphi_u + \varepsilon_{gv} \end{aligned} \tag{5}$$

The group characteristics considered are:

- Share of landless households in the group (Tables E1-E2)
- Baseline ownership of any latrine (Tables E3-E4)
- Baseline ownership of non-hygienic latrines (Tables E5-E6)
- Whether the group contained an individual considered by others in the village to be a village leader (Tables E7-E8)
- Group size (number of households) (Tables E9-E10)
- Group density (the average number of households within 50m of each household in the group) (Tables E11-E12)
- Two social network statistics calculated using baseline data on household relationships within the village
  - Maximum eigenvalue of adjacency matrix, interpretable as the speed at which information will spread within the group (Tables E13-E14)
  - The second eigenvalue of the stochastized adjacency matrix, interpretable as how segregated a network is, i.e., negatively related to the extent to which information will spread within the group (Tables E15-E16)

Table E1: Short Term Effects: Hygienic Latrine Ownership
Interacted with Group Share Landless

	(1)	(2)	(3)
Monetary Reward	0.109***	0.129***	0.077***
	(0.035)	(0.029)	(0.014)
Monetary Reward X Share Landless	-0.107	-0.059	-0.086**
	(0.091)	(0.091)	(0.043)
Reward Certificate	0.048	0.042	0.009
	(0.037)	(0.033)	(0.012)
Reward Certificate X Share Landless	-0.005	0.007	-0.035
	(0.093)	(0.093)	(0.044)
Private Commitment	-0.002	0.005	0.008
	(0.037)	(0.033)	(0.012)
Private Commitment X Share Landless	-0.038	-0.056	-0.051
	(0.089)	(0.095)	(0.042)
Public Commitment	0.047	0.057*	0.044***
	(0.034)	(0.033)	(0.015)
Public Commitment X Share Landless	-0.060	-0.046	-0.043
	(0.098)	(0.100)	(0.047)
Group share landless	-0.325***	-0.284***	-0.009
	(0.076)	(0.083)	(0.044)
Baseline share owning hyg. lat.			0.709***
			(0.022)
Union FEs	No	Yes	Yes
Number of groups	1,236	1,236	1,235
Number of villages	107	107	107
Omitted category mean	0.451	0.451	0.451
Omitted category S.D.	(0.189)	(0.189)	(0.189)

Notes: the dependent variable is the share of households in the group with a hygienic latrine in the short term (at the time of assessment). Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table E2: Medium Term Effects: Hygienic Latrine Ownership
Interacted with Group Share Landless

	(1)	(2)	(3)
Monetary Reward	0.047	0.049*	0.012
	(0.029)	(0.027)	(0.020)
Monetary Reward X Share Landless	0.063	0.095	0.074
	(0.081)	(0.084)	(0.059)
Reward Certificate	0.043	0.041	0.018
	(0.032)	(0.031)	(0.022)
Reward Certificate X Share Landless	0.063	0.061	0.030
	(0.086)	(0.089)	(0.066)
Private Commitment	0.009	0.011	0.013
	(0.034)	(0.034)	(0.024)
Private Commitment X Share Landless	-0.051	-0.070	-0.067
	(0.082)	(0.086)	(0.057)
Public Commitment	0.070**	0.067**	0.058***
	(0.028)	(0.027)	(0.017)
Public Commitment X Share Landless	-0.013	-0.003	-0.003
	(0.093)	(0.096)	(0.073)
Group share landless	-0.358***	-0.322***	-0.124**
	(0.072)	(0.076)	(0.055)
Baseline share owning hyg. lat.			0.511***
			(0.036)
Union FEs	No	Yes	Yes
Number of groups	1,235	1,235	1,234
Number of villages	107	107	107
Omitted category mean	0.544	0.544	0.544
Omitted category S.D.	(0.255)	(0.255)	(0.255)

Notes: the dependent variable is the share of households in the group with a hygienic latrine in the medium term (12-15 months after assessment). Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table E3: Short Term Effects: Hygienic Latrine Ownership
Interacted with Baseline Latrine Ownership Share

	(1)	(2)	(3)
Monetary Reward	0.074**	0.092***	0.098***
	(0.031)	(0.026)	(0.024)
Monetary Reward X Baseline share owning any latr.	0.054	0.016	-0.001
	(0.093)	(0.079)	(0.073)
Reward Certificate	0.022	0.020	0.022
	(0.026)	(0.024)	(0.024)
Reward Certificate X Baseline share owning any latr.	-0.008	0.006	0.020
	(0.063)	(0.056)	(0.052)
Private Commitment	0.005	0.010	0.007
	(0.028)	(0.024)	(0.024)
Private Commitment X Baseline share owning any latr.	0.071	0.054	0.057
	(0.072)	(0.063)	(0.059)
Public Commitment	0.043	0.047*	0.044*
	(0.028)	(0.028)	(0.027)
Public Commitment X Baseline share owning any latr.	0.129	0.050	0.076
	(0.081)	(0.070)	(0.067)
Baseline share owning any latr.	0.578***	0.547***	0.465***
	(0.054)	(0.052)	(0.050)
Share of households landless			-0.205***
			(0.029)
Union FEs	No	Yes	Yes
Number of groups	1,235	1,235	1,235
Number of villages	107	107	107
Omitted category mean	0.451	0.451	0.451
Omitted category S.D.	(0.189)	(0.189)	(0.189)

Notes: the dependent variable is the share of households in the group with a hygienic latrine in the short term (at the time of assessment). Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table E4: Medium Term Effects: Hygienic Latrine Ownership
Interacted with Baseline Latrine Ownership Share

	(1)	(2)	(3)
Monetary Reward	0.021	0.021	0.026
	(0.028)	(0.026)	(0.025)
Monetary Reward X Baseline share owning any latr.	0.115	0.094	0.081
	(0.101)	(0.100)	(0.095)
Reward Certificate	0.023	0.024	0.026
	(0.027)	(0.027)	(0.026)
Reward Certificate X Baseline share owning any latr.	0.117	0.142	0.154*
	(0.099)	(0.095)	(0.091)
Private Commitment	0.009	0.010	0.007
	(0.029)	(0.029)	(0.028)
Private Commitment X Baseline share owning any latr.	0.014	0.022	0.025
	(0.106)	(0.104)	(0.101)
Public Commitment	0.061**	0.054**	0.052**
	(0.024)	(0.022)	(0.022)
Public Commitment X Baseline share owning any latr.	0.084	0.036	0.057
	(0.086)	(0.087)	(0.082)
Baseline share owning any latr.	0.428***	0.399***	0.333***
	(0.082)	(0.079)	(0.077)
Share of households landless			-0.165***
			(0.035)
Union FEs	No	Yes	Yes
Number of groups	1,234	1,234	1,234
Number of villages	107	107	107
Omitted category mean	0.544	0.544	0.544
Omitted category S.D.	(0.255)	(0.255)	(0.255)

Notes: the dependent variable is the share of households in the group with a hygienic latrine in the medium term (12-15 months after assessment). Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table E5: Short Term Effects: Hygienic Latrine Ownership
Interacted with Baseline Non-Hygienic Latrine Ownership Share

	(1)	(2)	(3)	(4)
Monetary Reward	0.096**	0.118***	0.123***	0.078***
	(0.042)	(0.030)	(0.027)	(0.015)
Monetary Reward X Baseline share owning non-hyg. latr.	-0.254*	-0.222*	-0.167	-0.128
	(0.144)	(0.126)	(0.108)	(0.080)
Reward Certificate	0.044	0.037	0.037	0.010
	(0.038)	(0.032)	(0.029)	(0.012)
Reward Certificate X Baseline share owning non-hyg. latr.	-0.227	-0.218	-0.165	-0.106
	(0.143)	(0.136)	(0.120)	(0.068)
Private Commitment	0.001	0.007	0.004	0.009
	(0.038)	(0.033)	(0.030)	(0.012)
Private Commitment X Baseline share owning non-hyg. latr.	-0.029	0.007	0.006	0.010
	(0.138)	(0.127)	(0.112)	(0.072)
Public Commitment	0.059	0.065**	0.059*	0.045***
	(0.037)	(0.031)	(0.030)	(0.015)
Public Commitment X Baseline share owning non-hyg. latr.	-0.115	-0.085	-0.050	-0.009
	(0.121)	(0.092)	(0.089)	(0.065)
Baseline share owning non-hyg. latr.	-0.258***	-0.265***	-0.250***	0.095
	(0.095)	(0.084)	(0.080)	(0.068)
Share of households landless			-0.304***	-0.082***
			(0.031)	(0.018)
Baseline share owning hyg. lat.				0.711***
				(0.027)
Union FEs	No	Yes	Yes	Yes
Number of groups	1,235	1,235	1,235	1,235
Number of villages	107	107	107	107
Omitted category mean	0.451	0.451	0.451	0.451
Omitted category S.D.	(0.189)	(0.189)	(0.189)	(0.189)

Notes: the dependent variable is the share of households in the group with a hygienic latrine in the short term (at the time of assessment). Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table E6: Medium Term Effects: Hygienic Latrine Ownership
Interacted with Baseline Non-Hygienic Latrine Ownership Share

	(1)	(2)	(3)	(4)
Monetary Reward	0.040	0.043	0.047*	0.012
	(0.035)	(0.028)	(0.026)	(0.020)
Monetary Reward X Baseline share owning non-hyg. latr.	-0.013	0.032	0.073	0.103
	(0.142)	(0.141)	(0.128)	(0.114)
Reward Certificate	0.038	0.037	0.037	0.016
	(0.034)	(0.032)	(0.030)	(0.022)
Reward Certificate X Baseline share owning non-hyg. latr.	-0.176	-0.147	-0.101	-0.057
	(0.144)	(0.139)	(0.129)	(0.106)
Private Commitment	0.008	0.009	0.007	0.011
	(0.036)	(0.035)	(0.032)	(0.024)
Private Commitment X Baseline share owning non-hyg. latr.	-0.096	-0.113	-0.114	-0.111
	(0.133)	(0.130)	(0.112)	(0.100)
Public Commitment	0.078**	0.073***	0.067***	0.057***
	(0.030)	(0.026)	(0.026)	(0.018)
Public Commitment X Baseline share owning non-hyg. latr.	0.041	0.045	0.069	0.101
	(0.143)	(0.130)	(0.129)	(0.106)
Baseline share owning non-hyg. latr.	-0.175	-0.188*	-0.174*	0.089
	(0.109)	(0.104)	(0.096)	(0.098)
Share of households landless			-0.256***	-0.086***
			(0.035)	(0.032)
Baseline share owning hyg. lat.				0.543***
				(0.042)
Union FEs	No	Yes	Yes	Yes
Number of groups	1,234	1,234	1,234	1,234
Number of villages	107	107	107	107
Omitted category mean	0.544	0.544	0.544	0.544
Omitted category S.D.	(0.255)	(0.255)	(0.255)	(0.255)

Notes: the dependent variable is the share of households in the group with a hygienic latrine in the medium term (12-15 months after assessment). Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table E7: Short Term Effects: Hygienic Latrine Ownership
Interacted with Village Leader Present

	(1)	(2)	(3)	(4)
Monetary Reward	0.110**	0.138***	0.145***	0.091***
	(0.050)	(0.038)	(0.033)	(0.015)
Monetary Reward X Village Leader Present in Group	-0.065	-0.074	-0.088*	-0.068*
	(0.061)	(0.054)	(0.051)	(0.035)
Reward Certificate	0.068	0.058	0.056	0.021*
	(0.047)	(0.040)	(0.036)	(0.012)
Reward Certificate X Village Leader Present in Group	-0.102*	-0.088*	-0.077*	-0.059**
	(0.052)	(0.046)	(0.043)	(0.027)
Private Commitment	0.016	0.019	0.014	0.011
	(0.046)	(0.040)	(0.036)	(0.012)
Private Commitment X Village Leader Present in Group	-0.087*	-0.058	-0.055	-0.016
	(0.046)	(0.041)	(0.040)	(0.029)
Public Commitment	0.056	0.064	0.055	0.039**
	(0.044)	(0.040)	(0.037)	(0.015)
Public Commitment X Village Leader Present in Group	-0.024	-0.019	-0.006	0.016
	(0.054)	(0.048)	(0.045)	(0.030)
Village Leader Present in Group	0.119***	0.110***	0.081**	0.035
	(0.041)	(0.039)	(0.035)	(0.027)
Share of households landless			-0.332***	-0.086***
			(0.032)	(0.017)
Baseline share owning hyg. lat.				0.706***
				(0.022)
Union FEs	No	Yes	Yes	Yes
Number of groups	1,236	1,236	1,236	1,235
Number of villages	107	107	107	107
Omitted category mean	0.451	0.451	0.451	0.451
Omitted category S.D.	(0.189)	(0.189)	(0.189)	(0.189)

Notes: the dependent variable is the share of households in the group with a hygienic latrine in the short term (at the time of assessment). Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table E8: Medium Term Effects: Hygienic Latrine Ownership
Interacted with Village Leader Present

	(1)	(2)	(3)	(4)
Monetary Reward	0.051	0.058*	0.064**	0.024
	(0.039)	(0.033)	(0.029)	(0.021)
Monetary Reward X Village Leader Present in Group	-0.069	-0.068	-0.079*	-0.064
	(0.052)	(0.050)	(0.046)	(0.043)
Reward Certificate	0.059	0.056	0.054	0.029
	(0.041)	(0.038)	(0.034)	(0.023)
Reward Certificate X Village Leader Present in Group	-0.094*	-0.087	-0.078	-0.065
	(0.053)	(0.052)	(0.048)	(0.045)
Private Commitment	0.016	0.015	0.011	0.009
	(0.041)	(0.040)	(0.036)	(0.025)
Private Commitment X Village Leader Present in Group	-0.027	-0.008	-0.006	0.023
	(0.050)	(0.050)	(0.048)	(0.044)
Public Commitment	0.075**	0.071**	0.063**	0.051***
	(0.036)	(0.031)	(0.029)	(0.017)
Public Commitment X Village Leader Present in Group	-0.021	-0.011	0.000	0.017
	(0.053)	(0.051)	(0.047)	(0.045)
Village Leader Present in Group	0.092*	0.077	0.053	0.020
	(0.049)	(0.049)	(0.044)	(0.046)
Share of households landless			-0.271***	-0.091***
			(0.035)	(0.032)
Baseline share owning hyg. lat.				0.513***
				(0.036)
Union FEs	No	Yes	Yes	Yes
Number of groups	1,235	1,235	1,235	1,234
Number of villages	107	107	107	107
Omitted category mean	0.544	0.544	0.544	0.544
Omitted category S.D.	(0.255)	(0.255)	(0.255)	(0.255)

