Social and Financial Incentives for Overcoming a Collective Action Problem

Appendix Tables and Figures

M. Mehrab Bakhtiar*
IFPRI

Raymond Guiteras
North Carolina State University

James Levinsohn
Yale University

Ahmed Mushfiq Mobarak
Yale University

January 2023

*Email: m.bakhtiar@cgiar.org, rpguiter@ncsu.edu, james.levinsohn@yale.edu, ahmed.mobarak@yale.edu.

A Effect of Common, Meetings-Only Treatment **A-1**

B Robustness Checks for Main Outcomes of Interest **B-1**

C Estimated Effects on Secondary Outcomes **C-1**

D Household Investments and Behaviors **D-1**

E Interaction with Household Characteristics **E-1**

F Interaction with Group Characteristics **F-1**

G Single Treatment Villages and Fully Interacted Model **G-1**

G.1 Single-Treatment Village Estimates G-1

G.2 Fully Interacted Model G-1

Appendix References

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:

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

In each table, estimates of short-term effects are presented in columns (1) and (2), with medium-term effects in columns (3) and (4). 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 A6). However, note that this is not reflected in the surveyor assessment of open defecation in the same period (Table A5), nor in any of the endline measures of access or ownership (Tables A1, A2, A3, A4), and so this seems likely to be the result of social desirability bias rather than a true change in behavior.

Table A1: Hygienic Latrine Ownership

	Short term		Medium term	
	(1)	(2)	(3)	(4)
Meetings Only	-0.015	-0.014	-0.025	-0.025
	(0.041)	(0.023)	(0.034)	(0.021)
	[-0.075, 0.113]	[-0.041, 0.071]	[-0.047, 0.103]	[-0.020, 0.071]
Baseline share owning hyg. lat.		0.709***		0.513***
		(0.022)		(0.036)
Share of households landless		-0.083***		-0.089***
		(0.017)		(0.032)
Union FEs	Yes	Yes	Yes	Yes
Number of groups	377	376	377	376
Number of villages	31	31	31	31
Omitted category mean	0.399	0.401	0.540	0.543
Omitted category S.D.	(0.240)	(0.240)	(0.249)	(0.247)

Notes: the dependent variable is the share of households in the group owning a hygienic latrine. Columns (1) and (2) report short-term effects (at the time of assessment); columns (3) and (4) report medium-term effects (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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A2: Hygienic Latrine Access

	Short term		Medium term	
	(1)	(2)	(3)	(4)
Meetings Only	-0.023	-0.027	-0.034	-0.037
	(0.045)	(0.026)	(0.037)	(0.025)
	[-0.072, 0.129]	[-0.035, 0.089]	[-0.044, 0.118]	[-0.018, 0.093]
Hygienic latrine access (group share, R4)		0.691***		0.443***
		(0.025)		(0.038)
Share of households landless		-0.096***		-0.083**
		(0.022)		(0.033)
Union FEs	Yes	Yes	Yes	Yes
Number of groups	377	377	377	377
Number of villages	31	31	31	31
Omitted category mean	0.484	0.484	0.636	0.636
Omitted category S.D.	(0.268)	(0.268)	(0.253)	(0.253)

Notes: the dependent variable is the share of households in the group with access to a hygienic latrine. Columns (1) and (2) report short-term effects (at the time of assessment); columns (3) and (4) report medium-term effects (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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A3: Any Latrine Ownership

	Short term		Medium term	
	(1)	(2)	(3)	(4)
Meetings Only	-0.005	0.019	0.001	0.017
	(0.031)	(0.020)	(0.024)	(0.020)
	[-0.061, 0.073]	[-0.061, 0.029]	[-0.052, 0.052]	[-0.060, 0.026]
Any latrine ownership (group share, R4)		0.682***		0.513***
		(0.031)		(0.043)
Share of households landless		-0.096***		-0.129***
		(0.021)		(0.026)
Union FEs	Yes	Yes	Yes	Yes
Number of groups	377	376	377	376
Number of villages	31	31	31	31
Omitted category mean	0.666	0.669	0.768	0.771
Omitted category S.D.	(0.229)	(0.225)	(0.203)	(0.198)

Notes: the dependent variable is the share of households in the group owning any latrine. Columns (1) and (2) report short-term effects (at the time of assessment); columns (3) and (4) report medium-term effects (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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A4: Any Latrine Access

	Short term		Medium term	
	(1)	(2)	(3)	(4)
Meetings Only	-0.018	-0.004	-0.009	-0.000
	(0.030)	(0.014)	(0.023)	(0.015)
	[-0.044, 0.081]	[-0.027, 0.035]	[-0.042, 0.058]	[-0.035, 0.033]
Any latrine access (group share, R4)		0.680***		0.456***
		(0.032)		(0.045)
Share of households landless		-0.102***		-0.078***
		(0.022)		(0.025)
Union FEs	Yes	Yes	Yes	Yes
Number of groups	377	377	377	377
Number of villages	31	31	31	31
Omitted category mean	0.850	0.850	0.916	0.916
Omitted category S.D.	(0.208)	(0.208)	(0.153)	(0.153)

Notes: the dependent variable is the share of households in the group with access to any latrine. Columns (1) and (2) report short-term effects (at the time of assessment); columns (3) and (4) report medium-term effects (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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A5: Open Defecation – Surveyor Assessment

	Short term		Medium term	
	(1)	(2)	(3)	(4)
Meetings Only	0.018	-0.000	0.009	-0.003
	(0.030)	(0.012)	(0.023)	(0.014)
	[-0.081, 0.045]	[-0.024, 0.025]	[-0.058, 0.043]	[-0.029, 0.034]
Open defecation (group share, R4)		0.760***		0.504***
		(0.028)		(0.046)
Share of households landless		0.050**		0.046*
		(0.019)		(0.025)
Union FEs	Yes	Yes	Yes	Yes
Number of groups	377	377	377	377
Number of villages	31	31	31	31
Omitted category mean	0.150	0.150	0.084	0.084
Omitted category S.D.	(0.208)	(0.208)	(0.153)	(0.153)

Notes: the dependent variable is the share of households primarily practicing OD. Columns (1) and (2) report short-term effects (at the time of assessment); columns (3) and (4) report medium-term effects (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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A6: Medium Term OD – Household Self-Report

	(1)	(2)
Meetings Only	-0.171*	-0.162*
	(0.089)	(0.087)
	[-0.050, 0.368]	[-0.051, 0.353]
Open defecation (group share, R4)		0.414***
		(0.052)
Share of households landless		0.143***
		(0.040)
Union FEs	Yes	Yes
Number of groups	377	377
Number of villages	31	31
Omitted category mean	0.469	0.469
Omitted category S.D.	(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 Table B1, are virtually unchanged from those of the main text (Table 3).

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, in Table B2 and Figure B1. 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: Program Effects: Hygienic Latrine Ownership
Unweighted Regressions

	Short term		Medium term	
	(1)	(2)	(3)	(4)
Monetary Reward	0.125***	0.079***	0.048	0.013
	(0.035)	(0.016)	(0.031)	(0.020)
	[0.046, 0.203]	[0.044, 0.111]	[-0.019, 0.116]	[-0.030, 0.056]
Reward Certificate	0.048	0.012	0.045	0.018
	(0.040)	(0.012)	(0.038)	(0.023)
	[-0.050, 0.142]	[-0.015, 0.039]	[-0.044, 0.132]	[-0.033, 0.068]
Private Commitment	0.012	0.010	0.017	0.016
	(0.040)	(0.012)	(0.041)	(0.025)
	[-0.078, 0.106]	[-0.018, 0.037]	[-0.082, 0.113]	[-0.046, 0.071]
Public Commitment	0.067*	0.045***	0.080***	0.062***
	(0.037)	(0.016)	(0.029)	(0.017)
	[-0.016, 0.150]	[0.010, 0.080]	[0.019, 0.140]	[0.027, 0.098]
Baseline share owning hyg. lat.		0.712***		0.518***
		(0.022)		(0.037)
Share of households landless		-0.083***		-0.090***
		(0.018)		(0.033)
Union FEs	Yes	Yes	Yes	Yes
Diff.: Monetary – Public	0.058	0.034	-0.032	-0.049
	(0.047)	(0.020)	(0.042)	(0.031)
p-value	0.216	0.097	0.448	0.121
Diff.: Monetary – Certificate	0.076	0.067	0.003	-0.005
	(0.040)	(0.016)	(0.033)	(0.019)
p-value	0.058	0.000	0.935	0.795
Diff.: Public – Private	0.055	0.035	0.063	0.047
	(0.041)	(0.015)	(0.037)	(0.022)
p-value	0.180	0.023	0.095	0.040
Number of groups	1,236	1,235	1,235	1,234
Number of villages	107	107	107	107
Omitted category mean	0.451	0.451	0.544	0.544
Omitted category S.D.	(0.189)	(0.189)	(0.255)	(0.255)

