The Effect of Reminders for Self-Set Goals on Productivity*

Martin Abel
Bowdoin College

Tomoko Harigaya
Precision Development

Michael Kremer
University of Chicago

Jessica Zhu
Precision Development

April 24, 2025

Abstract

We examine how reminders for self-set goals influence productivity by analyzing data from 10,187 volunteer agricultural extension workers in Rwanda. We elicited workers' goals and experimentally varied their salience through text reminders. Goal reminders sent during the regular working period increased a productivity index by 0.08 standard deviations, while reminders sent late had no effect. Further analysis of heterogeneity by goal ambition quartiles reveals an inverted U-shaped relationship: reminders are effective for goals in the second and third quartiles, but ineffective for low or excessively high goals. These results suggest that workers who set ambitious yet realistic goals are more likely to respond to reminders and increase productivity, consistent with prior evidence on externally set goals.

Keywords: Goal setting, agriculture, digital technology, extension workers
JEL Classification: D91, J22, O12, O13, Q16.

*Abel: Bowdoin College (email: m.abel@bowdoin.edu); Harigaya: Precision Development (PxD) (email: tharigaya@precisiondev.org); Kremer: University of Chicago (email: kremermr@uchicago.edu); Zhu: PxD (email: jzhu@precisiondev.org). The authors would like to thank Rulof Burger, Jeff Carpenter, Rachel Cassidy, Nishith Prakash, Leticia Donoso Peña, Gautam Rao, Dan Stone, and participants at the Development Innovation Lab seminar, NEUDC, CSAE, and LACDEV conference for helpful comments. We are grateful to the National Bureau of Economic Research and the Wellspring Philanthropic Fund for generous financial support, and to the teams at One Acre Fund and Precision Development for implementing research activities and providing helpful insights. Diana McLeod and Georges Poquillon provided outstanding research support. This study was registered in the AEA RCT Registry: AEARCTR-0008757 (https://doi.org/10.1257/rct.8757-1.1). International IRB approval was obtained from Middlebury College. For local ethic reviews, the study was approved by Rwanda Agriculture and Animal Resources Development Board (RAB) and the data collections were approved by the National Institute of Statistics of Rwanda. Usual disclaimers apply.

1 Introduction

Goal setting has been shown to improve outcomes across a range of settings, including workplaces, schools, personal health, and finances.[1] Within organizational structures, one important question is whether to remind individuals of the goals they set. This question is relevant in various principal-agent relationships, such as between supervisors and employees, teachers and students, or coaches and athletes. The effect of goal reminders is theoretically unclear. On one hand, reminders can help bring a goal to "top of mind" (Karlan et al., 2016) or increase commitment (Heath et al., 1999) and accountability (Travers et al., 2015). On the other hand, they may also undermine autonomy and intrinsic motivation as individuals perceive reminders as surveillance (Deci and Ryan, 2000). This negative effect may be particularly important for self-set goals.

The effect of reminders may also depend on the magnitude of goals. Studies find that goals are most effective if they are ambitious but attainable, suggesting that reminders may backfire if the goals are unachievable or overly ambitious (see Locke and Latham (2002) for a review). Identifying the causal effect of goal magnitude for self-set goals is challenging because of the nature of these goals. It is unclear whether setting effective goals drives productivity or whether more productive individuals are simply more inclined to set ambitious but attainable goals. This distinction has important implications. First, it informs whether principals should selectively target certain agents for goal reminders. Second, it guides whether principals should encourage agents to set different goals for themselves.

In this study, we examine the effect of sending text reminders of self-set goals in a sample of 10,187 agricultural extension workers, known as farmer promoters (FP), in Rwanda. Farmer promoters are farmers from the local communities and work as volunteers. Their main duties include helping farmers in their community with adopting improved agricultural practices and inputs through information and input delivery campaigns. Their familiarity with local farmers provides them with clear information advantages over their supervisors, who are paid government employees. Their supervisors also lack monitoring and sanctioning mechanisms. These features, which are commonly shared in decentralized systems, make self-set goals an appealing motivating strategy.

[1] The impact of goal settings are demonstrated in employment (Latham, 2012; Goerg, 2015; Teo and Low, 2016), education (Dobronyi et al., 2017; van Lent, 2019; Islam et al., 2022), health (Adams et al., 2017), resource conservation (Löschel et al., 2023), and finance (Grohmann et al., 2020).

We employ a novel strategy to investigate the effect of goal reminders. First, we elicit goals for three key performance outcomes in a non-conspicuous way for *all* extension workers as part of a baseline survey. These outcomes include the number of farmers who register for a subsidized input scheme, the number of farmers who are trained on improved agricultural practices, and the number of training sessions held at the demonstration plot. Subsequently, we randomly assign a subset of farmer promoters to receive SMS reminders that increase the salience of their self-set goals. This design allows us to identify the aggregate effect of goal reminders and, under stronger assumptions, the causal effects of goal magnitude on outcomes.