Notes: the dependent variable is the share of households in the group with a hygienic latrine in the medium term (12-15 months after assessment). Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table E9: Short Term Effects: Hygienic Latrine Ownership
Interacted with Group Size (Number of Households)

	(1)	(2)	(3)	(4)
Monetary Reward	0.101**	0.128***	0.075***	0.078***
	(0.045)	(0.035)	(0.016)	(0.015)
Monetary Reward X Num. HH in group	0.004	0.000	-0.002	-0.001
	(0.010)	(0.008)	(0.004)	(0.004)
Reward Certificate	0.056	0.048	0.011	0.012
	(0.046)	(0.039)	(0.012)	(0.012)
Reward Certificate X Num. HH in group	-0.009	-0.009	-0.002	-0.002
	(0.008)	(0.008)	(0.003)	(0.003)
Private Commitment	0.003	0.010	0.011	0.009
	(0.044)	(0.038)	(0.012)	(0.012)
Private Commitment X Num. HH in group	-0.012	-0.010	-0.005	-0.004
	(0.007)	(0.007)	(0.003)	(0.003)
Public Commitment	0.052	0.065*	0.044***	0.043***
	(0.042)	(0.037)	(0.016)	(0.016)
Public Commitment X Num. HH in group	-0.003	-0.006	0.000	0.001
	(0.009)	(0.007)	(0.004)	(0.004)
Num. HH in group	0.009	0.009	0.003	0.002
	(0.007)	(0.006)	(0.003)	(0.003)
Baseline share owning hyg. lat.			0.746***	0.710***
			(0.021)	(0.022)
Share of households landless				-0.082***
				(0.017)
Union FEs	No	Yes	Yes	Yes
Number of groups	1,236	1,236	1,235	1,235
Number of villages	107	107	107	107
Omitted category mean	0.451	0.451	0.451	0.451
Omitted category S.D.	(0.189)	(0.189)	(0.189)	(0.189)

Notes: the dependent variable is the share of households in the group with a hygienic latrine in the short term (at the time of assessment). Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table E10: Medium Term Effects: Hygienic Latrine Ownership
Interacted with Group Size (Number of Households)

	(1)	(2)	(3)	(4)
Monetary Reward	0.044	0.051*	0.011	0.014
	(0.036)	(0.030)	(0.020)	(0.020)
Monetary Reward X Num. HH in group	0.001	-0.002	-0.004	-0.002
	(0.009)	(0.009)	(0.007)	(0.008)
Reward Certificate	0.048	0.045	0.017	0.018
	(0.041)	(0.039)	(0.024)	(0.023)
Reward Certificate X Num. HH in group	-0.008	-0.007	-0.002	-0.002
	(0.008)	(0.009)	(0.007)	(0.007)
Private Commitment	0.015	0.017	0.018	0.016
	(0.041)	(0.039)	(0.025)	(0.025)
Private Commitment X Num. HH in group	-0.013*	-0.011	-0.008	-0.007
	(0.007)	(0.007)	(0.005)	(0.005)
Public Commitment	0.077**	0.076***	0.060***	0.059***
	(0.032)	(0.029)	(0.017)	(0.017)
Public Commitment X Num. HH in group	-0.010	-0.011*	-0.006	-0.006
	(0.007)	(0.007)	(0.007)	(0.007)
Num. HH in group	0.014**	0.014**	0.010	0.008
	(0.007)	(0.007)	(0.006)	(0.006)
Baseline share owning hyg. lat.			0.553***	0.516***
			(0.033)	(0.036)
Share of households landless				-0.086***
				(0.032)
Union FEs	No	Yes	Yes	Yes
Number of groups	1,235	1,235	1,234	1,234
Number of villages	107	107	107	107
Omitted category mean	0.544	0.544	0.544	0.544
Omitted category S.D.	(0.255)	(0.255)	(0.255)	(0.255)

Notes: the dependent variable is the share of households in the group with a hygienic latrine in the medium term (12-15 months after assessment). Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table E11: Short Term Effects: Hygienic Latrine Ownership Interacted with Group Density

	(1)	(2)	(3)	(4)
Monetary Reward	0.103**	0.127***	0.075***	0.078***
	(0.041)	(0.032)	(0.015)	(0.015)
Monetary Reward X Group density	0.004	0.003	0.003	0.003
	(0.005)	(0.004)	(0.002)	(0.002)
Reward Certificate	0.048	0.042	0.008	0.010
	(0.042)	(0.035)	(0.012)	(0.012)
Reward Certificate X Group density	-0.006*	-0.004	-0.001	-0.001
	(0.004)	(0.003)	(0.002)	(0.002)
Private Commitment	0.001	0.008	0.009	0.008
	(0.043)	(0.038)	(0.012)	(0.012)
Private Commitment X Group density	-0.007**	-0.007*	-0.002	-0.002
	(0.004)	(0.003)	(0.002)	(0.002)
Public Commitment	0.056	0.064*	0.045***	0.044***
	(0.037)	(0.034)	(0.015)	(0.015)
Public Commitment X Group density	0.003	0.001	0.001	0.001
	(0.004)	(0.004)	(0.002)	(0.002)
Group density	0.007**	0.004	0.000	0.000
	(0.003)	(0.003)	(0.002)	(0.002)
Baseline share owning hyg. lat.			0.741***	0.706***
			(0.021)	(0.022)
Share of households landless				-0.082***
				(0.017)
Union FEs	No	Yes	Yes	Yes
Number of groups	1,236	1,236	1,235	1,235
Number of villages	107	107	107	107
Omitted category mean	0.451	0.451	0.451	0.451
Omitted category S.D.	(0.189)	(0.189)	(0.189)	(0.189)

Notes: the dependent variable is the share of households in the group with a hygienic latrine in the short term (at the time of assessment). Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table E12: Medium Term Effects: Hygienic Latrine Ownership
Interacted with Group Density

	(1)	(2)	(3)	(4)
Monetary Reward	0.042	0.047	0.008	0.011
	(0.034)	(0.030)	(0.020)	(0.020)
Monetary Reward X Group density	0.004	0.003	0.003	0.003
	(0.004)	(0.004)	(0.003)	(0.003)
Reward Certificate	0.043	0.042	0.017	0.018
	(0.038)	(0.035)	(0.023)	(0.023)
Reward Certificate X Group density	-0.002	-0.001	0.001	0.001
	(0.004)	(0.004)	(0.003)	(0.003)
Private Commitment	0.009	0.012	0.012	0.011
	(0.041)	(0.039)	(0.025)	(0.025)
Private Commitment X Group density	-0.002	-0.002	0.002	0.002
	(0.004)	(0.004)	(0.003)	(0.003)
Public Commitment	0.074**	0.071**	0.057***	0.056***
	(0.030)	(0.028)	(0.017)	(0.017)
Public Commitment X Group density	0.002	0.000	0.000	0.000
	(0.005)	(0.005)	(0.003)	(0.004)
Group density	0.002	0.000	-0.002	-0.003
	(0.003)	(0.003)	(0.002)	(0.002)
Baseline share owning hyg. lat.			0.552***	0.513***
			(0.034)	(0.036)
Share of households landless				-0.091***
				(0.031)
Union FEs	No	Yes	Yes	Yes
Number of groups	1,235	1,235	1,234	1,234
Number of villages	107	107	107	107
Omitted category mean	0.544	0.544	0.544	0.544
Omitted category S.D.	(0.255)	(0.255)	(0.255)	(0.255)

Notes: the dependent variable is the share of households in the group with a hygienic latrine in the medium term (12-15 months after assessment). Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table E13: Short Term Effects: Hygienic Latrine Ownership
Interacted with Maximum eigenvalue of adjacency matrix

	(1)	(2)	(3)	(4)
Monetary Reward	0.096**	0.122***	0.071***	0.075***
	(0.045)	(0.034)	(0.015)	(0.015)
Monetary Reward X Max. eigval. of adj. matrix	0.003	0.004	-0.010	-0.009
	(0.018)	(0.015)	(0.009)	(0.009)
Reward Certificate	0.049	0.042	0.009	0.010
	(0.043)	(0.037)	(0.012)	(0.012)
Reward Certificate X Max. eigval. of adj. matrix	0.010	0.008	0.001	0.002
	(0.014)	(0.013)	(0.007)	(0.007)
Private Commitment	0.003	0.010	0.010	0.009
	(0.042)	(0.038)	(0.012)	(0.012)
Private Commitment X Max. eigval. of adj. matrix	-0.009	-0.009	-0.008	-0.007
	(0.011)	(0.011)	(0.006)	(0.006)
Public Commitment	0.059	0.065*	0.045***	0.044***
	(0.040)	(0.035)	(0.015)	(0.015)
Public Commitment X Max. eigval. of adj. matrix	-0.011	-0.009	-0.005	-0.005
	(0.017)	(0.015)	(0.008)	(0.008)
Max. eigval. of adj. matrix	-0.018	-0.007	0.000	-0.001
	(0.011)	(0.012)	(0.006)	(0.006)
Baseline share owning hyg. lat.			0.746***	0.711***
			(0.022)	(0.022)
Share of households landless				-0.079***
				(0.017)
Union FEs	No	Yes	Yes	Yes
Number of groups	1,234	1,234	1,233	1,233
Number of villages	107	107	107	107
Omitted category mean	0.451	0.451	0.451	0.451
Omitted category S.D.	(0.189)	(0.189)	(0.189)	(0.189)

Notes: the dependent variable is the share of households in the group with a hygienic latrine in the short term (at the time of assessment). Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table E14: Medium Term Effects: Hygienic Latrine Ownership
Interacted with Maximum eigenvalue of adjacency matrix

	(1)	(2)	(3)	(4)
Monetary Reward	0.040	0.048	0.011	0.014
	(0.036)	(0.030)	(0.020)	(0.019)
Monetary Reward X Max. eigval. of adj. matrix	-0.009	-0.009	-0.018	-0.017
	(0.014)	(0.014)	(0.013)	(0.013)
Reward Certificate	0.045	0.043	0.018	0.020
	(0.038)	(0.035)	(0.022)	(0.022)
Reward Certificate X Max. eigval. of adj. matrix	-0.009	-0.012	-0.017*	-0.016*
	(0.013)	(0.012)	(0.009)	(0.009)
Private Commitment	0.011	0.013	0.013	0.012
	(0.040)	(0.038)	(0.024)	(0.024)
Private Commitment X Max. eigval. of adj. matrix	-0.005	-0.007	-0.006	-0.005
	(0.013)	(0.012)	(0.010)	(0.010)
Public Commitment	0.075**	0.072**	0.056***	0.055***
	(0.032)	(0.027)	(0.017)	(0.017)
Public Commitment X Max. eigval. of adj. matrix	-0.001	0.001	0.005	0.005
	(0.014)	(0.013)	(0.011)	(0.011)
Max. eigval. of adj. matrix	0.003	0.010	0.015*	0.014*
	(0.013)	(0.012)	(0.008)	(0.008)
Baseline share owning hyg. lat.			0.553***	0.514***
			(0.033)	(0.036)
Share of households landless				-0.088***
				(0.031)
Union FEs	No	Yes	Yes	Yes
Number of groups	1,233	1,233	1,232	1,232
Number of villages	107	107	107	107
Omitted category mean	0.544	0.544	0.544	0.544
Omitted category S.D.	(0.255)	(0.255)	(0.255)	(0.255)

Notes: the dependent variable is the share of households in the group with a hygienic latrine in the medium term (12-15 months after assessment). Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table E15: Short Term Effects: Hygienic Latrine Ownership
Interacted with Second eigenvalue of stochastized adjacency matrix

	(1)	(2)	(3)	(4)
Monetary Reward	0.100**	0.126***	0.076***	0.079***
	(0.045)	(0.034)	(0.016)	(0.015)
Monetary Reward X Second eignval. of stoch. adj. matrix	0.007	0.017	-0.048**	-0.046**
	(0.036)	(0.037)	(0.022)	(0.023)
Reward Certificate	0.051	0.042	0.008	0.010
	(0.044)	(0.037)	(0.012)	(0.012)
Reward Certificate X Second eignval. of stoch. adj. matrix	0.002	0.013	-0.011	-0.010
	(0.025)	(0.022)	(0.016)	(0.016)
Private Commitment	0.002	0.009	0.010	0.009
	(0.045)	(0.039)	(0.012)	(0.012)
Private Commitment X Second eignval. of stoch. adj. matrix	0.011	0.007	-0.008	-0.007
	(0.025)	(0.025)	(0.016)	(0.017)
Public Commitment	0.056	0.065*	0.047***	0.046***
	(0.041)	(0.036)	(0.016)	(0.016)
Public Commitment X Second eignval. of stoch. adj. matrix	0.017	-0.010	-0.003	-0.001
	(0.034)	(0.031)	(0.022)	(0.022)
Second eignval. of stoch. adj. matrix	0.004	0.000	0.025	0.022
	(0.021)	(0.020)	(0.017)	(0.018)
Baseline share owning hyg. lat.			0.746***	0.710***
			(0.021)	(0.022)
Share of households landless				-0.082***
				(0.017)
Union FEs	No	Yes	Yes	Yes
Number of groups	1,234	1,234	1,233	1,233
Number of villages	107	107	107	107
Omitted category mean	0.451	0.451	0.451	0.451
Omitted category S.D.	(0.189)	(0.189)	(0.189)	(0.189)

Notes: the dependent variable is the share of households in the group with a hygienic latrine in the short term (at the time of assessment). Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table E16: Medium Term Effects: Hygienic Latrine Ownership
Interacted with Second eigenvalue of stochastized adjacency matrix

	(1)	(2)	(3)	(4)
Monetary Reward	0.039	0.046	0.008	0.012
	(0.036)	(0.030)	(0.020)	(0.020)
Monetary Reward X Second eignval. of stoch. adj. matrix	0.030	0.036	-0.011	-0.009
	(0.040)	(0.036)	(0.034)	(0.034)
Reward Certificate	0.044	0.041	0.016	0.018
	(0.039)	(0.036)	(0.023)	(0.023)
Reward Certificate X Second eignval. of stoch. adj. matrix	0.018	0.024	0.006	0.007
	(0.032)	(0.029)	(0.028)	(0.028)
Private Commitment	0.012	0.014	0.014	0.013
	(0.041)	(0.039)	(0.025)	(0.025)
Private Commitment X Second eignval. of stoch. adj. matrix	0.001	0.000	-0.010	-0.010
	(0.031)	(0.029)	(0.027)	(0.027)
Public Commitment	0.075**	0.073**	0.059***	0.058***
	(0.032)	(0.028)	(0.017)	(0.017)
Public Commitment X Second eignval. of stoch. adj. matrix	0.013	0.004	0.009	0.012
	(0.037)	(0.034)	(0.033)	(0.032)
Second eignval. of stoch. adj. matrix	0.006	0.000	0.018	0.015
	(0.028)	(0.025)	(0.020)	(0.020)
Baseline share owning hyg. lat.			0.551***	0.512***
			(0.033)	(0.036)
Share of households landless				-0.089***
				(0.032)
Union FEs	No	Yes	Yes	Yes
Number of groups	1,233	1,233	1,232	1,232
Number of villages	107	107	107	107
Omitted category mean	0.544	0.544	0.544	0.544
Omitted category S.D.	(0.255)	(0.255)	(0.255)	(0.255)

Notes: the dependent variable is the share of households in the group with a hygienic latrine in the medium term (12-15 months after assessment). Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level. Standard errors clustered at the village level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

F Fully Interacted Model and Single Treatment Estimation

In this section, we present (1) estimates using only the single-treatment villages and (2) fully interacted factorial specifications.