Notes: the dependent variable is the share of households in the group owning a hygienic latrine. Columns (1) and (2) report short-term effects (at the time of assessment); columns (3) and (4) report medium-term effects (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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

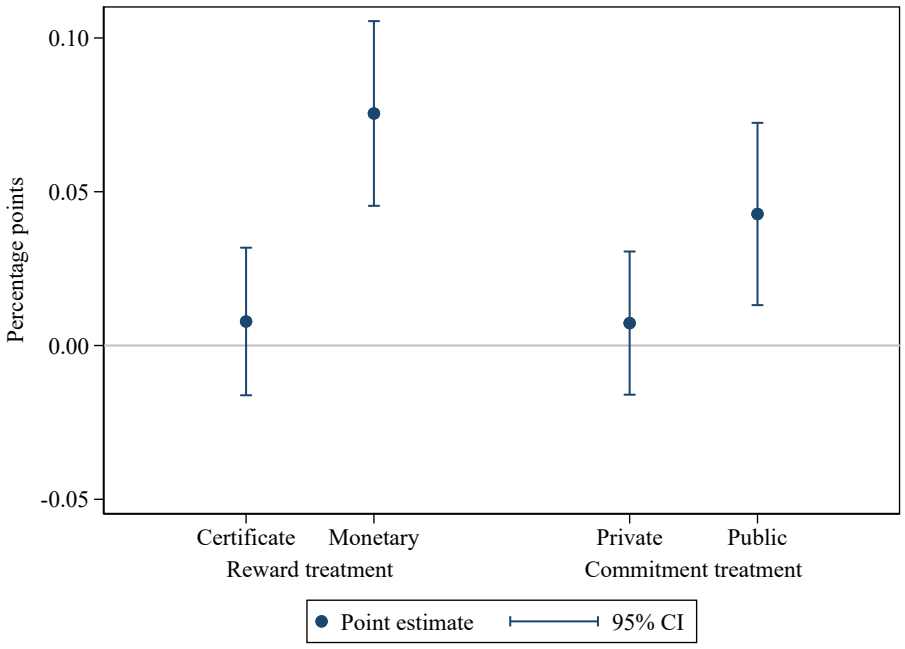
Table B2: Program Effects: Hygienic Latrine Ownership
Interact Treatment with De-Meaned Control Variables

	Short term		Medium term	
	(1)	(2)	(3)	(4)
Monetary Reward	0.125***	0.075***	0.047	0.012
	(0.034)	(0.015)	(0.030)	(0.021)
	[0.052, 0.200]	[0.042, 0.108]	[-0.017, 0.111]	[-0.031, 0.056]
Reward Certificate	0.044	0.008	0.043	0.015
	(0.037)	(0.012)	(0.035)	(0.021)
	[-0.047, 0.130]	[-0.019, 0.035]	[-0.040, 0.124]	[-0.033, 0.061]
Private Commitment	0.008	0.007	0.013	0.009
	(0.038)	(0.012)	(0.039)	(0.024)
	[-0.076, 0.098]	[-0.019, 0.034]	[-0.079, 0.103]	[-0.046, 0.063]
Public Commitment	0.063*	0.043***	0.072**	0.055***
	(0.036)	(0.015)	(0.028)	(0.018)
	[-0.017, 0.143]	[0.009, 0.078]	[0.012, 0.132]	[0.018, 0.093]
Baseline share owning hyg. lat.		0.694***		0.451***
		(0.053)		(0.084)
Share of households landless		-0.016		-0.152**
		(0.040)		(0.066)
Union FEs	Yes	Yes	Yes	Yes
Diff.: Monetary – Public	0.062	0.033	-0.025	-0.043
	(0.046)	(0.020)	(0.042)	(0.030)
p-value	0.182	0.101	0.544	0.161
Diff.: Monetary – Certificate	0.081	0.068	0.004	-0.003
	(0.039)	(0.015)	(0.032)	(0.019)
p-value	0.038	0.000	0.899	0.892
Diff.: Public – Private	0.055	0.035	0.059	0.046
	(0.038)	(0.014)	(0.036)	(0.021)
p-value	0.156	0.013	0.098	0.030
Number of groups	1,236	1,235	1,235	1,234
Number of villages	107	107	107	107
Omitted category mean	0.451	0.451	0.544	0.544
Omitted category S.D.	(0.189)	(0.189)	(0.255)	(0.255)

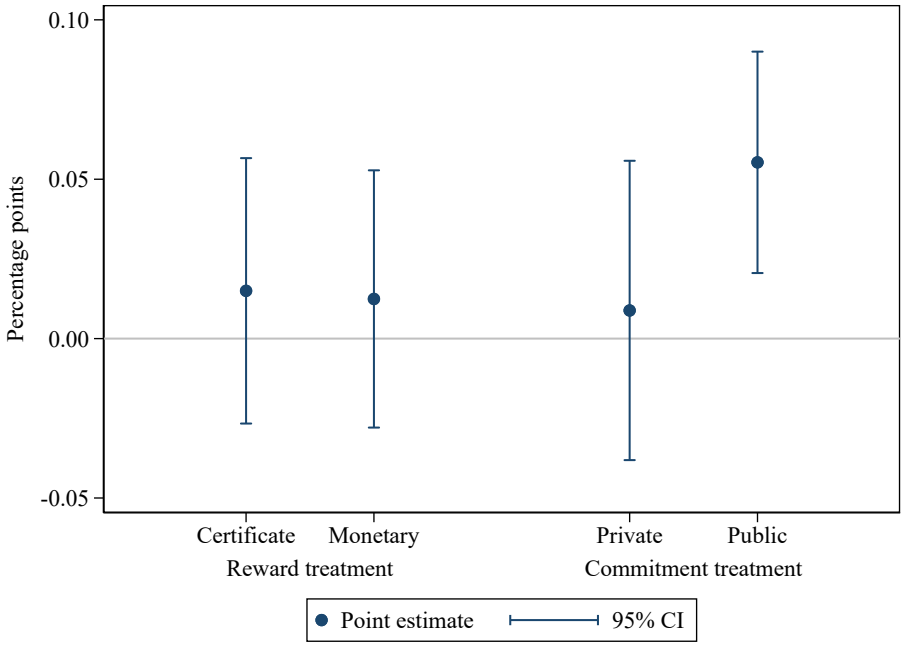
Notes: the dependent variable is the share of households in the group owning a hygienic latrine. Columns (1) and (2) report short-term effects (at the time of assessment); columns (3) and (4) report medium-term effects (12-15 months after assessment). Observations (groups) are weighted by the number 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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

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

(a) Short-term



(b) Medium-term



Notes: this graph presents estimated treatment effects of the interventions on the share of households in the group owning a hygienic latrine. Panel (a) presents effects in the short term (at the time of assessment); panel (b) 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. Following Lin (2013), the control variables are de-meaned and interacted with treatment indicators. This figure plots the non-interacted treatment coefficients, representing 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. 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: Table C1
- Any Latrine Ownership: Table C2
- Any Latrine Access: Table C3
- Open Defecation – Surveyor Assessment: Table C4
- Open Defecation – Household Self-Report: Table C5 (medium-term only)

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

Table C1: Program Effects: Hygienic Latrine Access

	Short term		Medium term	
	(1)	(2)	(3)	(4)
Monetary Reward	0.123***	0.076***	0.030	-0.000
	(0.037)	(0.018)	(0.034)	(0.023)
	[0.045, 0.202]	[0.037, 0.114]	[-0.043, 0.105]	[-0.050, 0.049]
Reward Certificate	0.052	0.008	0.045	0.017
	(0.044)	(0.016)	(0.043)	(0.029)
	[-0.057, 0.152]	[-0.028, 0.045]	[-0.060, 0.145]	[-0.049, 0.081]
Private Commitment	0.021	0.028*	0.021	0.025
	(0.045)	(0.015)	(0.047)	(0.032)
	[-0.076, 0.124]	[-0.006, 0.060]	[-0.091, 0.131]	[-0.054, 0.098]
Public Commitment	0.071	0.052**	0.088**	0.075***
	(0.043)	(0.021)	(0.034)	(0.021)
	[-0.024, 0.167]	[0.005, 0.100]	[0.016, 0.160]	[0.030, 0.122]
Hygienic latrine access (group share, R4)		0.691***		0.443***
		(0.025)		(0.038)
Share of households landless		-0.096***		-0.083**
		(0.022)		(0.033)
Union FEs	Yes	Yes	Yes	Yes
Diff.: Monetary – Public	0.052	0.024	-0.058	-0.075
	(0.055)	(0.026)	(0.050)	(0.035)
p-value	0.343	0.348	0.245	0.035
Diff.: Monetary – Certificate	0.071	0.068	-0.015	-0.017
	(0.045)	(0.020)	(0.038)	(0.024)
p-value	0.116	0.001	0.695	0.469
Diff.: Public – Private	0.049	0.024	0.067	0.050
	(0.043)	(0.020)	(0.042)	(0.029)
p-value	0.253	0.225	0.111	0.086
Number of groups	1,236	1,236	1,235	1,235
Number of villages	107	107	107	107
Omitted category mean	0.528	0.528	0.627	0.627
Omitted category S.D.	(0.218)	(0.218)	(0.278)	(0.278)

Notes: the dependent variable is the share of households in the group with access to a hygienic latrine. Columns (1) and (2) report short-term effects (at the time of assessment); columns (3) and (4) report medium-term effects (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 C2: Program Effects: Any Latrine Ownership

	Short term		Medium term	
	(1)	(2)	(3)	(4)
Monetary Reward	0.065***	0.028*	0.023	-0.004
	(0.023)	(0.015)	(0.021)	(0.016)
	[0.017, 0.113]	[-0.002, 0.061]	[-0.022, 0.068]	[-0.038, 0.032]
Reward Certificate	0.029	0.004	0.029	0.009
	(0.025)	(0.012)	(0.020)	(0.016)
	[-0.031, 0.087]	[-0.021, 0.028]	[-0.017, 0.071]	[-0.024, 0.043]
Private Commitment	-0.007	-0.006	-0.008	-0.008
	(0.027)	(0.012)	(0.022)	(0.016)
	[-0.066, 0.053]	[-0.031, 0.019]	[-0.060, 0.039]	[-0.041, 0.028]
Public Commitment	0.023	0.002	0.008	-0.009
	(0.023)	(0.014)	(0.017)	(0.015)
	[-0.027, 0.073]	[-0.030, 0.033]	[-0.028, 0.044]	[-0.041, 0.022]
Any latrine ownership (group share, R4)		0.682***		0.513***
		(0.031)		(0.043)
Share of households landless		-0.096***		-0.129***
		(0.021)		(0.026)
Union FEs	Yes	Yes	Yes	Yes
Diff.: Monetary – Public	0.042	0.026	0.015	0.005
	(0.033)	(0.020)	(0.025)	(0.023)
p-value	0.209	0.201	0.560	0.842
Diff.: Monetary – Certificate	0.035	0.025	-0.006	-0.013
	(0.024)	(0.014)	(0.021)	(0.014)
p-value	0.142	0.076	0.774	0.353
Diff.: Public – Private	0.030	0.008	0.016	-0.001
	(0.026)	(0.014)	(0.021)	(0.016)
p-value	0.254	0.581	0.447	0.944
Number of groups	1,236	1,235	1,235	1,234
Number of villages	107	107	107	107
Omitted category mean	0.713	0.713	0.782	0.782
Omitted category S.D.	(0.204)	(0.204)	(0.217)	(0.217)

Notes: the dependent variable is the share of households in the group owning any latrine. Columns (1) and (2) report short-term effects (at the time of assessment); columns (3) and (4) report medium-term effects (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 C3: Program Effects: Any Latrine Access

	Short term		Medium term	
	(1)	(2)	(3)	(4)
Monetary Reward	0.038	0.018	0.006	-0.007
	(0.026)	(0.014)	(0.022)	(0.017)
	[-0.016, 0.094]	[-0.014, 0.051]	[-0.043, 0.055]	[-0.044, 0.030]
Reward Certificate	0.042	0.011	0.028	0.007
	(0.026)	(0.012)	(0.022)	(0.013)
	[-0.019, 0.098]	[-0.014, 0.036]	[-0.023, 0.075]	[-0.022, 0.036]
Private Commitment	-0.016	-0.004	-0.009	-0.001
	(0.027)	(0.013)	(0.024)	(0.015)
	[-0.077, 0.042]	[-0.031, 0.025]	[-0.067, 0.044]	[-0.034, 0.031]
Public Commitment	-0.002	-0.010	0.003	-0.002
	(0.025)	(0.012)	(0.018)	(0.013)
	[-0.055, 0.050]	[-0.035, 0.016]	[-0.035, 0.041]	[-0.029, 0.025]
Any latrine access (group share, R4)		0.680***		0.456***
		(0.032)		(0.045)
Share of households landless		-0.102***		-0.078***
		(0.022)		(0.025)
Union FEs	Yes	Yes	Yes	Yes
Diff.: Monetary – Public	0.040	0.028	0.003	-0.005
	(0.039)	(0.019)	(0.030)	(0.024)
p-value	0.299	0.159	0.914	0.833
Diff.: Monetary – Certificate	-0.003	0.007	-0.021	-0.014
	(0.027)	(0.015)	(0.025)	(0.017)
p-value	0.905	0.655	0.398	0.390
Diff.: Public – Private	0.014	-0.006	0.012	-0.001
	(0.027)	(0.013)	(0.023)	(0.014)
p-value	0.606	0.674	0.597	0.934
Number of groups	1,236	1,236	1,235	1,235
Number of villages	107	107	107	107
Omitted category mean	0.868	0.868	0.918	0.918
Omitted category S.D.	(0.195)	(0.195)	(0.188)	(0.188)

Notes: the dependent variable is the share of households in the group with access to any latrine. Columns (1) and (2) report short-term effects (at the time of assessment); columns (3) and (4) report medium-term effects (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 C4: Program Effects: Open Defecation
Based on surveyor assessment of household's primary latrine

	Short term		Medium term	
	(1)	(2)	(3)	(4)
Monetary Reward	-0.038	-0.005	-0.006	0.015
	(0.026)	(0.012)	(0.022)	(0.015)
	[-0.092, 0.015]	[-0.032, 0.021]	[-0.054, 0.042]	[-0.019, 0.048]
Reward Certificate	-0.042	-0.004	-0.028	-0.003
	(0.026)	(0.010)	(0.022)	(0.013)
	[-0.097, 0.019]	[-0.026, 0.015]	[-0.074, 0.022]	[-0.031, 0.026]
Private Commitment	0.016	0.001	0.009	-0.001
	(0.027)	(0.010)	(0.024)	(0.014)
	[-0.043, 0.077]	[-0.023, 0.023]	[-0.043, 0.067]	[-0.031, 0.031]
Public Commitment	0.002	-0.006	-0.003	-0.008
	(0.025)	(0.010)	(0.018)	(0.011)
	[-0.050, 0.056]	[-0.026, 0.015]	[-0.041, 0.035]	[-0.032, 0.017]
Open defecation (group share, R4)		0.760***		0.504***
		(0.028)		(0.046)
Share of households landless		0.050**		0.046*
		(0.019)		(0.025)
Union FEs	Yes	Yes	Yes	Yes
Diff.: Monetary – Public	-0.040	0.000	-0.003	0.023
	(0.039)	(0.016)	(0.030)	(0.022)
p-value	0.299	0.985	0.914	0.285
Diff.: Monetary – Certificate	0.003	-0.001	0.021	0.018
	(0.027)	(0.012)	(0.025)	(0.015)
p-value	0.905	0.940	0.398	0.222
Diff.: Public – Private	-0.014	-0.006	-0.012	-0.007
	(0.027)	(0.011)	(0.023)	(0.013)
p-value	0.606	0.543	0.597	0.598
Number of groups	1,236	1,236	1,235	1,235
Number of villages	107	107	107	107
Omitted category mean	0.132	0.132	0.082	0.082
Omitted category S.D.	(0.195)	(0.195)	(0.188)	(0.188)

Notes: the dependent variable is the share of households primarily practicing OD. Columns (1) and (2) report short-term effects (at the time of assessment); columns (3) and (4) report medium-term effects (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 C5: Medium-term Effects: Open Defecation
Based on household's self-report

	(1)	(2)
Monetary Reward	0.079	0.083
	(0.061)	(0.059)
	[-0.069, 0.219]	[-0.055, 0.214]
Reward Certificate	0.061	0.077
	(0.058)	(0.054)
	[-0.067, 0.191]	[-0.048, 0.194]
Private Commitment	0.042	0.039
	(0.057)	(0.053)
	[-0.091, 0.175]	[-0.088, 0.161]
Public Commitment	0.008	0.017
	(0.065)	(0.060)
	[-0.139, 0.154]	[-0.114, 0.151]
Open defecation (group share, R4)		0.414***
		(0.052)
Share of households landless		0.143***
		(0.040)
Union FEs	Yes	Yes
Diff.: Monetary – Public	0.071	0.066
	(0.089)	(0.082)
p-value	0.425	0.424
Diff.: Monetary – Certificate	0.017	0.006
	(0.056)	(0.053)
p-value	0.755	0.912
Diff.: Public – Private	-0.035	-0.022
	(0.055)	(0.051)
p-value	0.525	0.666
Number of groups	1,235	1,235
Number of villages	107	107
Omitted category mean	0.346	0.346
Omitted category S.D.	(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 Household Investments and Behaviors

In this appendix, we report full regression results the analysis of household behavior discussed in Section 5.2.1. In each case, we estimate a regression of the form

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

where y_{hgv} is the outcome variable of interest (e.g., whether the household owns a latrine with an intact, properly installed slab) for household h in 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), $\text{ShareOwnHygienic}_{0gv}$ is the pre-intervention share of households in group g owning a hygienic latrine, $\text{ShareLandless}_{gv}$ is the share of landless households in the group, φ_u is a set of union fixed effects, and ε_{hgv} is an error term which may be correlated at the village level (the level of randomization).