F.1 Single-Treatment Village Estimates

Here, we restrict attention to the villages receiving only one of the treatments (monetary reward, reward certificate, private commitment, public commitment), plus the meetings-only and pure control villages. These correspond to cells A (meetings only), B (private commitment, no reward), C (public commitment, no reward), D (monetary reward, no commitment), G (reward certificate, no commitmement), and J (pure controls) from Table 1. In other words, we estimate Equation 1 from the main text but drop villages receiving combined treatments, specifically cells E (monetary reward, private commitment), F (monetary reward, public commitment), H (reward certificate, private commitment), and I (reward certificate, public commitment) from Table 1.

We present the results for the main outcomes of interest, short-term and medium-term hygienic latrine ownership, in Table F1 and Figure F1 (short-term) and Table F1 and Figure F1 (medium-term). The results are noisier, as expected, but generally comparable to those using the full sample. The relative magnitudes of point estimates are the same – in the short term, the point estimate for monetary reward is largest, followed by public commitment; in the medium term, the point estimate for public commitment is largest – and the confidence intervals around each estimate from this restricted sample overlap with those from the full sample. However, the absolute magnitudes of these point estimates are smaller, which could suggest some complementarity between treatments.

F.2 Fully Interacted Model

Here, we estimate a fully interacted model, augmenting Equation 1 with separate indicators for each treatment cell.

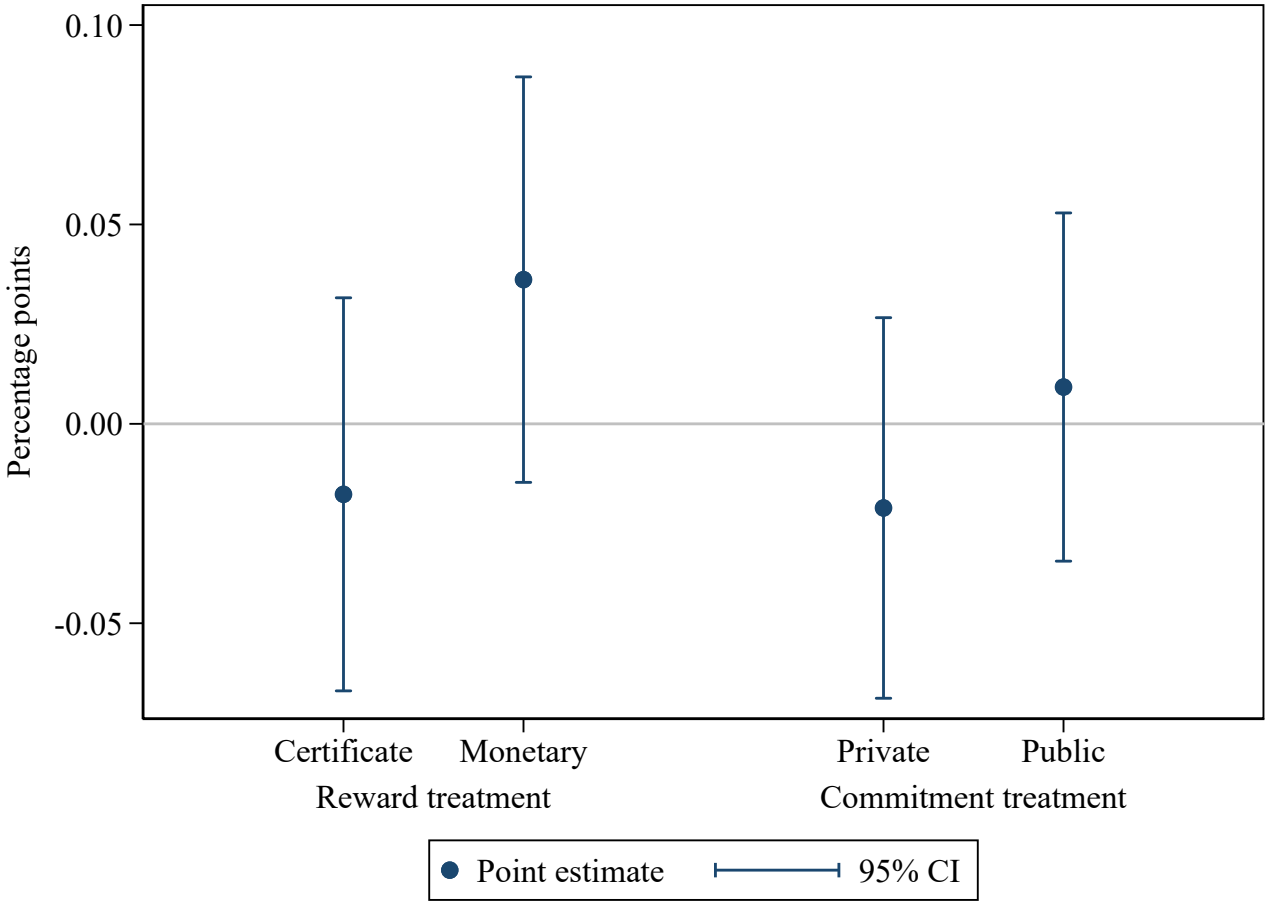
The estimates are presented in Table F1 and Figure F3 for the short term and Table F2 and Figure F4 for the medium term. As with the results of Section F.1, there is suggestive evidence of positive interaction effects, although as expected the estimates are imprecise. Specifically, in the short term, the combination of the monetary reward and the public commitment treatment is larger than either of these treatments alone, and these differences are both economically meaningful and statistically significant ($p < 0.01$). However, this relationship does not hold into the medium term, when the combination of monetary incentive and public commitment does no better than the public commitment alone. Interestingly, in the medium term, the point estimate for the combination of public commitment and reward certificate (i.e., non-monetary reward) is greatest, which is consistent with the mechanism of signalling and reputation we discuss in the main text. However, given the imprecision of our estimates for individual cells, we view this as only suggestive.

Table F1: Short-term Effects: Hygienic Latrine Ownership
Single Treatment Villages

	(1)	(2)	(3)	(4)
Reward Certificate Only	-0.026	-0.011	-0.018	-0.018
	(0.044)	(0.049)	(0.025)	(0.025)
	[-0.122, 0.078]	[-0.133, 0.109]	[-0.084, 0.043]	[-0.084, 0.044]
Monetary Reward Only	0.029	0.069*	0.035	0.036
	(0.049)	(0.041)	(0.025)	(0.026)
	[-0.082, 0.140]	[-0.022, 0.164]	[-0.029, 0.090]	[-0.031, 0.093]
Private Commitment Only	-0.064	-0.034	-0.019	-0.021
	(0.045)	(0.040)	(0.025)	(0.024)
	[-0.182, 0.031]	[-0.132, 0.056]	[-0.085, 0.039]	[-0.083, 0.036]
Public Commitment	-0.032	-0.005	0.011	0.009
	(0.064)	(0.043)	(0.023)	(0.022)
	[-0.162, 0.167]	[-0.093, 0.125]	[-0.043, 0.070]	[-0.043, 0.066]
Baseline share owning hyg. lat.			0.721***	0.688***
			(0.025)	(0.028)
Share of households landless				-0.075***
				(0.023)
Union FEs	No	Yes	Yes	Yes
Number of groups	847	847	846	846
Number of villages	75	75	75	75
Omitted category mean	0.399	0.399	0.401	0.401
Omitted category S.D.	(0.240)	(0.240)	(0.240)	(0.240)

Notes: the dependent variable is the share of households in the group with a hygienic latrine in the short term (at the time of assessment). Observations (groups) are weighted by the number of households. The sample includes villages that received only one treatment, plus meetings-only villages and pure controls. Meetings-only villages are the omitted category. Pure control villages are included for enhanced precision. Standard errors clustered at the village level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure F1: Short-term Effects – Hygienic Latrine Ownership
Single Treatment Villages



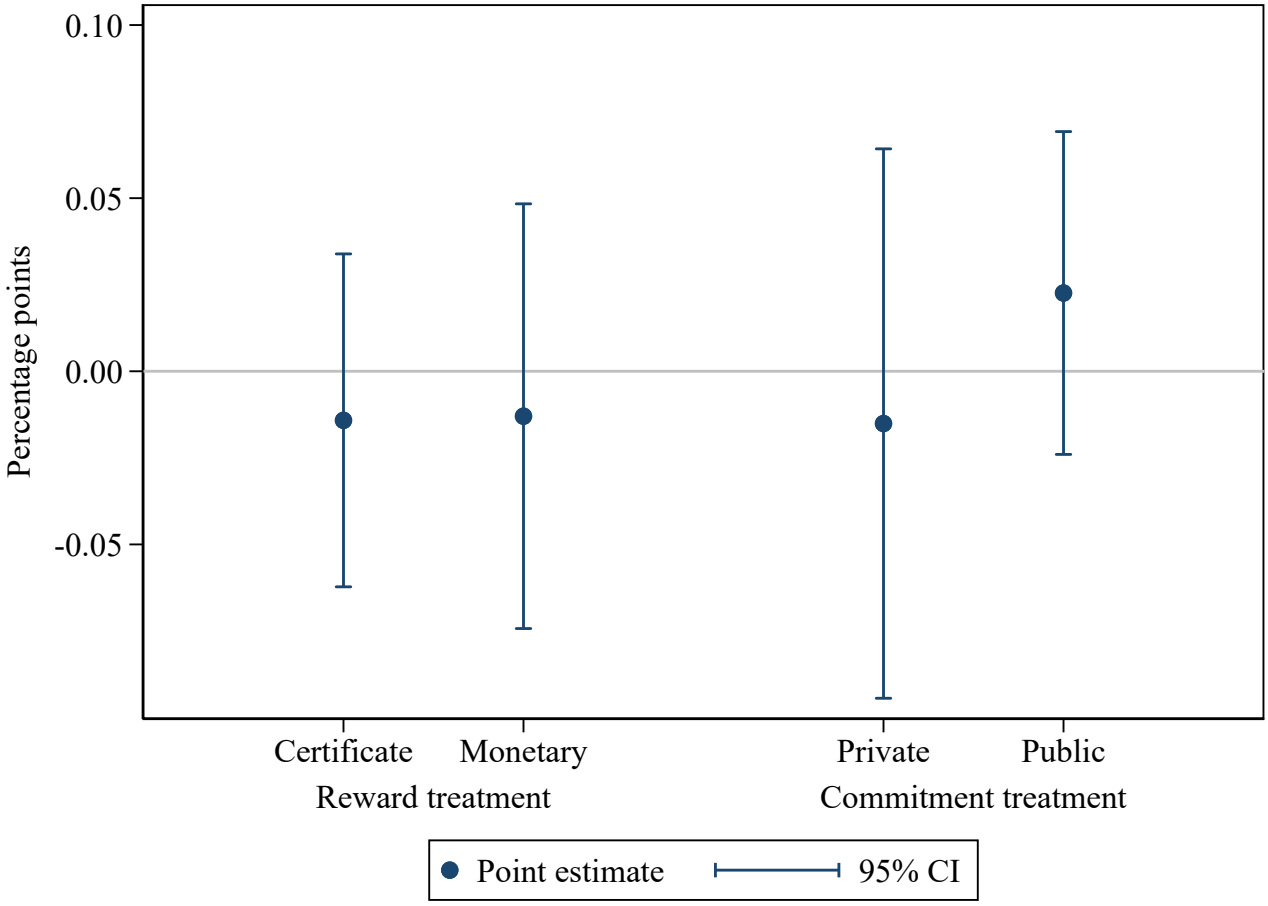
Notes: this graph presents estimated treatment effects of the interventions on the share of households in the group with a hygienic latrine in the short term (at the time of assessment). The regression controls for the baseline level of the outcome variable, the share of households in the group that are landless, and union fixed effects. Observations (groups) are weighted by the number of households. The sample includes villages that received only one treatment, plus meetings-only villages and pure controls. Meetings-only villages are the omitted category. Pure control villages are included for enhanced precision. 95% confidence intervals use standard errors clustered at the village level (the level of randomization).