Tables D1 and D2 present results on latrine components, specifically, whether the household owns a latrine with the corresponding component intact and properly installed. These tables correspond to the estimates presented in Figures 5b and 5b of the main text.

Tables D3 and D4 examine outcomes related to latrine maintenance. These estimates correspond to those presented in Figures 6a and 6b of the main text.

Table D5 shows the effects of the treatments on whether the household reported receiving advice, assistance, or pressure from others in the group. These estimates correspond to those presented in Figure 7 of the main text.

Table D6 shows the effects of the treatments on whether the household reported conflicts with neighbors over latrines. This outcome was only collected in the endline survey.

Table D1: 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 D2: 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 D3: 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 for whether the household owns a latrine in the condition noted in the column header, as observed at the time of assessment (short term). 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: 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 for whether the household owns a latrine in the condition noted in the column header, as observed 12-15 months after assessment (medium term). 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: Assistance from others in group

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

Notes: this table shows estimated treatment effects on 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 D6: Medium-term Effects: Conflicts with Neighbors over Latrines

	(1)	(2)	(3)	(4)
Monetary Reward	-0.001	-0.003	-0.002	-0.002
	(0.003)	(0.004)	(0.004)	(0.004)
Reward Certificate	-0.005*	-0.005*	-0.005	-0.005
	(0.003)	(0.003)	(0.003)	(0.003)
Private Commitment	-0.004	-0.004	-0.004	-0.004
	(0.003)	(0.003)	(0.003)	(0.003)
Public Commitment	-0.006**	-0.009**	-0.008**	-0.008**
	(0.003)	(0.003)	(0.003)	(0.003)
Baseline share owning hyg. lat.			-0.015**	-0.012*
			(0.007)	(0.006)
Share of households landless				0.007
				(0.006)
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	0.012	0.012	0.012	0.012

Notes: the dependent variable is an indicator for whether the household reports conflict with neighbors over latrines 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 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:

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

The estimates in Table E1 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 Table E2, D_{hgv} is an indicator for whether the household is landless, a proxy for poverty. The estimates plotted in Figure 8 of the main text correspond to columns (2) (short-term) and (4) (medium-term) of this table.

In Table E3, 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 9 of the main text correspond to columns (2) (short-term) and (4) (medium-term) of this table.

Table E1: Program Effects: Hygienic Latrine Ownership
Household-level Data

	Short term		Medium term	
	(1)	(2)	(3)	(4)
Monetary Reward	0.125***	0.078***	0.049	0.017
	(0.033)	(0.014)	(0.031)	(0.021)
Reward Certificate	0.044	0.012	0.044	0.022
	(0.035)	(0.012)	(0.037)	(0.024)
Private Commitment	0.013	0.013	0.014	0.015
	(0.036)	(0.011)	(0.040)	(0.026)
Public Commitment	0.063*	0.047***	0.068**	0.050***
	(0.035)	(0.014)	(0.029)	(0.018)
Baseline share owning hyg. lat.		0.692***		0.510***
		(0.020)		(0.035)
Share of households landless		-0.064***		-0.094***
		(0.017)		(0.030)
Union FEs	Yes	Yes	Yes	Yes
Number of households	16,352	16,347	7,979	7,974
Number of groups	1,236	1,235	1,235	1,234
Number of villages	107	107	107	107
Omitted category mean	0.429	0.429	0.551	0.551

Notes: the dependent variable is an indicator for whether the household owns a hygienic latrine. Columns (1) and (2) report short-term effects (at the time of assessment); columns (3) and (4) report medium-term effects (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 E2: Program Effects: Hygienic Latrine Ownership
Household-Level Data – By Landlessness

	Short term		Medium term	
	(1)	(2)	(3)	(4)
Monetary Reward	0.131***	0.078***	0.042	0.005
	(0.030)	(0.016)	(0.031)	(0.025)
Monetary Reward X Household landless	-0.011	-0.011	0.026	0.032
	(0.040)	(0.025)	(0.039)	(0.034)
Reward Certificate	0.048	0.016	0.036	0.014
	(0.038)	(0.015)	(0.037)	(0.028)
Reward Certificate X Household landless	-0.014	-0.017	0.027	0.023
	(0.031)	(0.021)	(0.036)	(0.033)
Private Commitment	0.008	0.009	0.028	0.033
	(0.039)	(0.015)	(0.040)	(0.030)
Private Commitment X Household landless	-0.008	-0.004	-0.042	-0.046
	(0.035)	(0.024)	(0.039)	(0.034)
Public Commitment	0.057*	0.042***	0.071**	0.059***
	(0.032)	(0.016)	(0.028)	(0.022)
Public Commitment X Household landless	0.002	0.001	-0.028	-0.029
	(0.035)	(0.022)	(0.043)	(0.037)
Household landless	-0.203***	-0.163***	-0.158***	-0.121***
	(0.026)	(0.020)	(0.030)	(0.030)
Baseline share owning hyg. lat.		0.715***		0.509***
		(0.021)		(0.036)
Group share landless		0.102***		0.031
		(0.018)		(0.032)
Union FEs	Yes	Yes	Yes	Yes
Number of households	15,204	15,199	7,974	7,969
Number of groups	1,236	1,235	1,235	1,234
Number of villages	107	107	107	107
Omitted category mean	0.452	0.452	0.552	0.552

Notes: the dependent variable is an indicator for whether the household owns a hygienic latrine. Columns (1) and (2) report short-term effects (at the time of assessment); columns (3) and (4) report medium-term effects (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 E3: Program Effects: Hygienic Latrine Ownership
Household-Level Data – By Baseline Ownership Category

	Short term		Medium term	
	(1)	(2)	(3)	(4)
Monetary Reward	0.084***	0.078***	0.010	0.002
	(0.025)	(0.022)	(0.037)	(0.034)
Monetary Reward X Owns non-hygienic latrine	0.007	0.010	0.056	0.058
	(0.023)	(0.023)	(0.041)	(0.041)
Monetary Reward X Owns hygienic latrine	-0.017	-0.015	0.014	0.017
	(0.035)	(0.033)	(0.043)	(0.041)
Reward Certificate	0.004	-0.001	0.019	0.013
	(0.021)	(0.017)	(0.038)	(0.035)
Reward Certificate X Owns non-hygienic latrine	0.000	0.003	0.008	0.011
	(0.021)	(0.021)	(0.043)	(0.041)
Reward Certificate X Owns hygienic latrine	0.020	0.021	0.018	0.018
	(0.027)	(0.025)	(0.042)	(0.040)
Private Commitment	0.001	0.001	0.014	0.012
	(0.021)	(0.017)	(0.042)	(0.038)
Private Commitment X Owns non-hygienic latrine	0.027	0.026	-0.014	-0.009
	(0.022)	(0.022)	(0.045)	(0.043)
Private Commitment X Owns hygienic latrine	0.013	0.011	0.021	0.020
	(0.028)	(0.026)	(0.046)	(0.043)
Public Commitment	0.054**	0.050**	0.035	0.026
	(0.025)	(0.022)	(0.036)	(0.032)
Public Commitment X Owns non-hygienic latrine	0.021	0.023	0.070	0.076*
	(0.022)	(0.022)	(0.044)	(0.043)
Public Commitment X Owns hygienic latrine	-0.025	-0.023	-0.006	-0.000
	(0.032)	(0.029)	(0.043)	(0.041)
Owns non-hygienic latrine	-0.012	-0.015	-0.028	-0.039
	(0.019)	(0.020)	(0.039)	(0.038)
Owns hygienic latrine	0.643***	0.618***	0.413***	0.377***
	(0.029)	(0.027)	(0.040)	(0.038)
Baseline share owning hyg. lat.		0.104***		0.133***
		(0.021)		(0.033)
Share of households landless		-0.067***		-0.097***
		(0.017)		(0.029)
Union FEs	Yes	Yes	Yes	Yes
Number of households	15,927	15,927	7,827	7,827
Number of groups	1,235	1,235	1,234	1,234
Number of villages	107	107	107	107
Omitted category mean	0.432	0.432	0.553	0.553

Notes: the dependent variable is an indicator for whether the household owns a hygienic latrine. Columns (1) and (2) report short-term effects (at the time of assessment); columns (3) and (4) report medium-term effects (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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

F 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 5.2.3.

First, in Table F1, we report estimates of Equation 3, interacting the reward treatments (monetary and certificate) with the group's distance to the nearest reward threshold above its baseline status. Columns (1) and (2) report short-term results and Columns (3) and (4) report medium-term results. Columns (2) and (4) correspond to the specification plotted in Figure 10 in the main text.

Second, in Table F2, we report estimates of Equation 5, interacting the treatments with the baseline share of households in the group owning a hygienic latrine. Columns (1) and (2) report short-term results and Columns (3) and (4) report medium-term results. Columns (2) and (4) correspond to the specification plotted in Figure 13 in the main text.

Finally, we report results from our ex-post exploratory analyses. Similar to equation 5 in the main text, we estimate

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

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,[1] 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 (Table F3)
- Baseline ownership of any latrine (Table F4)
- Baseline ownership of non-hygienic latrines (Table F5)
- Whether the group contained an individual considered by others in the village to be a village leader (Table F6)
- Group size (number of households) (Table F7)
- Group density (the average number of households within 50m of each household in the group) (Table F8)

[1] 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).

- 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 (Table F9)
  - 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 (Table F10)

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 (Table F3). 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 (Table F6). The effectiveness of the monetary reward treatment is negatively associated with the network segregation measure, once again in the short term only (Table F10). Given the large number of hypotheses tested and the relatively low power to detect interactions, we view these results as suggestive only.

Table F1: Program Effects: Hygienic Latrine Ownership
Interacted with Distance to Reward Threshold

	Short term		Medium term	
	(1)	(2)	(3)	(4)
Monetary Reward	0.110***	0.086***	0.029	0.010
	(0.031)	(0.019)	(0.028)	(0.022)
Monetary Reward × Distance to nearest threshold above	-0.198	0.007	-0.117	0.047
	(0.206)	(0.137)	(0.224)	(0.172)
Reward Certificate	0.016	0.010	0.009	0.004
	(0.027)	(0.013)	(0.030)	(0.023)
Reward Certificate × Distance to nearest threshold above	0.127	0.004	0.013	-0.090
	(0.154)	(0.100)	(0.195)	(0.164)
Private Commitment	-0.004	0.009	-0.005	0.005
	(0.026)	(0.013)	(0.032)	(0.027)
Public Commitment	0.061**	0.048***	0.067**	0.056***
	(0.030)	(0.018)	(0.027)	(0.020)
Distance to nearest threshold above	-0.624***	0.024	-0.371***	0.173
	(0.106)	(0.080)	(0.135)	(0.121)
Baseline share owning hyg. lat.		0.742***		0.609***
		(0.039)		(0.053)
Share of households landless		-0.089***		-0.098***
		(0.018)		(0.035)
Union FEs	Yes	Yes	Yes	Yes
Number of groups	1,028	1,028	1,027	1,027
Number of villages	106	106	106	106
Omitted category mean	0.421	0.421	0.535	0.535
Omitted category S.D.	(0.175)	(0.175)	(0.258)	(0.258)

Notes: the dependent variable is the share of households in the group owning a hygienic latrine Columns (1) and (2) report short-term effects (at the time of assessment); columns (3) and (4) report medium-term effects (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. Groups above the higher threshold for their union are dropped. 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 F2: Program Effects: Hygienic Latrine Ownership
Interacted with Group Baseline Hygienic Latrine Ownership Share

	Short term		Medium term	
	(1)	(2)	(3)	(4)
Monetary Reward	0.072***	0.076***	0.008	0.011
	(0.016)	(0.016)	(0.021)	(0.020)
Monetary Reward X Baseline share owning hyg. latr.	0.067	0.058	0.007	-0.002
	(0.070)	(0.065)	(0.079)	(0.075)
Reward Certificate	0.008	0.009	0.013	0.014
	(0.012)	(0.012)	(0.022)	(0.022)
Reward Certificate X Baseline share owning hyg. latr.	0.022	0.023	0.107	0.108
	(0.053)	(0.050)	(0.076)	(0.074)
Private Commitment	0.009	0.008	0.009	0.008
	(0.012)	(0.012)	(0.025)	(0.024)
Private Commitment X Baseline share owning hyg. latr.	0.056	0.056	0.080	0.080
	(0.054)	(0.051)	(0.079)	(0.076)
Public Commitment	0.043***	0.042***	0.056***	0.055***
	(0.016)	(0.015)	(0.018)	(0.018)
Public Commitment X Baseline share owning hyg. latr.	0.043	0.049	-0.033	-0.025
	(0.065)	(0.062)	(0.082)	(0.079)
Baseline share owning hyg. latr.	0.696***	0.661***	0.516***	0.477***
	(0.057)	(0.054)	(0.076)	(0.074)
Share of households landless		-0.084***		-0.092***
		(0.018)		(0.031)
Union FEs	Yes	Yes	Yes	Yes
Number of groups	1,235	1,235	1,234	1,234
Number of villages	107	107	107	107
Omitted category mean	0.451	0.451	0.544	0.544
Omitted category S.D.	(0.189)	(0.189)	(0.255)	(0.255)

Notes: the dependent variable is the share of households in the group with a hygienic latrine. Columns (1) and (2) report short-term effects (at the time of assessment); columns (3) and (4) report medium-term effects (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 F3: Program Effects: Hygienic Latrine Ownership
Interacted with Group Share Landless

	Short term		Medium term	
	(1)	(2)	(3)	(4)
Monetary Reward	0.129***	0.077***	0.049*	0.012
	(0.029)	(0.014)	(0.027)	(0.020)
Monetary Reward X Group share landless	-0.059	-0.086**	0.095	0.074
	(0.091)	(0.043)	(0.084)	(0.059)
Reward Certificate	0.042	0.009	0.041	0.018
	(0.033)	(0.012)	(0.031)	(0.022)
Reward Certificate X Group share landless	0.007	-0.035	0.061	0.030
	(0.093)	(0.044)	(0.089)	(0.066)
Private Commitment	0.005	0.008	0.011	0.013
	(0.033)	(0.012)	(0.034)	(0.024)
Private Commitment X Group share landless	-0.056	-0.051	-0.070	-0.067
	(0.095)	(0.042)	(0.086)	(0.057)
Public Commitment	0.057*	0.044***	0.067**	0.058***
	(0.033)	(0.015)	(0.027)	(0.017)
Public Commitment X Group share landless	-0.046	-0.043	-0.003	-0.003
	(0.100)	(0.047)	(0.096)	(0.073)
Group share landless	-0.284***	-0.009	-0.322***	-0.124**
	(0.083)	(0.044)	(0.076)	(0.055)
Baseline share owning hyg. lat.		0.709***		0.511***
		(0.022)		(0.036)
Union FEs	Yes	Yes	Yes	Yes
Number of groups	1,236	1,235	1,235	1,234
Number of villages	107	107	107	107
Omitted category mean	0.451	0.451	0.544	0.544
Omitted category S.D.	(0.189)	(0.189)	(0.255)	(0.255)

Notes: the dependent variable is the share of households in the group with a hygienic latrine. Columns (1) and (2) report short-term effects (at the time of assessment); columns (3) and (4) report medium-term effects (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 F4: Program Effects: Hygienic Latrine Ownership
Interacted with Baseline Latrine Ownership Share

	Short term		Medium term	
	(1)	(2)	(3)	(4)
Monetary Reward	0.092***	0.098***	0.021	0.026
	(0.026)	(0.024)	(0.026)	(0.025)
Monetary Reward X Baseline share owning any latr.	0.016	-0.001	0.094	0.081
	(0.079)	(0.073)	(0.100)	(0.095)
Reward Certificate	0.020	0.022	0.024	0.026
	(0.024)	(0.024)	(0.027)	(0.026)
Reward Certificate X Baseline share owning any latr.	0.006	0.020	0.142	0.154*
	(0.056)	(0.052)	(0.095)	(0.091)
Private Commitment	0.010	0.007	0.010	0.007
	(0.024)	(0.024)	(0.029)	(0.028)
Private Commitment X Baseline share owning any latr.	0.054	0.057	0.022	0.025
	(0.063)	(0.059)	(0.104)	(0.101)
Public Commitment	0.047*	0.044*	0.054**	0.052**
	(0.028)	(0.027)	(0.022)	(0.022)
Public Commitment X Baseline share owning any latr.	0.050	0.076	0.036	0.057
	(0.070)	(0.067)	(0.087)	(0.082)
Baseline share owning any latr.	0.547***	0.465***	0.399***	0.333***
	(0.052)	(0.050)	(0.079)	(0.077)
Share of households landless		-0.205***		-0.165***
		(0.029)		(0.035)
Union FEs	Yes	Yes	Yes	Yes
Number of groups	1,235	1,235	1,234	1,234
Number of villages	107	107	107	107
Omitted category mean	0.451	0.451	0.544	0.544
Omitted category S.D.	(0.189)	(0.189)	(0.255)	(0.255)