Table F2: Medium-term Effects: Hygienic Latrine Ownership
Single Treatment Villages

	(1)	(2)	(3)	(4)
Reward Certificate Only	-0.029	-0.009	-0.015	-0.014
	(0.044)	(0.040)	(0.024)	(0.025)
	[-0.127, 0.073]	[-0.103, 0.089]	[-0.066, 0.044]	[-0.067, 0.046]
Monetary Reward Only	-0.013	0.011	-0.014	-0.013
	(0.041)	(0.039)	(0.029)	(0.031)
	[-0.108, 0.088]	[-0.079, 0.104]	[-0.091, 0.045]	[-0.101, 0.052]
Private Commitment Only	-0.052	-0.023	-0.013	-0.015
	(0.047)	(0.046)	(0.042)	(0.040)
	[-0.162, 0.060]	[-0.134, 0.091]	[-0.099, 0.110]	[-0.100, 0.100]
Public Commitment	0.003	0.014	0.026	0.023
	(0.044)	(0.033)	(0.025)	(0.024)
	[-0.088, 0.140]	[-0.053, 0.106]	[-0.025, 0.087]	[-0.028, 0.080]
Baseline share owning hyg. lat.			0.523***	0.479***
			(0.040)	(0.043)
Share of households landless				-0.100***
				(0.038)
Union FEs	No	Yes	Yes	Yes
Number of groups	847	847	846	846
Number of villages	75	75	75	75
Omitted category mean	0.540	0.540	0.543	0.543
Omitted category S.D.	(0.249)	(0.249)	(0.247)	(0.247)

Notes: the dependent variable is the share of households in the group with a hygienic latrine in the medium term (12-15 months after assessment). Observations (groups) are weighted by the number of households. The sample includes villages that received only one treatment, plus meetings-only villages and pure controls. Meetings-only villages are the omitted category. Pure control villages are included for enhanced precision. Standard errors clustered at the village level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure F2: Medium-term Effects – Hygienic Latrine Ownership
Single Treatment Villages



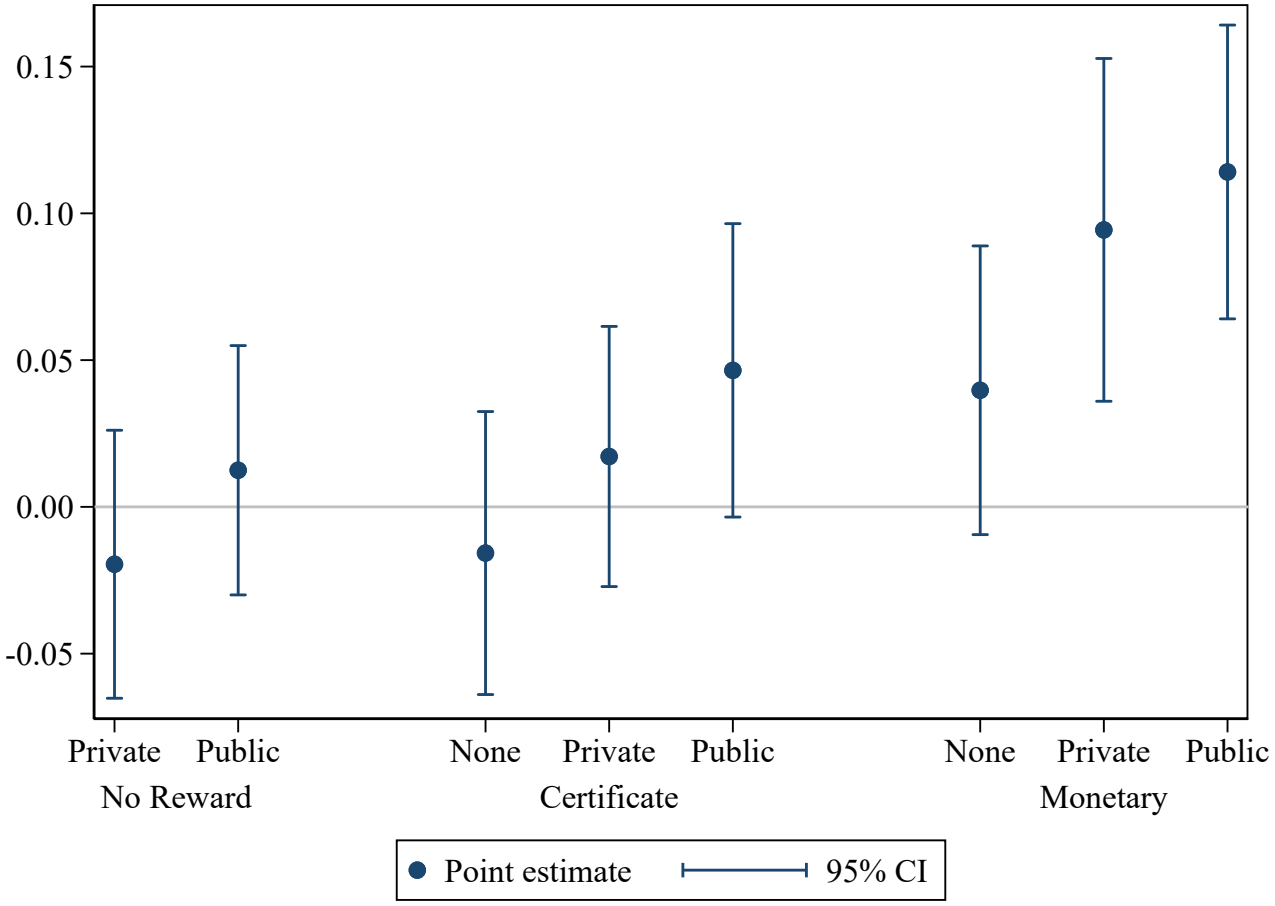
Notes: this graph presents estimated treatment effects of the interventions on the share of households in the group with a hygienic latrine in the medium term (12-15 months after assessment). The regression controls for the baseline level of the outcome variable, the share of households in the group that are landless, and union fixed effects. Observations (groups) are weighted by the number of households. The sample includes villages that received only one treatment, plus meetings-only villages and pure controls. Meetings-only villages are the omitted category. Pure control villages are included for enhanced precision. 95% confidence intervals use standard errors clustered at the village level (the level of randomization).

Table F3: Short-term Effects: Hygienic Latrine Ownership
Fully Interacted Treatments

	(1)	(2)	(3)	(4)
Monetary reward only	0.029	0.078*	0.039	0.040
	(0.049)	(0.042)	(0.025)	(0.025)
	[-0.083, 0.144]	[-0.015, 0.176]	[-0.023, 0.091]	[-0.025, 0.094]
Monetary reward & private commitment	0.057	0.122***	0.095***	0.094***
	(0.072)	(0.046)	(0.031)	(0.030)
	[-0.116, 0.265]	[0.009, 0.266]	[0.017, 0.200]	[0.020, 0.194]
Monetary reward & public commitment	0.158**	0.191***	0.113***	0.114***
	(0.073)	(0.058)	(0.028)	(0.026)
	[-0.037, 0.317]	[0.015, 0.302]	[0.040, 0.173]	[0.046, 0.170]
Certificate only	-0.026	-0.014	-0.016	-0.016
	(0.044)	(0.054)	(0.024)	(0.025)
	[-0.121, 0.077]	[-0.142, 0.121]	[-0.077, 0.041]	[-0.078, 0.044]
Certificate & private commitment	0.077	0.087	0.019	0.017
	(0.066)	(0.057)	(0.023)	(0.023)
	[-0.137, 0.203]	[-0.078, 0.201]	[-0.047, 0.075]	[-0.046, 0.074]
Certificate & public commitment	0.077	0.099**	0.049*	0.047*
	(0.047)	(0.046)	(0.026)	(0.026)
	[-0.034, 0.189]	[-0.012, 0.218]	[-0.015, 0.112]	[-0.018, 0.109]
Private commitment only	-0.064	-0.040	-0.017	-0.020
	(0.045)	(0.041)	(0.024)	(0.023)
	[-0.182, 0.031]	[-0.140, 0.051]	[-0.079, 0.038]	[-0.078, 0.035]
Public commitment only	-0.032	0.005	0.015	0.012
	(0.064)	(0.042)	(0.023)	(0.022)
	[-0.162, 0.164]	[-0.082, 0.137]	[-0.042, 0.070]	[-0.040, 0.067]
Baseline share owning hyg. lat.			0.737***	0.701***
			(0.022)	(0.023)
Share of households landless				-0.082***
				(0.018)
Union FEs	No	Yes	Yes	Yes
Diff.: Monetary & Public – Monetary Only	0.128	0.112	0.074	0.074
	(0.079)	(0.063)	(0.028)	(0.027)
p-value	0.110	0.078	0.009	0.007
Diff.: Monetary & Public – Public Only	0.190	0.185	0.098	0.102
	(0.090)	(0.062)	(0.027)	(0.025)
p-value	0.037	0.003	0.000	0.000
Number of groups	1,236	1,236	1,235	1,235
Number of villages	107	107	107	107
Omitted category mean	0.451	0.451	0.451	0.451
Omitted category S.D.	(0.189)	(0.189)	(0.189)	(0.189)

Notes: the dependent variable is the share of households in the group with a hygienic latrine in the short term (at the time of assessment). Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level in parentheses. Wild cluster bootstrap (9,999 repetitions, Webb weights) 95% confidence intervals, resampling at the village level, in brackets for the coefficients of interest. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure F3: Short-term Effects – Hygienic Latrine Ownership
Fully Interacted Treatments



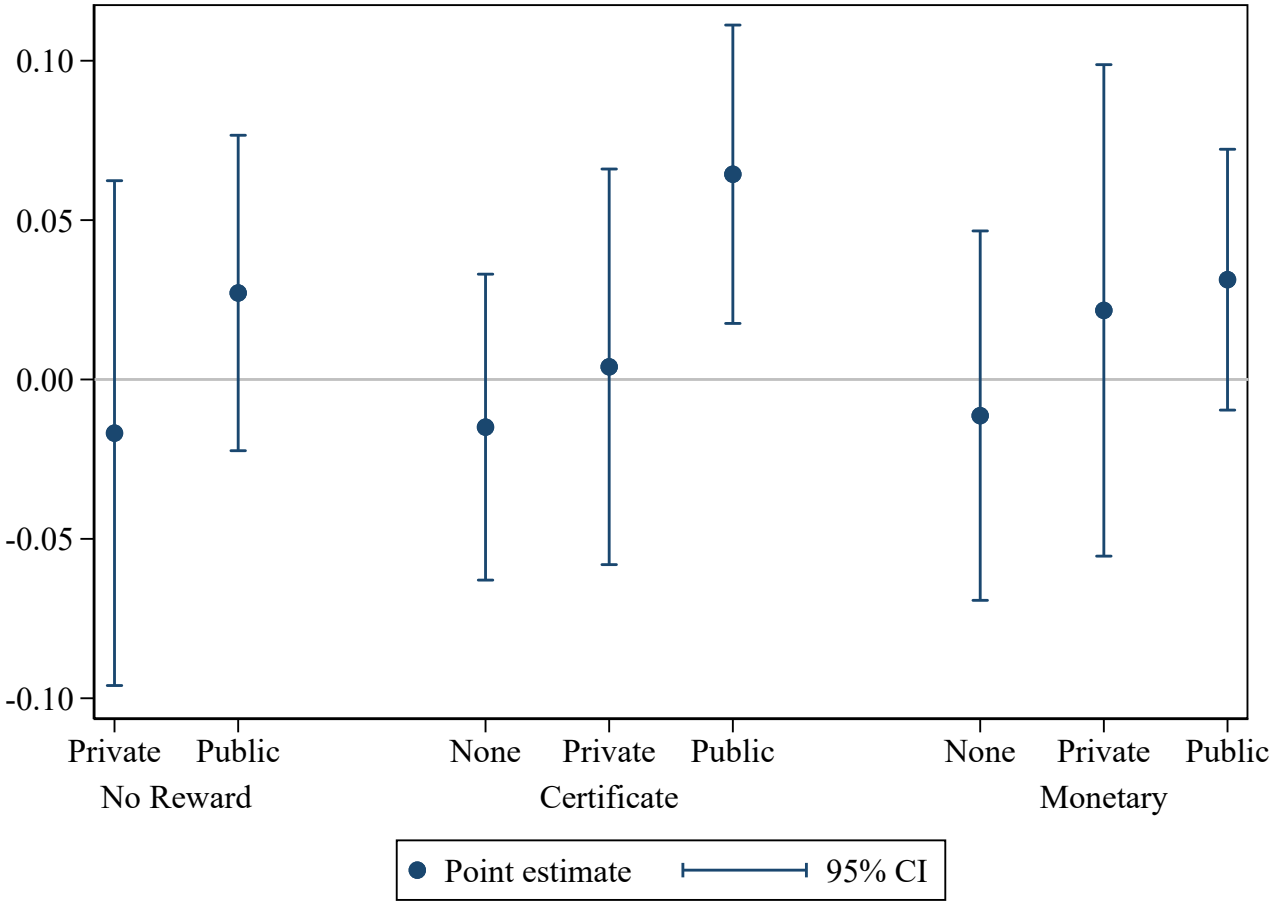
Notes: this graph presents estimated treatment effects of the interventions on the share of households in the group with a hygienic latrine in the short term (at the time of assessment). The regression controls for the baseline level of the outcome variable, the share of households in the group that are landless, and union fixed effects. Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. 95% confidence intervals use standard errors clustered at the village level (the level of randomization).