Notes: the dependent variable is the share of households in the group with a hygienic latrine. Columns (1) and (2) report short-term effects (at the time of assessment); columns (3) and (4) report medium-term effects (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 F5: Program Effects: Hygienic Latrine Ownership
Interacted with Baseline Non-Hygienic Latrine Ownership Share

	Short term		Medium term	
	(1)	(2)	(3)	(4)
Monetary Reward	0.118***	0.078***	0.043	0.012
	(0.030)	(0.015)	(0.028)	(0.020)
Monetary Reward X Baseline share owning non-hyg. latr.	-0.222*	-0.128	0.032	0.103
	(0.126)	(0.080)	(0.141)	(0.114)
Reward Certificate	0.037	0.010	0.037	0.016
	(0.032)	(0.012)	(0.032)	(0.022)
Reward Certificate X Baseline share owning non-hyg. latr.	-0.218	-0.106	-0.147	-0.057
	(0.136)	(0.068)	(0.139)	(0.106)
Private Commitment	0.007	0.009	0.009	0.011
	(0.033)	(0.012)	(0.035)	(0.024)
Private Commitment X Baseline share owning non-hyg. latr.	0.007	0.010	-0.113	-0.111
	(0.127)	(0.072)	(0.130)	(0.100)
Public Commitment	0.065**	0.045***	0.073***	0.057***
	(0.031)	(0.015)	(0.026)	(0.018)
Public Commitment X Baseline share owning non-hyg. latr.	-0.085	-0.009	0.045	0.101
	(0.092)	(0.065)	(0.130)	(0.106)
Baseline share owning non-hyg. latr.	-0.265***	0.095	-0.188*	0.089
	(0.084)	(0.068)	(0.104)	(0.098)
Share of households landless		-0.082***		-0.086***
		(0.018)		(0.032)
Baseline share owning hyg. lat.		0.711***		0.543***
		(0.027)		(0.042)
Union FEs	Yes	Yes	Yes	Yes
Number of groups	1,235	1,235	1,234	1,234
Number of villages	107	107	107	107
Omitted category mean	0.451	0.451	0.544	0.544
Omitted category S.D.	(0.189)	(0.189)	(0.255)	(0.255)

Notes: the dependent variable is the share of households in the group with a hygienic latrine. Columns (1) and (2) report short-term effects (at the time of assessment); columns (3) and (4) report medium-term effects (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 F6: Program Effects: Hygienic Latrine Ownership
Interacted with Village Leader Present

	Short term		Medium term	
	(1)	(2)	(3)	(4)
Monetary Reward	0.138***	0.091***	0.058*	0.024
	(0.038)	(0.015)	(0.033)	(0.021)
Monetary Reward X Village Leader Present in Group	-0.074	-0.068*	-0.068	-0.064
	(0.054)	(0.035)	(0.050)	(0.043)
Reward Certificate	0.058	0.021*	0.056	0.029
	(0.040)	(0.012)	(0.038)	(0.023)
Reward Certificate X Village Leader Present in Group	-0.088*	-0.059**	-0.087	-0.065
	(0.046)	(0.027)	(0.052)	(0.045)
Private Commitment	0.019	0.011	0.015	0.009
	(0.040)	(0.012)	(0.040)	(0.025)
Private Commitment X Village Leader Present in Group	-0.058	-0.016	-0.008	0.023
	(0.041)	(0.029)	(0.050)	(0.044)
Public Commitment	0.064	0.039**	0.071**	0.051***
	(0.040)	(0.015)	(0.031)	(0.017)
Public Commitment X Village Leader Present in Group	-0.019	0.016	-0.011	0.017
	(0.048)	(0.030)	(0.051)	(0.045)
Village Leader Present in Group	0.110***	0.035	0.077	0.020
	(0.039)	(0.027)	(0.049)	(0.046)
Share of households landless		-0.086***		-0.091***
		(0.017)		(0.032)
Baseline share owning hyg. lat.		0.706***		0.513***
		(0.022)		(0.036)
Union FEs	Yes	Yes	Yes	Yes
Number of groups	1,236	1,235	1,235	1,234
Number of villages	107	107	107	107
Omitted category mean	0.451	0.451	0.544	0.544
Omitted category S.D.	(0.189)	(0.189)	(0.255)	(0.255)

Notes: the dependent variable is the share of households in the group with a hygienic latrine. Columns (1) and (2) report short-term effects (at the time of assessment); columns (3) and (4) report medium-term effects (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 F7: Program Effects: Hygienic Latrine Ownership
Interacted with Group Size (Number of Households)

	Short term		Medium term	
	(1)	(2)	(3)	(4)
Monetary Reward	0.128***	0.078***	0.051*	0.014
	(0.035)	(0.015)	(0.030)	(0.020)
Monetary Reward X Num. HH in group	0.000	-0.001	-0.002	-0.002
	(0.008)	(0.004)	(0.009)	(0.008)
Reward Certificate	0.048	0.012	0.045	0.018
	(0.039)	(0.012)	(0.039)	(0.023)
Reward Certificate X Num. HH in group	-0.009	-0.002	-0.007	-0.002
	(0.008)	(0.003)	(0.009)	(0.007)
Private Commitment	0.010	0.009	0.017	0.016
	(0.038)	(0.012)	(0.039)	(0.025)
Private Commitment X Num. HH in group	-0.010	-0.004	-0.011	-0.007
	(0.007)	(0.003)	(0.007)	(0.005)
Public Commitment	0.065*	0.043***	0.076***	0.059***
	(0.037)	(0.016)	(0.029)	(0.017)
Public Commitment X Num. HH in group	-0.006	0.001	-0.011*	-0.006
	(0.007)	(0.004)	(0.007)	(0.007)
Num. HH in group	0.009	0.002	0.014**	0.008
	(0.006)	(0.003)	(0.007)	(0.006)
Baseline share owning hyg. lat.		0.710***		0.516***
		(0.022)		(0.036)
Share of households landless		-0.082***		-0.086***
		(0.017)		(0.032)
Union FEs	Yes	Yes	Yes	Yes
Number of groups	1,236	1,235	1,235	1,234
Number of villages	107	107	107	107
Omitted category mean	0.451	0.451	0.544	0.544
Omitted category S.D.	(0.189)	(0.189)	(0.255)	(0.255)

Notes: the dependent variable is the share of households in the group with a hygienic latrine. Columns (1) and (2) report short-term effects (at the time of assessment); columns (3) and (4) report medium-term effects (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 F8: Program Effects: Hygienic Latrine Ownership
Interacted with Group Density

	Short term		Medium term	
	(1)	(2)	(3)	(4)
Monetary Reward	0.127***	0.078***	0.047	0.011
	(0.032)	(0.015)	(0.030)	(0.020)
Monetary Reward X Group density	0.003	0.003	0.003	0.003
	(0.004)	(0.002)	(0.004)	(0.003)
Reward Certificate	0.042	0.010	0.042	0.018
	(0.035)	(0.012)	(0.035)	(0.023)
Reward Certificate X Group density	-0.004	-0.001	-0.001	0.001
	(0.003)	(0.002)	(0.004)	(0.003)
Private Commitment	0.008	0.008	0.012	0.011
	(0.038)	(0.012)	(0.039)	(0.025)
Private Commitment X Group density	-0.007*	-0.002	-0.002	0.002
	(0.003)	(0.002)	(0.004)	(0.003)
Public Commitment	0.064*	0.044***	0.071**	0.056***
	(0.034)	(0.015)	(0.028)	(0.017)
Public Commitment X Group density	0.001	0.001	0.000	0.000
	(0.004)	(0.002)	(0.005)	(0.004)
Group density	0.004	0.000	0.000	-0.003
	(0.003)	(0.002)	(0.003)	(0.002)
Baseline share owning hyg. lat.		0.706***		0.513***
		(0.022)		(0.036)
Share of households landless		-0.082***		-0.091***
		(0.017)		(0.031)
Union FEs	Yes	Yes	Yes	Yes
Number of groups	1,236	1,235	1,235	1,234
Number of villages	107	107	107	107
Omitted category mean	0.451	0.451	0.544	0.544
Omitted category S.D.	(0.189)	(0.189)	(0.255)	(0.255)

Notes: the dependent variable is the share of households in the group with a hygienic latrine. Columns (1) and (2) report short-term effects (at the time of assessment); columns (3) and (4) report medium-term effects (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 F9: Program Effects: Hygienic Latrine Ownership
Interacted with Maximum eigenvalue of adjacency matrix