Table F4: Medium-term Effects: Hygienic Latrine Ownership
Fully Interacted Treatments

	(1)	(2)	(3)	(4)
Monetary reward only	-0.013	0.018	-0.013	-0.011
	(0.041)	(0.038)	(0.028)	(0.030)
	[-0.106, 0.088]	[-0.067, 0.115]	[-0.085, 0.045]	[-0.094, 0.049]
Monetary reward & private commitment	0.011	0.043	0.022	0.022
	(0.070)	(0.052)	(0.041)	(0.039)
	[-0.157, 0.213]	[-0.073, 0.209]	[-0.072, 0.175]	[-0.070, 0.162]
Monetary reward & public commitment	0.080	0.091**	0.030	0.031
	(0.049)	(0.041)	(0.022)	(0.021)
	[-0.044, 0.190]	[-0.028, 0.176]	[-0.025, 0.076]	[-0.020, 0.076]
Certificate only	-0.029	-0.013	-0.015	-0.015
	(0.044)	(0.044)	(0.024)	(0.024)
	[-0.128, 0.075]	[-0.120, 0.092]	[-0.066, 0.042]	[-0.067, 0.044]
Certificate & private commitment	0.042	0.057	0.006	0.004
	(0.064)	(0.061)	(0.032)	(0.032)
	[-0.132, 0.167]	[-0.103, 0.183]	[-0.083, 0.070]	[-0.083, 0.068]
Certificate & public commitment	0.088**	0.105***	0.067***	0.064***
	(0.039)	(0.031)	(0.025)	(0.024)
	[-0.003, 0.175]	[0.033, 0.175]	[0.012, 0.124]	[0.010, 0.118]
Private commitment only	-0.052	-0.031	-0.014	-0.017
	(0.047)	(0.046)	(0.042)	(0.040)
	[-0.161, 0.060]	[-0.139, 0.082]	[-0.098, 0.110]	[-0.099, 0.100]
Public commitment only	0.003	0.023	0.029	0.027
	(0.044)	(0.034)	(0.026)	(0.025)
	[-0.086, 0.142]	[-0.050, 0.122]	[-0.027, 0.090]	[-0.030, 0.090]
Baseline share owning hyg. lat.			0.550***	0.512***
			(0.033)	(0.036)
Share of households landless				-0.088***
				(0.032)
Union FEs	No	Yes	Yes	Yes
Diff.: Monetary & Public – Monetary Only	0.093	0.073	0.043	0.043
	(0.056)	(0.049)	(0.028)	(0.029)
p-value	0.097	0.138	0.132	0.150
Diff.: Monetary & Public – Public Only	0.077	0.068	0.001	0.004
	(0.058)	(0.044)	(0.026)	(0.024)
p-value	0.187	0.130	0.977	0.864
Number of groups	1,235	1,235	1,234	1,234
Number of villages	107	107	107	107
Omitted category mean	0.544	0.544	0.544	0.544
Omitted category S.D.	(0.255)	(0.255)	(0.255)	(0.255)

Notes: the dependent variable is the share of households in the group with a hygienic latrine in the medium term (12-15 months after assessment). Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. Standard errors clustered at the village level in parentheses. Wild cluster bootstrap (9,999 repetitions, Webb weights) 95% confidence intervals, resampling at the village level, in brackets for the coefficients of interest. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure F4: Medium-term Effects – Hygienic Latrine Ownership
Fully Interacted Treatments



Notes: this graph presents estimated treatment effects of the interventions on the share of households in the group with a hygienic latrine in the medium term (12-15 months after assessment). The regression controls for the baseline level of the outcome variable, the share of households in the group that are landless, and union fixed effects. Observations (groups) are weighted by the number of households. The comparison group consists of groups that received the meetings only treatment. Pure control villages are included as a separate category to enhance precision. 95% confidence intervals use standard errors clustered at the village level (the level of randomization).

Appendix References

Gibbons, C. E., S. J. C. Suárez, and M. B. Urbancic (2019). "Broken or Fixed Effects?" *Journal of Econometric Methods* 8.1. DOI: 10.1515/jem-2017-0002.

Lin, W. (2013). "Agnostic notes on regression adjustments to experimental data: Reexamining Freedman's critique." *The Annals of Applied Statistics* 7.1, pp. 295–318. DOI: 10.1214/12-AOAS583.

Social and Financial Incentives for Overcoming a Collective Action Problem

Supplementary Materials

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SM1 Group Formation

As noted in Section 2, the sample consisted of households living in villages that were part of the previous demand study. In that study, villages were subdivided into neighborhoods, and that first set of interventions was conducted at the neighborhood level.[1] The median number of households per neighborhood was 40 (IQR 26-56), and the median number of neighborhoods per village was 4 (IQR 2-6).

For this study, a somewhat smaller intervention unit was appropriate because our fieldwork and qualitative background-information gathering suggested that having households making public commitments to smaller groups of immediate neighbors was more sensible, and that there would be less free-riding and meeting non-attendance in smaller groups. Therefore, we further divided neighborhoods into "groups": sets of 15-20 roughly contiguous households within the neighborhood.

The intervention supervisors who had also been involved with the first set of interventions – the "demand study interventions" – were tasked with the process of assigning households to groups. Because of their long stay in the survey area, the supervisors had developed a close understanding of the socio-dynamics of the sample. This helped them form groups without breaking any organic link between clusters of households in a neighborhood. The general instructions for constructing groups were:

1. Groups should consist of around 15 continuous / neighboring households;
2. Groups should generally not exceed 20 households

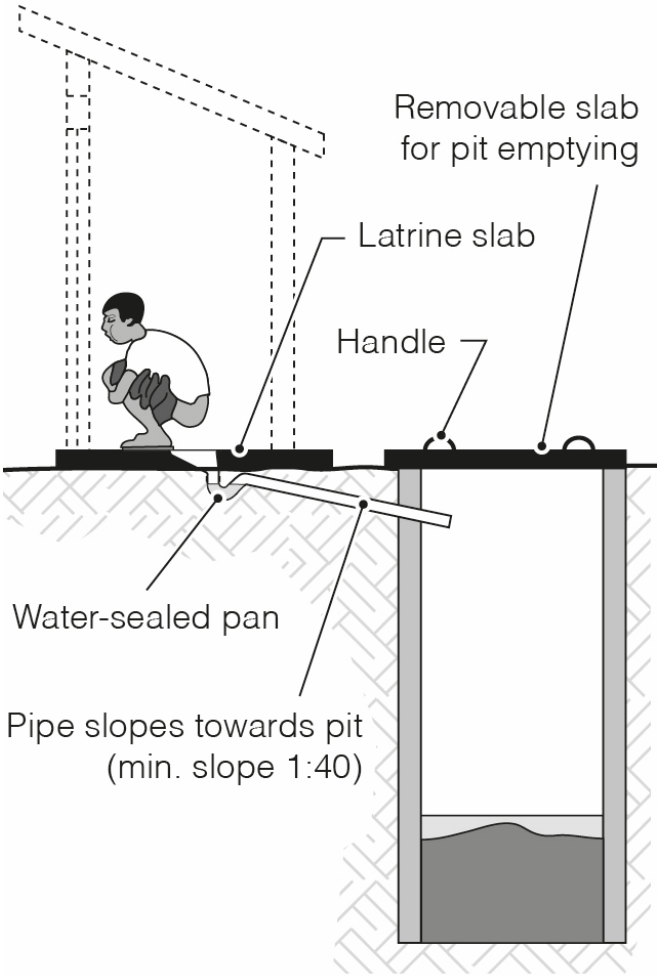
Generally, natural divisions such as rivers or open space between households were used to assign households into simple, contiguous groups. However, some exceptions were made based on practical constraints, in particular when:

1. Households were located in isolated places. If the number of such isolated households was too few to form their own group (say, only 1-2 households) they were added to the nearest group. On the other hand, if the number of such nearby households was higher but still less than 15, these households were put together to form a group. Ultimately, only 6 groups of less than 10 households were formed.
2. At the other extreme, sometimes households were very densely packed and it proved difficult to separate them meaningfully into discrete groups. The largest group in the study area consists of 33 households. Ultimately, only 3 groups consisted of more than 23 households.

[1]The neighborhood, or *para* in Bangla, is not a formal or official designation, but unofficial neighborhood boundaries were usually common knowledge in the community, and in these cases we followed local convention. If there were not well-defined neighborhoods in a village, or if a neighborhood needed to be divided because of its size, we used natural divisions such as rivers or roads where such existed. If such natural pre-existing divisions did not exist or were not practical, we created "neighborhoods" (for the purpose of the study) of households in simple, contiguous sets.

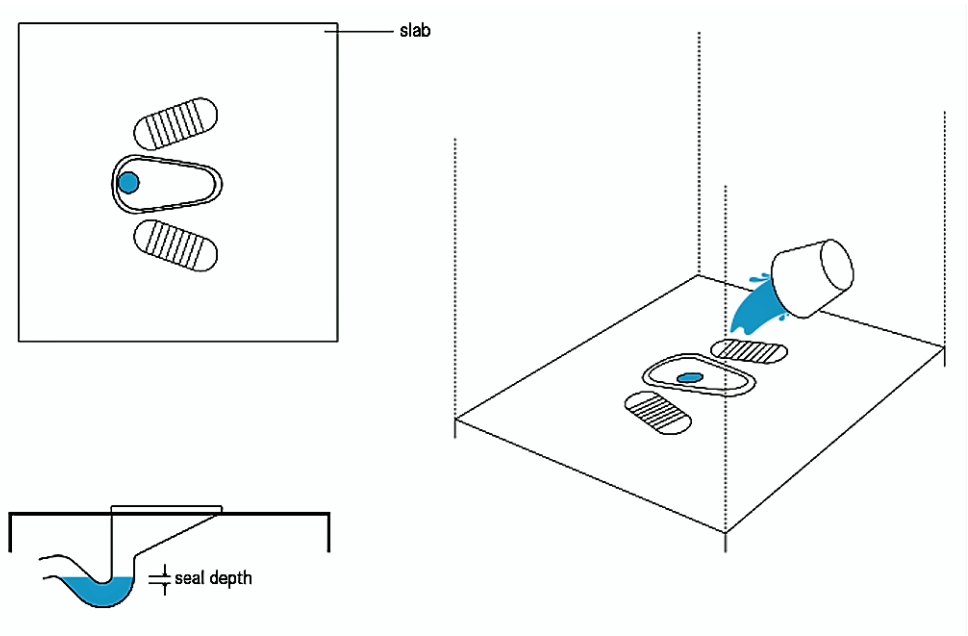
SM2 Key Components of Hygienic Latrines

Figure SM2-1: Pour-flush latrine with offset sealed pit: overview



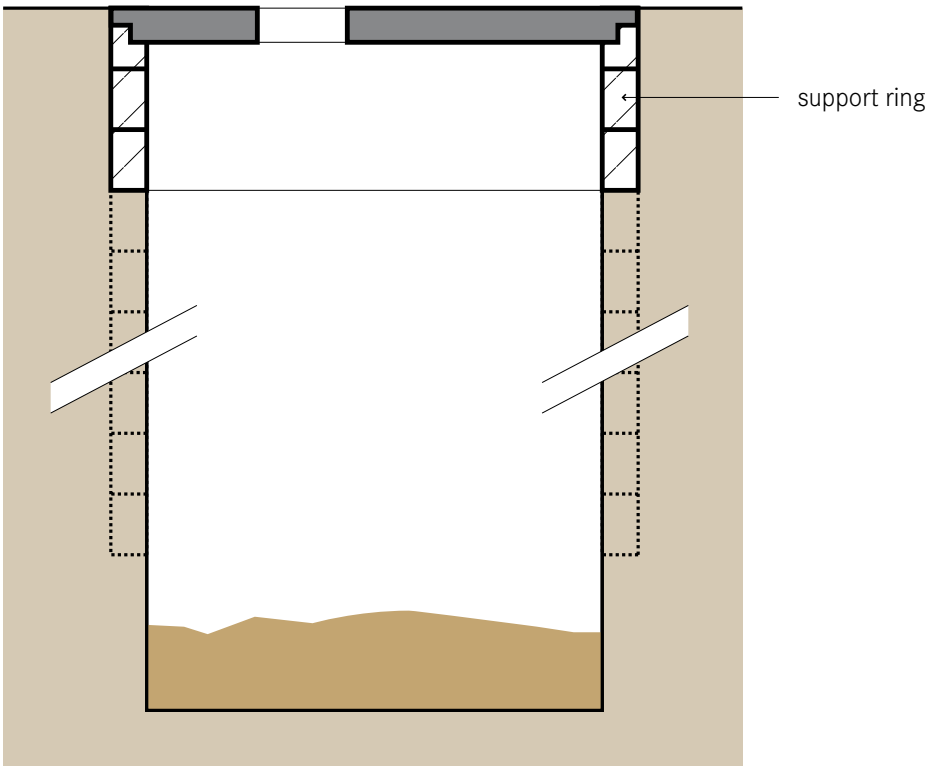
Notes: from Reed (2014). The key features are the slab, water seal and the offet sealed pit.

Figure SM2-2: Pour-flush latrine: pan and water seal



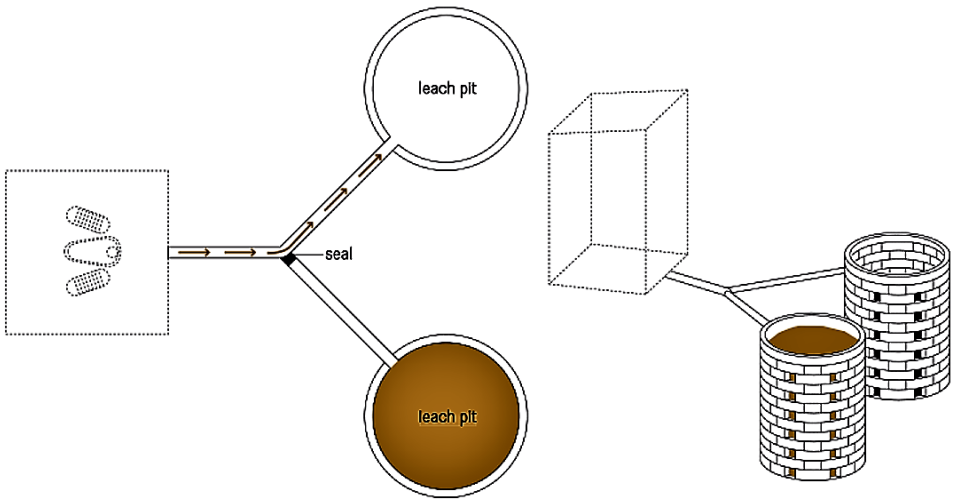
Notes: from Tilley et al. (2014). The water seal blocks flies from accessing the pit and blocks odors from escaping the pit.

Figure SM2-3: Sealed pit



Notes: from Tilley et al. (2014). The sealed rings at the top of the pit reinforce against collapse and prevent surface water from entering the pit. Concrete rings are appropriate for the wet conditions of the study site. The lower section is lined, often with bricks in a honeycomb pattern, to collect solid waste while allowing liquid waste to seep into the ground.

Figure SM2-4: Twin Pit Latrine



Notes: from Tilley et al. (2014). The twin pit design allows one pit to be sealed off when full and the other pit to be put in use. After several months of decomposition, the material in the first pit will have decomposed, making pit emptying no longer hazardous or unpleasant.

SM3 Outcome Variables

Here, we provide detail on how our outcome variables are constructed from our survey instruments. See Sections 3.2 and 4 for discussion of the concepts underlying these definitions.

Household-level variables

Short-term outcomes

- *Open defecation:*

  Survey Section 1, Q4, "What kind of facility is the latrine most regularly used (primary latrine) by the household?" Surveyor observes facility. Response 01 "Don't have any latrine / Open defecation" or 02 "Hanging latrine" coded as open defection.