	Short term		Medium term	
	(1)	(2)	(3)	(4)
Monetary Reward	0.122***	0.075***	0.048	0.014
	(0.034)	(0.015)	(0.030)	(0.019)
Monetary Reward X Max. eigval. of adj. matrix	0.004	-0.009	-0.009	-0.017
	(0.015)	(0.009)	(0.014)	(0.013)
Reward Certificate	0.042	0.010	0.043	0.020
	(0.037)	(0.012)	(0.035)	(0.022)
Reward Certificate X Max. eigval. of adj. matrix	0.008	0.002	-0.012	-0.016*
	(0.013)	(0.007)	(0.012)	(0.009)
Private Commitment	0.010	0.009	0.013	0.012
	(0.038)	(0.012)	(0.038)	(0.024)
Private Commitment X Max. eigval. of adj. matrix	-0.009	-0.007	-0.007	-0.005
	(0.011)	(0.006)	(0.012)	(0.010)
Public Commitment	0.065*	0.044***	0.072**	0.055***
	(0.035)	(0.015)	(0.027)	(0.017)
Public Commitment X Max. eigval. of adj. matrix	-0.009	-0.005	0.001	0.005
	(0.015)	(0.008)	(0.013)	(0.011)
Max. eigval. of adj. matrix	-0.007	-0.001	0.010	0.014*
	(0.012)	(0.006)	(0.012)	(0.008)
Baseline share owning hyg. lat.		0.711***		0.514***
		(0.022)		(0.036)
Share of households landless		-0.079***		-0.088***
		(0.017)		(0.031)
Union FEs	Yes	Yes	Yes	Yes
Number of groups	1,234	1,233	1,233	1,232
Number of villages	107	107	107	107
Omitted category mean	0.451	0.451	0.544	0.544
Omitted category S.D.	(0.189)	(0.189)	(0.255)	(0.255)

Notes: the dependent variable is the share of households in the group with a hygienic latrine. Columns (1) and (2) report short-term effects (at the time of assessment); columns (3) and (4) report medium-term effects (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 F10: Program Effects: Hygienic Latrine Ownership
Interacted with Second eigenvalue of stochastized adjacency matrix

	Short term		Medium term	
	(1)	(2)	(3)	(4)
Monetary Reward	0.126***	0.079***	0.046	0.012
	(0.034)	(0.015)	(0.030)	(0.020)
Monetary Reward X Second eignval. of stoch. adj. matrix	0.017	-0.046**	0.036	-0.009
	(0.037)	(0.023)	(0.036)	(0.034)
Reward Certificate	0.042	0.010	0.041	0.018
	(0.037)	(0.012)	(0.036)	(0.023)
Reward Certificate X Second eignval. of stoch. adj. matrix	0.013	-0.010	0.024	0.007
	(0.022)	(0.016)	(0.029)	(0.028)
Private Commitment	0.009	0.009	0.014	0.013
	(0.039)	(0.012)	(0.039)	(0.025)
Private Commitment X Second eignval. of stoch. adj. matrix	0.007	-0.007	0.000	-0.010
	(0.025)	(0.017)	(0.029)	(0.027)
Public Commitment	0.065*	0.046***	0.073**	0.058***
	(0.036)	(0.016)	(0.028)	(0.017)
Public Commitment X Second eignval. of stoch. adj. matrix	-0.010	-0.001	0.004	0.012
	(0.031)	(0.022)	(0.034)	(0.032)
Second eignval. of stoch. adj. matrix	0.000	0.022	0.000	0.015
	(0.020)	(0.018)	(0.025)	(0.020)
Baseline share owning hyg. lat.		0.710***		0.512***
		(0.022)		(0.036)
Share of households landless		-0.082***		-0.089***
		(0.017)		(0.032)
Union FEs	Yes	Yes	Yes	Yes
Number of groups	1,234	1,233	1,233	1,232
Number of villages	107	107	107	107
Omitted category mean	0.451	0.451	0.544	0.544
Omitted category S.D.	(0.189)	(0.189)	(0.255)	(0.255)

Notes: the dependent variable is the share of households in the group with a hygienic latrine. Columns (1) and (2) report short-term effects (at the time of assessment); columns (3) and (4) report medium-term effects (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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

G Single Treatment Villages and Fully Interacted Model

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

G.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 commitment), 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 G1 and Figure G1. 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, suggesting some complementarity between treatments.

G.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 G2 and Figure G2. As with the results of Section G.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 only as suggestive.

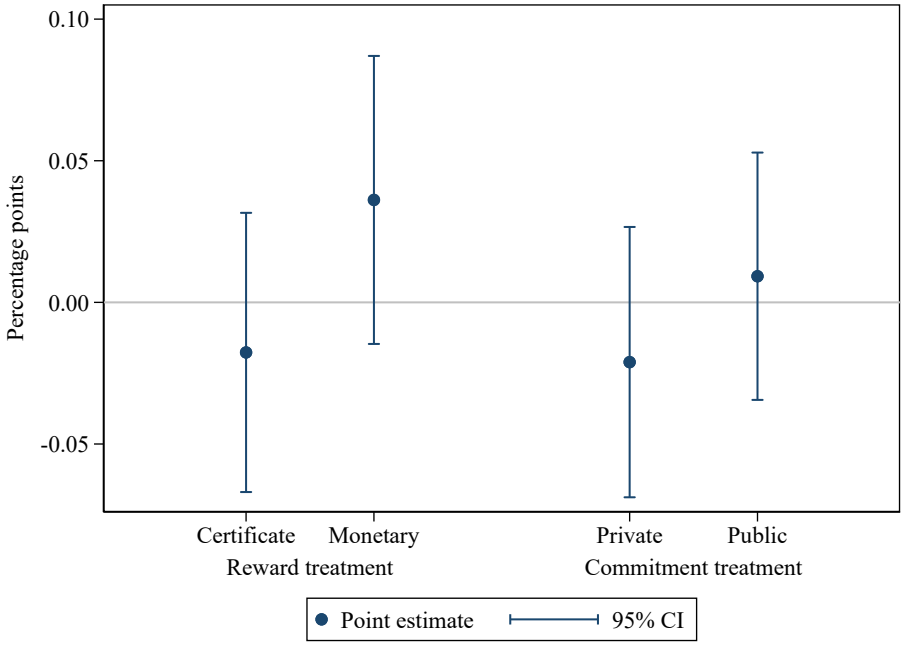
Table G1: Program Effects: Hygienic Latrine Ownership
Single Treatment Villages

	Short term		Medium term	
	(1)	(2)	(3)	(4)
Reward Certificate Only	-0.011	-0.018	-0.009	-0.014
	(0.049)	(0.025)	(0.040)	(0.025)
	[-0.133, 0.109]	[-0.084, 0.044]	[-0.103, 0.089]	[-0.067, 0.046]
Monetary Reward Only	0.069*	0.036	0.011	-0.013
	(0.041)	(0.026)	(0.039)	(0.031)
	[-0.022, 0.164]	[-0.031, 0.093]	[-0.079, 0.104]	[-0.101, 0.052]
Private Commitment Only	-0.034	-0.021	-0.023	-0.015
	(0.040)	(0.024)	(0.046)	(0.040)
	[-0.132, 0.056]	[-0.083, 0.036]	[-0.134, 0.091]	[-0.100, 0.100]
Public Commitment	-0.005	0.009	0.014	0.023
	(0.043)	(0.022)	(0.033)	(0.024)
	[-0.093, 0.125]	[-0.043, 0.066]	[-0.053, 0.106]	[-0.028, 0.080]
Baseline share owning hyg. lat.		0.688***		0.479***
		(0.028)		(0.043)
Share of households landless		-0.075***		-0.100***
		(0.023)		(0.038)
Union FEs	Yes	Yes	Yes	Yes
Number of groups	847	846	847	846
Number of villages	75	75	75	75
Omitted category mean	0.399	0.401	0.540	0.543
Omitted category S.D.	(0.240)	(0.240)	(0.249)	(0.247)

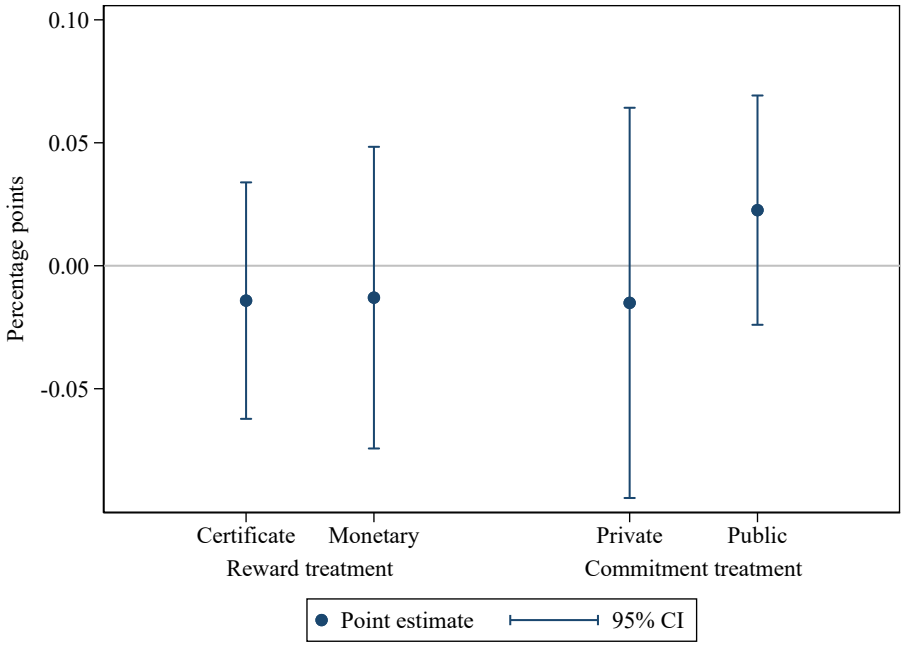
Notes: the dependent variable is the share of households in the group with a hygienic latrine Columns (1) and (2) report short-term effects (at the time of assessment); columns (3) and (4) report medium-term effects (12-15 months after assessment).. Observations (groups) are weighted by the number of 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 G1: Program Effects: Hygienic Latrine Ownership
Single Treatment Villages

(a) Short-term



(b) Medium-term



Notes: this graph presents estimated treatment effects of the interventions on the share of households in the group with a hygienic latrine. Panel (a) presents effects in the short term (at the time of assessment); panel (b) 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).

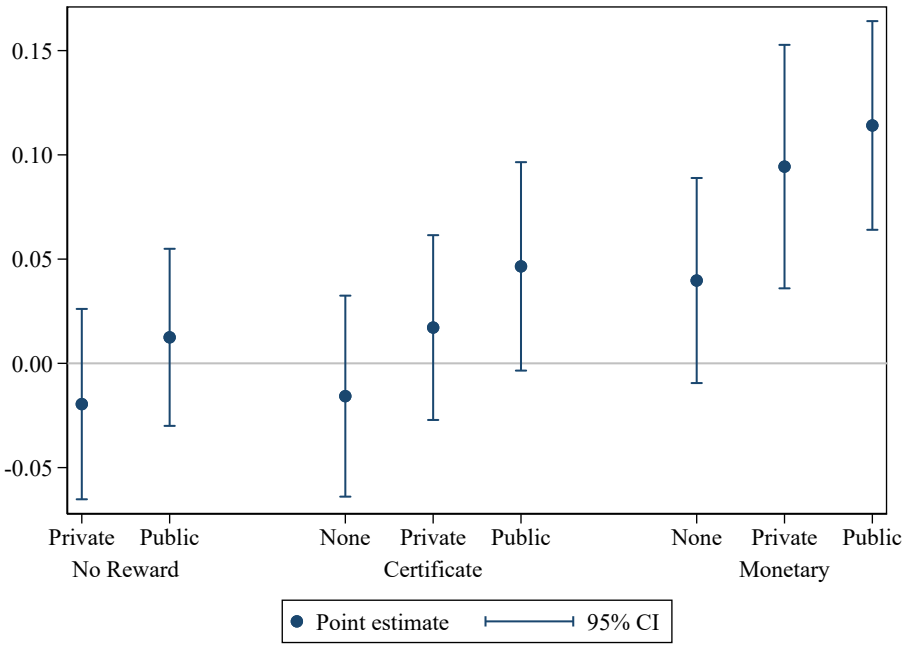
Table G2: Program Effects: Hygienic Latrine Ownership
Fully Interacted Treatments

	Short term		Medium term	
	(1)	(2)	(3)	(4)
Monetary reward only	0.078*	0.040	0.018	-0.011
	(0.042)	(0.025)	(0.038)	(0.030)
	[-0.015, 0.176]	[-0.025, 0.094]	[-0.067, 0.115]	[-0.094, 0.049]
Monetary reward & private commitment	0.122***	0.094***	0.043	0.022
	(0.046)	(0.030)	(0.052)	(0.039)
	[0.009, 0.266]	[0.020, 0.194]	[-0.073, 0.209]	[-0.070, 0.162]
Monetary reward & public commitment	0.191***	0.114***	0.091**	0.031
	(0.058)	(0.026)	(0.041)	(0.021)
	[0.015, 0.302]	[0.046, 0.170]	[-0.028, 0.176]	[-0.020, 0.076]
Certificate only	-0.014	-0.016	-0.013	-0.015
	(0.054)	(0.025)	(0.044)	(0.024)
	[-0.142, 0.121]	[-0.078, 0.044]	[-0.120, 0.092]	[-0.067, 0.044]
Certificate & private commitment	0.087	0.017	0.057	0.004
	(0.057)	(0.023)	(0.061)	(0.032)
	[-0.078, 0.201]	[-0.046, 0.074]	[-0.103, 0.183]	[-0.083, 0.068]
Certificate & public commitment	0.099**	0.047*	0.105***	0.064***
	(0.046)	(0.026)	(0.031)	(0.024)
	[-0.012, 0.218]	[-0.018, 0.109]	[0.033, 0.175]	[0.010, 0.118]
Private commitment only	-0.040	-0.020	-0.031	-0.017
	(0.041)	(0.023)	(0.046)	(0.040)
	[-0.140, 0.051]	[-0.078, 0.035]	[-0.139, 0.082]	[-0.099, 0.100]
Public commitment only	0.005	0.012	0.023	0.027
	(0.042)	(0.022)	(0.034)	(0.025)
	[-0.082, 0.137]	[-0.040, 0.067]	[-0.050, 0.122]	[-0.030, 0.090]
Baseline share owning hyg. lat.		0.701***		0.512***
		(0.023)		(0.036)
Share of households landless		-0.082***		-0.088***
		(0.018)		(0.032)
Union FEs	Yes	Yes	Yes	Yes
Diff.: Monetary & Public – Monetary Only	0.112	0.074	0.073	0.043
	(0.063)	(0.027)	(0.049)	(0.029)
p-value	0.078	0.007	0.138	0.150
Diff.: Monetary & Public – Public Only	0.185	0.102	0.068	0.004
	(0.062)	(0.025)	(0.044)	(0.024)
p-value	0.003	0.000	0.130	0.864
Number of groups	1,236	1,235	1,235	1,234
Number of villages	107	107	107	107
Omitted category mean	0.451	0.451	0.544	0.544
Omitted category S.D.	(0.189)	(0.189)	(0.255)	(0.255)

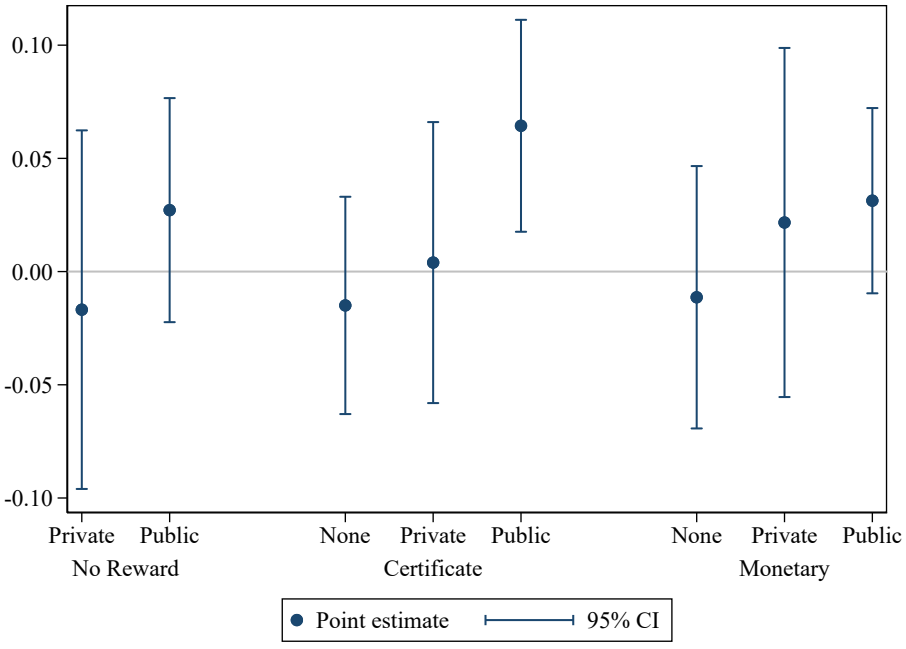
Notes: the dependent variable is the share of households in the group with a hygienic latrine Columns (1) and (2) report short-term effects (at the time of assessment); columns (3) and (4) report medium-term effects (12-15 months after assessment).. Observations (groups) are weighted by the number of 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 G2: Program Effects: Hygienic Latrine Ownership
Fully Interacted Treatments

(a) Short-term



(b) Medium-term



Notes: this graph presents estimated treatment effects of the interventions on the share of households in the group owning a hygienic latrine. Panel (a) presents effects in the short term (at the time of assessment); panel (b) 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.

Wainer, H. (2000). "The Centercept: An Estimable and Meaningful Regression Parameter." *Psychological Science* 11.5, pp. 434–436. DOI: 10.1111/1467-9280.00284.