  Because the short-term data collection was part of the assessment for rewards, self-report of open defecation was especially likely to be biased by treatment arm. Therefore, in this survey round, we use only OD as inferred from the surveyor's assessment of the facility the household reports as its primary latrine or defecation site.

- *Any Latrine Access:*

  Survey Section 1, Q4, "What kind of facility is the latrine most regularly used (primary latrine) by the household?" Surveyor observes facility. Response 01 "Don't have any latrine / Open defecation" or 02 "Hanging latrine" coded as not having access to a latrine, while any other response for this question - ranging from Response 03 "Open Pit/hole without slab and lid or cover" to Response 17 "Sanitary latrine with septic tank" - was coded as having access to a latrine.

- *Any Latrine Ownership:*

  Latrine ownership is defined as the sole or joint ownership of the household's primary latrine facility. Ownership is a strict subset of access – households without access to a latrine are coded as not owning a latrine facility.

  Survey Section 1, Q5, "What is the ownership status of the primary latrine? CODE: 01=Toilet jointly owned with another household, 02=Toilet solely owned by household, 03=community toilet, 04=owned by others/neighbor". Response 01 or Response 02 was coded as owning a latrine, while any other response was coded as not owning a latrine facility.

- *Hygienic Latrine Access:*

  A latrine that a household has access to (see above) is classified as hygienic if satisfies all three of the following criteria, which attempt to capture whether the latrine safely separates feces from the environment: (1) has an intact and functional slab; (2) has an

intact and functional water seal; and (3) does not have any observable leak from the pit or any other latrine component (such as the pipe or Y-junction).

Whether a latrine has an intact and functional slab is based on two questions. The first is Section 1, Q24, "Type of the latrine slab CODE: 00=No slab, 01=Concrete/cement, 02=Plastic, 03=Bamboo, 04=Brick, 05=Earthen, 06=Others". The second is Section 1, Q25, "What is the current condition of latrine slab? CODE: 01=Fully Intact, 02=Partially Broken, 03=Completely Broken". Response 00 for Q24 or Responses 02 or 03 for Q25 leads a latrine to be coded to not have a functional slab.

Whether a latrine has an intact and functional water seal is based on two questions. The first is Section 1, Q27, "What is the current condition of the water seal? CODE: 01=Fully Intact, 02=Partially Broken, 03=Completely Broken, 04=No water seal". A latrine is coded to have a functional/intact water seal with Response 01 to this question. On the other hand, a latrine is coded to not have a functional water seal for Responses 02, 03 and 04. The second is Section 1, Q4, "What kind of facility is the latrine most regularly used (primary latrine) by the household?" Response 01 "Don't have any latrine / Open defecation" or 02 "Hanging latrine" or 03 "Open Pit/hole without slab and lid or cover", as well as 08 "Ring-slab latrine (direct) with water seal:broken/none" or 11 "Single pit ring-slab latrine (Offset) with water seal: broken" or 14 "Double pit Ring-slab latrine (Offset) with water seal: broken", leads a latrine to be coded to not have a functional water seal.

Whether a latrine has components without any observed leaks is based on three questions. The first is Section 1, Q19a "(OBSERVE) Is there any leakage of the latrine pipe, Y junction, pit or the tank? Code: 01=Major, 02=Minor, 03=No leak". A response of 01 or 02 for this question leads a latrine to be coded to have a leaking component. The second is Section 1, Q18, "Is the latrine pipe linked to any ditch/canal/pond etc.? CODE: 01=Yes, 02=No". A response of 01 for this question leads a latrine to be coded to have a leaking component. The third is Section 1, Q4 is also used "What kind of facility is the latrine most regularly used (primary latrine) by the household?" . Response 01 "Don't have any latrine / Open defecation" or 02 "Hanging latrine" or "03. Open Pit/hole without slab and lid or cover" leads a latrine to be coded to have a leaking component.

- *Hygienic Latrine Ownership:*

  Hygienic latrine ownership is defined as the sole or joint ownership of a hygienic latrine facility a household has access to. Hygienic ownership is a strict subset of hygienic access – households without access to any latrine or a hygienic latrine are coded as not owning a hygienic latrine.

  Survey Section 1, Q5, "What is the ownership status of the primary latrine? CODE: 01=Toilet jointly owned with another household, 02=Toilet solely owned by household, 03=community toilet, 04=owned by others/neighbor". If a household has access to a hygienic latrine (see above), Response 01 or Response 02 is then coded as owning a hygienic latrine, while any other response was coded as not owning a hygienic latrine facility.

Medium-term outcomes

The medium-term outcomes are defined identically to those collected in the short term, except for household self-reported open defecation, which was not collected in the short term. There are slight differences in question and response numbering, so we include the definitions below in spite of the redundancy.

- *Open defecation:* Survey Section H, Q12, "What kind of facility is the latrine most regularly used (primary latrine) by the household?" Surveyor observes facility. Response 01 "Don't have any latrine / Open defecation" or 02 "Hanging latrine" coded as open defection.

- *Open defecation among adults (household self-report):* Survey Section H, Q7, "Do (adult men, adult women, children) use open spaces / bushes / hanging latrines for defecation?" Coded Yes if respondent answered Yes (01) for adult men or adult women.

  This measure was not collected in the short-term survey, since open defecation was connected to rewards and response bias would therefore likely be correlated with treatment.

- *Any Latrine Access:*

  Survey Section H-1, Q13, "What kind of facility is the latrine most regularly used (primary latrine) by the household?" Surveyor observes facility. Response 01 "Don't have any latrine / Open defecation" or 02 "Hanging latrine" coded as not having access to a latrine, while any other response for this question - ranging from Response 03 "Open Pit/hole without slab and lid or cover" to Response 17 "Sanitary latrine with septic tank" - was coded as having access to a latrine.

- *Any Latrine Ownership:*

  Latrine ownership is a strict subset of latrine access and is defined as the sole or joint ownership of the latrine facility a household has access to.

  Section H-1, Q18, "What is the ownership status of the primary latrine? CODE: 01=Toilet jointly owned with another household, 02=Toilet solely owned by household, 03= Other's toilet". Response 01 or Response 02 was coded as owning a latrine, while any other response was coded as not owning a latrine facility. Not having access to a latrine is also coded as not owning a latrine facility.

- *Hygienic Latrine Access:*

  A latrine that a household has access to (see above) is classified as hygienic if satisfies all three of the following criteria: (1) has an intact and functional slab; (2) has an intact and functional water seal; and (3) does not have any observable leak from the pit or any other latrine component (such as the pipe or Y-junction).

  Whether a latrine has an intact and functional slab is based on two questions. The first is Section H-1, Q46, "Type of the latrine slab CODE: 00=No slab, 01=Concrete/cement,

02=Plastic, 03=Bamboo, 04=Brick, 05=Earthen, 06=Others". The second is Section H-1, Q47, "What is the current condition of latrine slab? CODE: 01=Fully Intact, 02=Partially Broken, 03=Completely Broken". Response 00 for Q24 or Responses 02 or 03 for Q25 leads a latrine to be coded to not have a functional slab. Not having access to a latrine also leads this variable to be coded as zero.

Whether a latrine has an intact and functional water seal is based on two questions. The first is Section H-1, Q50, "What is the current condition of the water seal? CODE: 01=Fully Intact, 02=Partially Broken, 03=Completely Broken, 04=No water seal". A latrine is coded to have a functional/intact water seal with Response 01 to this question. On the other hand, a latrine is coded to not have a functional water seal for Responses 02, 03 and 04. The second is Section H-1, Q13, "What kind of facility is the latrine most regularly used (primary latrine) by the household?" Response 01 "Don't have any latrine / Open defecation" or 02 "Hanging latrine" or 03 "Open Pit/hole without slab and lid or cover", as well as 08 "Ring-slab latrine (direct) with water seal:broken/none" or 11 "Single pit ring-slab latrine (Offset) with water seal: broken" or 14 "Double pit Ring-slab latrine (Offset) with water seal: broken", leads a latrine to be coded to not have a functional water seal.

Whether a latrine has functional components without any observed leaks is based on three questions. The first is Section H-1, Q36a, "(OBSERVE) Is there any leakage of the latrine pipe, Y junction, pit or the tank? Code: 01=Major, 02=Minor, 03=No leak". A response of 01 or 02 for this question leads a latrine to be coded to have a leaking component. The second is Section H-1, Q35, "Is the latrine pipe linked to any ditch/canal/pond etc.? CODE: 01=Yes, 02=No". A response of 01 for this question leads a latrine to be coded to have a leaking component. The third is Survey Section H-1, Q13, "What kind of facility is the latrine most regularly used (primary latrine) by the household?" Response 01 "Don't have any latrine / Open defecation" or 02 "Hanging latrine" or "03. Open Pit/hole without slab and lid or cover" leads a latrine to be coded to have a leaking component.

- *Hygienic Latrine Ownership:*

  Hygienic latrine ownership is defined as the sole or joint ownership of a hygienic latrine facility a household has access to. Hygienic ownership is a strict subset of hygienic access – households without access to any latrine or a hygienic latrine are coded as not owning a hygienic latrine.

  Section H-1, Q18, "What is the ownership status of the primary latrine? CODE: 01=Toilet jointly owned with another household, 02=Toilet solely owned by household, 03= Other's toilet". If a household has access to a hygienic latrine (see above), Response 01 or Response 02 is then coded as owning a hygienic latrine, while any other response was coded as not owning a hygienic latrine facility.

Group shares

In all cases, group shares are the fraction of households surveyed in the group in the corresponding category. As discussed in Section 4 of the main text, the endline survey was conducted with a 50% subsample stratified by village, leading to some imbalance in the number of households surveyed per group. For groups with fewer than 6 households selected for the endline survey, we randomly selected a "top-up" sample from the remaining households and conducted a brief followup consisting of the endline's modules on latrine condition and use.

Followup-02/Final Cluster Meeting Training Manual

Step-01: On the day before the cluster meeting, the selected leader will be called on mobile so that s/he tells all other members to be present at the meeting on time.

Step-02: After reaching a cluster, at first the Health Motivator will go to each house of the cluster, exchange greetings and invite them to join the meeting at a selected place. Then s/he will inspect the household's latrine/s and collect the information on the electronic tabs. If the latrine is unhygienic (based on the criteria listed below) then it must be explained to the household what steps they need to take in order to make the latrine hygienic.

NOTE: Please ask the follow questions on the primary latrine which is the toilet facility that is used by the household members the majority of the time at the period during which the survey is being conducted.				
1	What kind of facility is the primary latrine used by the household?	01. Don't have any latrine/Open defecation	10. Single pit Ring-slab latrine (Offset) with water seal: intact	
		02. Hanging latrine	11. Single pit ring-slab latrine (Offset) with water seal: broken	
		03. Open Pit/hole without slab and lid or cover	12. Single pit Ring-slab latrine (Offset) with flip/ pollythene	
		04. Pit latrine with slab but without lid or cover	13. Double pit Ring-slab latrine (Offset) with water seal: intact	
		05. Pit latrine with cover	14. Double pit Ring-slab latrine (Offset) with water seal: broken	
		06. Modern pit latrine with vent pipe	15. Double pit Ring-slab latrine (Offset) with flip/ pollythene	
		07. Ring-slab latrine (direct) with water seal: intact	16. Eco Latrine	
		08. Ring-slab latrine (direct) with water seal: broken/none	17. Sanitary latrine with septic tank	
		09. Ring-slab latrine (direct) with flip/ pollythene	|___|___|	
2	What is the ownership status of the primary latrine? CODE: 01=Toilet jointly owned/shared with another household, 02=private toilet solely owned by household, 03=community toilet, 04=uses someone else's latrine, 05=open spaces/bushes/hanging latrine			|___|___|
3	Where is the primary latrine located? CODE: 01=In own homestead (attached), 02=Outside own homestead (not attached), 03=Community latrine, 04=Another household/neighbor's latrine, 05=open defecation			|___|___|
4	How many other households share this latrine facility?			|___|___|
5	What is the current condition of latrine slab? CODE: 01=Fully Intact, 02=Partially Broken, 03=Completely Broken, 04=No slab, 05=N/A			|___|___|
6	Is there any visual evidence of lumps of feces in the toilet area? (does not apply for traces or floating fecal matter) *CODE: 01 = On Pan; 02 = On Slab, 03 = On both Pan and slab, 04 =No fecal matter seen, 05=N/A*			|___|___|
7	What is the current condition of the water seal? CODE: 01=Fully Intact, 02=Partially Broken, 03=Completely Broken, 04= No Water Seal, 05=N/A			|___|___|
8	(If offset) What is the current condition of delivery pipe? CODE: 01=Fully Intact, 02=Partially Broken, 03=Completely Broken, 04= No Delivery Pipe, 05=N/A			|___|___|
9	(If offset) What is the current condition of pit cover? CODE: 01=Fully Intact, 02=Partially Broken, 03=Completely Broken, 04= No Pit Cover, 05=N/A			|___|___|
10	Are there rings in the latrine pit? CODE: 01=Sufficient no. of Rings, 02=Insufficient No. of Rings, 03=No rings, 05=N/A			|___|___|

Notes for data collection:

1. Information has to be entered for hanging latrines
2. If latrine code is 03 then the response to Question 6 is 05/NA
3. If the latrine code is 08 and there is no evidence of feces lumps , then the response to Question 6 will be 04 or 'No fecal matter seen'
4. For hanging latrine (leaking latrine) even if the condition of the ring and pit cover is good, the response to Question-09 will be 02 or 'Partially broken'

5. Need to explain to the household that visible fecal matter makes the latrine unhygienic
6. We will also monitor rings to determine hygienic status – this should be explained
7. If the pit doesn't have sufficient number of rings, the latrine will be deemed unhygienic

Step-03: The meeting will start only when three-fourth of all the members of the cluster are present. The meeting will start by giving thanks to everyone. Everyone will introduce her/himself.

Step-04: Discussion on working as a group:

A. Purpose behind forming groups and solving a problem collectively:

- Unhygienic latrine - feces will be visible, spread bad smell and exposed to flies and insects. Extensive discussion later.
- Unhygienic latrines and unhygienic practices are a social/collective problem. If someone has an unhygienic latrine then it will adversely impact others as well. For example - (pointing finger to someone from the group) "Because of your unhygienic latrine someone else/someone else's children (pointing fingers to someone else) might get sick with cholera, typhoid, diarrhea, jaundice and polio. It is likely to bring economic, physical loss to you and your children."
- For this reason having hygienic latrine for one's own household is not enough, neighbors must have hygienic latrines as well.
- "Whose problem is this? Is this your problem? Does this problem need to be solved in a collective manner?" Because of the enormity of this problem, it needs to be solved in a collective manner.
- "Unity is strength" (Similar Bangla phrases to put emphasis on group work)

B. Read out the names of the members of the group and put emphasis on the importance of spreading the information to those who are absent.

Step-05: Health Motivators will start the discussion on the topics detailed below. Characteristics of a hygienic latrine needs to be repeated as many times as required. Discussion on what is on this script must end within 10-12 minutes.

A. DEFINITION, CHARACTERISTICS AND USE OF HYGIENIC LATRINES

Broad definition of hygienic latrine

1. Hygienic latrines limit the spread of diseases caused by water/feces and keep the environment pollution free.
2. Feces is enclosed in one place and it can not be seen from outside.
3. Flies or other insects cannot enter into the pit.

Most Important technical characteristics of a hygienic latrine:

(These are the characteristics which form the basis for judging if a latrine is hygienic or not. Repeat these characterisitcs often in the cluster meeting so that particiapnts can internalize these attributes.)

1. There must be a slab and it cannot be broken.
2. There must be a water-seal (gooseneck or siphon) and it cannot be broken.
3. There must be an adequate number of rings depending upon the depth of the well and those must not be broken.
4. There should be no gap between the cover of the slab and ring or between the ring and pit cover.
5. There should be no feces, flies or bad smell in or around the latrine.
6. Delivery pipe, y-junction, pit cover cannot be broken.
7. The latrine cannot be connected to a lake or any enclosed water body/ environment cannot be polluted.
8. There should be earth/cement moulded around the slab in case of direct pit latrines.

(Try to get these characteristics repeated by some of the participants)

Methods of using a hygienic latrine:

1. The pan should be made wet by using little water before each use. Feces will not stick on the pan if this is done
2. 1-2 pots (few liters) of water should be used after using the latrine
3. No solid object (like- stone, cloth, mud) should be thrown into the pan
4. The pan of the latrine and the slab/floor must be cleaned everyday.
5. If the latrine pit becomes full than another latrine must be built or the pit must be emptied.

B. Discuss about the number of hygienic/unhygienic latrines among the cluster members and their current condition. Disucuss what must be done to turn the current unhygienic latrines of the clusters into hygienic ones.

C. Targeted number of latrines, deadline and rewards (where applicable) as set by the office must be repeated infront of everybody present so that they can understand it clearly. Make sure that everyone has understood it by asking one or two of them.

D. Motivate each of the households to create and maintain separate hygienic latrine. It must be ensured that they understand that only one household will be rewarded (where applicable) for one hygienic latrine.

[Note: *Cluster meeting participants cannot be shamed.* During household latrine visit if the latrine is found to be unhygienic then the Health Motivator must explain the resaons as to why the latrine is unhygienic. But during the meeting the household member can never be pointed out and shamed. If any household member present in the meeting asks something about her latrine then her questions must be answered while visiting her home at the end of the meeting. However, if any participant asks a question which is applicable for all the participants then that answer can be given in front of everyone. For example if someone asks, "I have not built a separate cover for my offset latrine. But I have covered it up nicely with a carpet (*chatai* in Bangla). Is this hygienic?" answer to this sort of questions can be given in front of all the participants as everyone needs to know about this.]

Step-06: Like the initial meeting, the Health Motivator will conduct a group commitment session (for public commitment intervention) where people will commit to achieve the target. In case of private commitment, the Health Motivators will go to each household separately and make people commit privately.

Commitment

Public Commitment: During each cluster meeting, members from all the households of a cluster will commit publicly that those who do not yet have hygienic latrines will meet hygienic latrine standards as set by the project. Those with hygienic latrines would promise that they would help others reaching the goal within the time limit set by the project. The script of the pledge is as follows:

"I hereby promise before everyone present that I will do my best to set up hygienic latrines or improve existing ones into hygienic latrines for myself and for my neighbors by [end date]."

Private Commitment: After organizing the cluster meeting, health motivators will visit each household in the cluster. The member of the household who had previously attended the meeting will make a commitment before the health motivator that he/she will transform their unhygienic latrines to hygienic ones within the time limit set by the project. The script of the pledge is as follows:

"I hereby promise that I will do my best to set up hygienic latrines or improve existing ones into hygienic latrines for myself and for my surrounding neighbors by [end date]."

Reward Components

There are two threshold targets fixed for clusters, which is in terms of ownership of hygienic latrines. The lower threshold is 25% for [Union 1] while it is 33% for rest of the unions. The higher threshold is 50% for [Union 1] and 66% for the rest of the unions.

Monetary Incentive: A household will get a monetary reward of Tk. 250 or Tk. 500, depending on whether the household owns a hygienic latrine and the ownership of hygienic latrine at the cluster level is above the lower or the upper threshold, respectively.

Certificate: A household will get a certificate of hygiene attainment by a Member or the Chairman of the union, depending on whether the household owns a hygienic latrine and the ownership of hygienic latrine at the cluster level is above the lower or the upper threshold, respectively.

At the end of the meeting, the name of the members of the group should be repeated again and the cluster leader should be handed a complete list containing names of all the members of the cluster so that the group has a better understanding of its members.

Step-07: At the end of the meeting the Health Motivator will briefly recap the whole discussion from beginning to end and give thanks to everyone.

Decisions:

0. Every cluster must be treated the same way (except for the differences arising from the difference in treatment type).

1. Census form has to be filled up in case of new members of the cluster. But add format does not need to be filled for this round.

2. The 'add or deduct' from has to be filled up if any household migrates. Use the code '8888' as before in the tab and in the tab, manually add to the cluster the household has been joined.

3. Similar to last rounds, in case of absent households, the form will be filled by using absent code 9999. Collecting information about the latrine of absent household is still a must.

4. If any new member (whose name is not in the village list) joins the meeting then enter 7777, give a space and then enter the name in the tab.

5. Cluster leader cannot be changed unless it is a special situation.

6. If any household member uses two latrines then enter information about the hygienic one. If both the latrines are used equally then collect information about the one which is closer to dwelling and contact with the field supervisor.

7. **Rewards will be given based on the total number of (hygienic) latrines in the cluster, not based on the number of households (or their access to hygienic latrines). Tell that to the household members a few times.**

8. Each field supervisor must meet two Health Motivators everyday and oversee 3 meetings.

9. The cluster meeting in which the superivisor is monitoring, has to end with a one-minute summary discussion. This has to be recorded as well.

10. Field supervisor will completely cross check the information about the latine provided by Health Motivator.

11. Information on the hardcopy filled by Health Motivator cannot be sent to the server without the concerned filed supervisor checking it.

12. Audio record of each of the meeting must be kept in the tab and submitted to the concerned field supervisor.

13. In the certificate intervention, there is no need to mention whose signature is going to be put in. Just mention that the certificates will be issued by the Union Parishad.

14. Do not use the word 'leader' in the meeting.

15. Consecutive meetings in the same cluster cannot happen within 18-21 days.

16. The new deadline is [end date] to meet the hygienic latrine criteria. This should be mentioned instead of January 20.

17. Supervisors must monitor three meetings everyday. Cross checks of recordings of the Health Motivators will be done by the supervisors under the guidance of the Project Assistant and Project Associates.

18. Health Motivators and Field Supervisors will be rewarded based on how well the cluster meetings have been conducted according the scripts.

19. Need to finish meetings with the words that "This is the last time I have come to talk about hygienic latrines and the reward/certificate program (if applicable). The next time someone else will come to monitor your progress in achieving hygienic latrine status."

HHID: |___|___|___|___|___|___|

Cluster ID: |___|___|___|___|___|___| Village ID: |___|___|___| Village name: _____ Union ID: |___| Para name: _____

Interviewer ID: |___|___|___|___| Interviewer's name: _____ Supervisor's initial: _____ Start Time:_____ End time: _____

HH head name: _____ Respondent's Name and ID: _____ |____|____| Date: _____

(N.B.: If you find anything out of the ordinary at this household, please take notes and contact your supervisor)

Consent

(READ TO RESPONDENT AT THE START OF THE VISIT) **Introduction:** Good morning/afternoon. My name is _____. I am working with Innovations with Poverty Action, an international research organization. We are currently interviewing households for a study on how people make decisions about sanitation. This study covers 4 unions ([redacted]) in the Tanore Upazilla of Rajshahi.

Procedures: We would like to invite you to participate in our study. If you choose to participate, today we will ask you some questions about the types of sanitation facilities your family uses and your family's interactions with other members of your community. This survey will take approximately 15 minutes of your time. We may also come back once in the next three-six months to conduct a longer follow-up survey that will include questions on the health of your family, the sources of water your family uses and your family's income and assets. The information collected in the follow-up surveys will be used to study how behavior in your community changes over time.

Risks and Benefits: We do not expect there to be any risk to you or your household associated with your participation in this study. There will be no direct benefit to you or your household for your participation in this survey. However, we hope that this research will result in findings that will help in improving access to sanitation facilities in communities throughout Bangladesh.

Confidentiality: All of your responses will remain confidential and will never be shared with anyone besides the researchers involved in this study. Neither your personal information nor any information linking your identity to your responses will ever be made public. Should you feel at any time that you are not comfortable answering a question or that your confidentiality is not assured, for example because someone else may be listening, please let us know.

Voluntary Participation: Participation in this study is completely voluntary. You can refuse to answer the entire survey, or you can tell us when a question makes you uncomfortable and we can skip that question. There is no need to answer any question that you do not wish to answer for any reason. If you like, you can end the interview at any time. There will be no penalty for ending or refusing to participate in the survey.

Questions and Concerns: If you have any questions, comments or concerns, you may contact [redacted]. The relevant principal investigators and their contact information is as follows: 1. [redacted]; 2. [redacted]

I have read (or someone has read to me) and understood the above information. I have had the opportunity to have any questions about this study answered and I agree to participate in this study. **CODE**: 01=Agree, 02=Do not agree **>> STOP SURVEY**, 03=Entire HH absent for extended period of time, 04=Migrated Household, 05=Combined Household, 06=Dwelling destroyed/perished |___|___|

HHID: |___|___|___|___|___|___|

Section 1				
1	(ASK and OBSERVE) How many latrines does the household own? (**00** if HH does not own any latrine)			|__|__|
2	(ASK) Does the household have regular access to a latrine? **CODE:** 01=YES, 02= NO **>> skip to Q04**			|__|__|
3	(ASK) Where is the latrine that is used most regularly by the household? **CODE:** 01=In own homestead, 02=Outside own homestead, 03= In neighbor's homestead			|__|__|
(ASK if household doesn't open defecate): "Could you take me there?"				
4	(OBSERVE AND ASK) What kind of facility is the latrine most regularly used (primary latrine) by the household? ***(if 01 then fill up Q12 to Q15 and Section 2)***	01. Don't have any latrine/Open defecation	10. Single pit Ring-slab latrine (Offset) with water seal: intact	
		02. Hanging latrine	11. Single pit ring-slab latrine (Offset) with water seal: broken	
		03. Open Pit/hole without slab and lid or cover	12. Single pit Ring-slab latrine (Offset) with flip/ pollythene	
		04. Pit latrine with slab but without lid or cover	13. Double pit Ring-slab latrine (Offset) with water seal: intact	
		05. Pit latrine with cover	14. Double pit Ring-slab latrine (Offset) with water seal: broken	
		06. Modern pit latrine with vent pipe	15. Double pit Ring-slab latrine (Offset) with flip/ pollythene	
		07. Ring-slab latrine (direct) with water seal: intact	16. Eco Latrine	
		08. Ring-slab latrine (direct) with water seal: broken/none	17. Sanitary latrine with septic tank	
		09. Ring-slab latrine (direct) with flip/ polythene	|__|__|	
For Q5 to Q13, ASK				
5	What is the ownership status of the primary latrine? **CODE:** 01=Toilet jointly owned with another household, 02=private toilet solely owned by household, 03=community toilet **>>Q12**, 04=owned by others/neighbor**>>Q08**			|__|__|
6	How much money was spent on the latrine (in total)? (in Tk.) **CODE:** 99=Don't remember/Don't know **NOTE:** Ask about material/labor/transport cost separately before writing the total amount. If the cost is **99** taka, round it to **100** taka.			Total tk. _____
7	a. Did you borrow any money to install the latrine? **CODE**: 01=Yes, 02=No**>>Q08**, 99= Don't Know**>>Q08**	|__|__|	b) If yes, from whom? (Code below)	|__|__|
Borrowing Code: 01=Bank, 02=NGO, 03=Cooperative/MFI, 04=Private (organization), 05= Private (Individual), 06=Bought on credit, 99=Don't Know				
8	How many households and individuals share the use of this latrine facility?		|__|__| households	|__|__| individuals
9	Identify the households who own the latrine ***(Use "99" if you cannot find the HH and fill up Section 03. If outside the survey area, use "55")***			
	a. |__|__|__|__|__|__|	**b.** |__|__|__|__|__|__|	**c.** |__|__|__|__|__|__|	**d.** |__|__|__|__|__|__|
10	a) How long has your primary latrine been in place? **CODE:** 01=0 - 6 months; 02 =6 months - 1 year; 03=1 - 2 years; 04 = 2 - 3 years; 05= 3-5 years; 06=more than 5 years	|__|__|	b) ***If built since February, 2012*** How many months ago was this latrine built? **CODE:** 99=can't remember/don't know, 77=built before February, 2012	|__|__|
11	a. Number of rings (USE "00" IF NO RINGS) (**CODE**: 99=Don't know) (Use 66 only for septic tanks)	|__|__|	b. How deep is the pit? (***Record answer in fet***) **CODE:** 99=Don't know	|__|__|

12	Where do the HH members usually wash their hands (henceforth, to be termed 'the hand-washing station') after going to the toilet? **CODE:** 01 = Inside toilet facility, 02=less than 3ft from toilet facility, 03=3-9ft of toilet facility, 04=more than 9ft from toilet facility, 05=No specific place **>>Q16**, 06=Do not wash**>>Q16**	|___|___|
13	Do HH members wash hands after returning from toilet? **CODE:** 01=Yes, with soap and water, 02= Yes, with only water, 03=Yes, With ash and water, 04= Yes, With clay and water (multiple responses allowed)	|___|___| |___|___|
	For Q14 to Q37, OBSERVE	
14	Is water available at the hand washing station? **CODE:**1=Yes, adequate water is available, 2=No, adequate water is not available, 3=No water available	|___|___|
15	Is soap and/or clay/ash available at the hand washing station? **CODE:** 01=Bar soap, 02=Powder/detergent, 03=Liquid soap, 04=Clay/ash, 05=No soap/clay/ash observed (multiple responses allowed)	|___|___| |___|___|
16	a. Have you (the interviewer) observed a HH member running to clean a latrine because of your presence or you suspect so? **CODE:** 1=Yes, 2=No ***(Take note if necessary)***	|___|___| _____
17	What materials were used to construct the superstructures? a. walls? |___|___| _____ b. roofs? |___|___|_____	
CODE: 00=none, 01=mud, 02=leaves/stick/straw, 03=bamboo thatch, 04=plastic sheets/polythene, 05=CI sheets/tin, 06=wood, 07=clay tiles, 08=bricks, 09=RC/cement/concrete, 10=other (specify)		
18	Is the latrine pipe linked to any ditch/canal/pond etc.? **CODE:** 1=Yes, 2=No	|___|___|
19	**a)** (OBSERVE) Leakage of the latrine pipe, Y junction, pit or the tank? Code: 01=Major, 02=Minor, 03=No leak**>>Q21** |___|___| **b)** Leakage in which component? Code: 01=Pipe, 02=Pit, 03=Tank, 04=Y-junction ***(Can choose several)***	|___|___|, |___|___|, |___|___|
20	***If pit thought to be leaking*** what are the signs of leaking? **CODE:** 01=Wet soil around pit, 02=Water-logged area outside/around pit, 03=Floating feces outside pit, 04=Some odour, 05=Strong odour *(multiple responses allowed)*	|___|___|, |___|___|, |___|___|
21	***If offset*** what is the current condition of delivery pipe/Y junction? **CODE**: 01=Fully Intact, 02=Partially Broken, 03=Completely Broken, 04= No Delivery Pipe, 66=Not an offset pit latrine**>>Q23**	|___|___|
22	***If offset*** What is the current condition of pit cover? **CODE**: 01=Fully Intact, 02=Partially Broken, 03=Completely Broken, 04= No Pit Cover	|___|___|
23	Any broken ring? **CODE**: 01=Yes, 02=No, 66=No ring/Septic tank	|___|___|
24	Type of the latrine slab **CODE:** 00=No slab**>>Q28**, 01=Concrete/cement, 02=Plastic, 03=Bamboo, 04=Brick, 05=Earthen, 06=Others (mention)	|___|___|
25	What is the current condition of latrine slab? **CODE**: 01=Fully Intact, 02=Partially Broken, 03=Completely Broken	|___|___|
26	**a.** Type of pan **CODE:** 1=Ceramic commode, 02=Ceramic pan, 03=Plastic pan, 04=Concrete/Cement pan, 05=Tin, 06= Bamboo top/covered with polythene, 07=No pan**>>Q08**	|___|___|
26	**b.** What is the current condition of the pan? **CODE**: 01=Fully Intact, 02=Partially Broken, 03=Completely Broken	|___|___|
27	What is the current condition of the water seal? **CODE**: 01=Fully Intact, 02=Partially Broken, 03=Completely Broken, 04=No water seal	|___|___|
28	Presence of Vent pipe on the pit, inside the latrine or outside, condition and net? **CODE:** 01=Yes, good condition, with net, 02=Yes, good condition, without net, 03=Yes, broken, 04=No vent pipe	|___|___|
29	Has the 'slab and pan' (for direct pit) or pit cover (for off-set) been placed properly on top of pit so that flies cannot enter/exit? **CODE**: 1=Yes,	|___|___|

	2=No, 66=No Slab/pan/pit cover					
30	a) Any evidence of fecal matter on the latrine floor? **CODE:** 00=None, 01=Trace amounts only, 02=Lumps of Feces	|___|___|	b) Any evidence of fecal matter on the pan? **CODE:** 00=None, 01=Trace amounts only, 02=Lumps of Feces, 66=No pan**>>Q31**		|___|___|
	c) Any fecal matter floating in the gooseneck/water-seal? **CODE:** 00=None, 01=Trace amounts only, 02=Lumps of Feces, 66=No water-seal		___	___				
31	Is there a bad smell in and around the latrine? **CODE:** 01=Strong bad smell, 02=Some bad smell, 03=No bad smell					|___|___|
32	Is there any visibility of flies or insects inside or around the latrine? **CODE:** 01=Yes, 02=No					|___|___|
33	a) Slippers outside or inside latrine? **CODE:** 1=Yes, 2=No	|___|___|	b) Wet floor? **CODE:** 01=Yes, 02=No	|___|___|	c) Dis-coloration of pan (e.g. yellow/ green) **CODE:** 01=Yes, 02=No, 66=No pan**>>e**	|___|___|
	d) Do you observe the following in the pan (that denotes lack of use) (Multiple response possible) **CODE:** 01= Leaves, 02= dirt, 03=spider webs, 04=Nothing					|___|___| , |___|___| , |___|___|
	e) Water container in/near the latrine? **CODE:** 01=Yes, 02=No	|___|___|	f) Cleaning agents inside the latrine? **CODE:** 01=Broom/brush, 02=Harpik/Bleaching powder/detergent, 03=Ash, 04=No cleaning agent	|___|___|	g) Is there evidence that this latrine is used for storage? **CODE:** 01=Yes, 02=No	|___|___|
	h) Does the path to the toilet suggest regular use (is it clear, well-worn, etc)? **CODE:** 01 = Yes; 02 = No					|___|___|
34	Level of the latrine pan: **CODE:** 01=Above yard height, 02=At yard height, 03=Somewhat lower than the yard, 04=Much lower than the yard					|___|___|
35	How many lumps of feces have you observed in the compound? **CODE:** 01=No lump of feces, 02=1-5 lumps, 03=6-10 lumps, 04=More than 10 lumps					|___|___|
36	Physical/Travel distance of latrine from main living room **CODE:** 00=Inside home compound, 01=01-10 ft, 02=11-20 ft, 03=21-30 ft, 04=More than 30 ft					|___|___|
37	a. ***(If the source of drinking water is TW or Dug well)*** Physical/Travel distance of latrine from the TW/ DW **(Use next question's code)**					|___|___|
	b. Physical/Travel distance between the latrine and the source of water used in the latrine: **Code:** 00=Attached to the room, 01=01-10 ft, 02=11-20 ft, 03=21-30 ft, 04=More than 30 ft					|___|___ |
Section 02 (For Q38 to Q46 ASK)						
38	Since November 01, 2013, (the month of Karttik in Bangla calendar) have you installed a complete latrine or any latrine parts? **CODE:** 01=Complete latrine**>>Q40**, 02=Latrine Parts, 03=Neither **>> *Q42***					|___|___|
39	***If you have installed any parts***, list all such latrine parts (Use **CODE B**)	|___|___| , |___|___| , |___|___| , |___|___| , |___|___|					
CODE B: 01=Water seal/goose-neck/syphon, 02=Slab/Pit Cover, 03=Pit Cover with pan, 04=Pan, 05=Delivery pipe/Y Junction, 06=Ventilation pipe, 07=Rings, 08=Mud/bricks/cement/sand, 09=Door, 10=Other (detail in note)						
40	Is this (for) the same latrine you have mentioned as your primary latrine? **CODE:** 01=Yes, 02=No					|___|___|
41	***If you have installed a complete latrine or any parts Since November 01, 2013*** what was the amount spent in total (***In taka)*** *(Including transportation, labor etc.)*	|___|___|___|___|___|					

HHID: |___|___|___|___|___|___|

<table>
<tr><td>42</td><td colspan="8">Since November 01, 2013 (prompt 'in the last three months' or 'since mid-Karttik' of Bangla calendar) has anyone from your community assisted you ('with advice-information/material/labor/cash/transport') to make your latrine hygienic? CODE: 01=Yes, 02=No>>Q44</td><td>|___|___|</td></tr>
<tr><td>43</td><td colspan="9">Since November 01, 2013 if you have received any assistance from your community to make your latrine hygienic, list the Households and the kind of assistance. (If cannot find HHID, use “99” and fill up section 03. If HH is outside the survey area, use “55”)</td></tr>
<tr><td colspan="2">a. HHID</td><td>b. Relationship with HH head (Code: 01=parents; 02=siblings; 03=children;04=near relatives;05=neighbor/community member; 06=other)</td><td>c. Assistance (Code: 01=Material; 02=Cash Loan >>e; 03=Cash help>>e; 04=Labor support>>f; 05=Advice or Information>>g,h&i; 06=Transport; 07=Other - Take Note)</td><td>d. What kind of material? (Code B);</td><td>e. Amount (in Tk.)</td><td>f. How many labor hours?</td><td>g. Frequency of mention/ discussion on latrines</td><td>h. In private or public gathering (01=private, 02=public, 03=both)</td><td>i. Did you feel pressurized? (Code: If No, use 00; If Yes, use pressure scale 01-05; 01=least and 05=highest pressure)</td></tr>
<tr><td colspan="2">a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td><td>g</td><td>h</td><td>i</td></tr>
<tr><td colspan="2">|__|__|__|__|__|__|</td><td>|___|___|</td><td>|___|___|, |___|___|, |___|___|</td><td>|___|___| , |___|___| , |___|___|</td><td></td><td>|___|___|</td><td>|___|___|</td><td>|___|___|</td><td>|___|___|</td></tr>
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</table>

<table>
<tr><td rowspan="5">44</td><td colspan="5">a. Since November 01, 2013, have you received any assistance ('with material/cash/advice') from the government/UP or any NGO to make your latrine hygienic? CODE: 1=Yes, 2=No>>Q45</td><td>|___|___|</td></tr>
<tr><td>b. NGO/Government/UP Code: 01=Government/UP; 02=BRAC; 03=World Vision; 04= IPA/VERC; 05=Other NGOs</td><td>c. Assistance Code (Code: 01=Material; 02=Cash Loan >>e; 03=Cash help>>e; 04=Labor support>>f; 05=Advice or Information; 06=Transport; 07=Other - Take Note)</td><td>d. What kind of material? (Code A); put commas in between each item</td><td>e. Amount (in Tk.)</td><td>f. Labor hours</td><td>Note</td></tr>
<tr><td>|___|___|</td><td>|___|___|, |___|___|, |___|___|</td><td>|___|___| , |___|___| , |___|___|</td><td>|___|___|,|___|___|___|</td><td></td><td></td></tr>
<tr><td>|___|___|</td><td>|___|___|, |___|___|, |___|___|</td><td>|___|___| , |___|___| , |___|___|</td><td>|___|___|,|___|___|___|</td><td></td><td></td></tr>
<tr><td>|___|___|</td><td>|___|___|, |___|___|, |___|___|</td><td>|___|___| , |___|___| , |___|___|</td><td>|___|___|,|___|___|___|</td><td></td><td></td></tr>
<tr><td colspan="7">CODE B: 01=Water seal/goose-neck/syphon, 02=Slab/Pit Cover, 03=Pit Cover with pan, 04=Delivery pipe, 05=Ventilation pipe, 06=Rings, 07=Mud/bricks/cement/sand, 08=Transportation, 09=Labor, 10=Door, 11=Superstructure (e.g. tin), 12=Other (detail in note)</td></tr>
</table>

45	Did you attend or know of any meeting sessions that were conducted in your village to promote hygienic sanitation between November 01, 2013 to February 05, 2014? **CODE:** 01= Yes, attended, 02=Knows, but did not attend, 03=Neither **>>Q47 >>END**				|___|___|
46	***(Even if HH didn't attend)*** What information was covered in these meetings? ***(Do not read out the options aloud)*** **CODE:** 1=Yes; 2=No				
	a. Private Pledge	|___|___|	i. Reward (Money)		|___|___|
	b. Public Pledge	|___|___|	j. Reward (Certificate)		|___|___|
	c. Deadline (regarding hygienic latrine attainment)	|___|___|	k. Target (percentage or no. of households)		|___|___|
	d. Disadvantages of Open Defecation	|___|___|	l. Importance of washing hands		|___|___|
	e. Importance of proper disposal of feces	|___|___|	m. Installing a hygienic latrine		|___|___|
	f. Importance of hygienic sanitary habits	|___|___|	n. Assessing quality of latrine parts		|___|___|
	g. Importance of using hygienic latrine	|___|___|	o. Places where quality latrines parts are available		|___|___|
	h. Maintaining hygienic latrine	|___|___|	p. Others (Specify): _____		|___|___|
47	**a.** Did any of your neighbor build a latrine since November 01, 2013? **CODE:** 01=Yes; 02=No **>>Q48**	|___|___|	**b.** How many households?		|___|___|
46	***(Even if HH didn't attend)*** What information was covered was covered in these meetings? ***(READ OUT the options)*** **CODE:** 1=Yes; 2=No				
	a. Private Pledge	|___|___|	i. Reward (Money)		|___|___|
	b. Public Pledge	|___|___|	j. Reward (Certificate)		|___|___|
	c. Deadline (regarding hygienic latrine attainment)	|___|___|	k. Target (percentage or no. of households)		|___|___|
	d. Disadvantages of Open Defecation	|___|___|	l. Importance of washing hands		|___|___|
	e. Importance of proper disposal of faeces	|___|___|	m. Installing a hygienic latrine		|___|___|
	f. Importance of hygienic sanitary habits	|___|___|	n. Assessing quality of latrine parts		|___|___|
	g. Importance of using hygienic latrine	|___|___|	o. Places where quality latrines parts are available		|___|___|
	h. Maintaining hygienic latrine	|___|___|	p. Others (Specify): _____		|___|___|

Supplementary Materials References

Reed, B. (2014). "Pour-flush latrines." WEDC Guide No. 26. Loughborogh University. https://hdl.handle.net/2134/30994.

Tilley, E., L. Ulrich, C. Luthi, P. Reymond, and C. Zurbrugg (2014). *Compendium of Sanitation Systems and Technologies: 2nd Revised Edition*. Duebendorf, Switzerland: Swiss Federal Institute of Aquatic Science and Technology (Eawag). https://sswm.info/node/5587.