We find that the average effect of goal reminders on farmer promoters' performance is small (0.03 standard deviations) and insignificant in the full sample. However, due to logistical challenges, about half of farmer promoters in the treatment group received the goal reminders after having completed all or most of their work. When we split the sample, we find positive effects of increasing the salience of self-set goals on all three performance outcomes among farmer promoters who received goal reminders on time. The average intent-to-treat effects are of a moderate size at approximately 0.08 standard deviations for an overall performance index. By contrast, the effects of goal reminders are close to zero and statistically insignificant among farmer promoters who received reminders late. While these results measure the causal effects of on-time goal reminders and late reminders, the timeliness of reminders was not randomly assigned. The difference in effectiveness is hence not necessarily due to the difference in timing.[2]

One important concern for goal-setting interventions is that agents may narrowly focus on achieving quantity targets, at the cost of compromising the quality of their work or performance of non-targeted tasks (Holmstrom and Milgrom, 1991). To test for these important unintended consequences, we examine data collected during field visits on how farmer promoters maintained their demonstration plots and administrative records of their performance on tasks for which no goals were set. We find that neither the quality of demonstration plots nor performance on other tasks differs between treatment and control groups. A related concern is that farmer promoters may misreport their performance to meet their goals. Using a social desirability measure collected at baseline, we show that the positive

[2]Since the implementation challenges that caused the delay of reminders were unforeseen, this split of the sample was not part of the pre-analysis plan.

goal reminder effects on self-reported outcomes are consistent regardless of farmer promoters' social desirability scores, assuaging concerns about differential reporting bias.

Next, we explore the role of goal magnitude. Our analysis suggests that goal reminders are most effective for farmer promoters who set ambitious but realistic goals. We measure goal ambition by taking the goal magnitude set at baseline as a proportion of last year's performance. To examine the relationship between goal ambition and the effectiveness of goal reminders, we compare treatment effect sizes across goal ambition quartiles. We find insignificant, negative effects of goal reminders among farmer promoters in the first quartile, who set goals at or below last year's performance. Effect sizes peak around the third quartile, where farmer promoters set the goal at approximately 30% to 80% above last year's performance. In contrast, reminding farmer promoters in the fourth quartile with overly ambitious goals that are, on average, more than twice as large as last year's performance shows no significant impact.

These results align with findings from the literature on externally-set goals, which indicate an inverted U-shaped relationship between goal magnitude and performance. This is noteworthy because there are several reasons why this relationship may differ for self-set goals. For example, while overly ambitious goals may have an adverse effect when exogenously assigned, they could be effective when set by agents themselves, as they are less likely to be perceived as threatening (Drach-Zahavy and Erez, 2002) or may leverage positive effects of adopting a growth mindset (Dweck, 2006).

The benefit of our research design is that it allows us to compare the performance of treatment and control farmer promoters with the *same* goal magnitude and hence account for factors that are correlated with goal ambition. Although this is an important step in isolating the effect of goal magnitude for self-set goals, other factors correlated with goal ambition might still make reminders more effective for certain workers. For example, farmer promoters who set ambitious yet realistic goals may be more responsive to *any* type of message. To test this possibility, we use data from a second experiment (part of a companion paper) that sent motivational messages to farmer promoters without mentioning their goals. We find that the effectiveness of these messages is uncorrelated with recipients' goal ambition. These results offer suggestive evidence that the observed heterogeneous treatment effects are driven by the difference in goal magnitude.

To investigate the mechanisms behind the effectiveness of goal reminders, we collect rich data on farmer promoters' personality traits and their susceptibility to persuasive strategies (STPS). These can be linked to mechanisms for goal effectiveness posited in the literature, including that goal reminders may increase commitment towards the goal (Heath et al., 1999), foster accountability towards external agents (Travers et al., 2015), or encourage better organization (Webb et al., 2007). Our heterogeneity analysis shows that the effect of goal reminders does not differ by farmer promoters' susceptibility to be convinced by commitments they made, requests made by authorities, or their conscientiousness level. We note, however, that these results are only suggestive as these traits may be correlated with other characteristics of farmer promoters that affect their performance.

Lastly, we explore practical implications for goal-setting interventions. We first investigate which types of agents set more effective goals for themselves — which we define by goals in the second or the third ambition quartile — and how well one can identify these agents with available data. We find that completing primary education or above (which represents 85% of the study sample) is positively correlated with the likelihood of setting an effective goal in an OLS model, but basic demographic characteristics and personality traits overall do not explain much of the variation in whether a farmer sets an effective goal or not. In addition, the machine learning analysis, estimating a random forest model, shows low accuracy, indicating the difficulty of predicting which farmer promoters set effective goals using observable characteristics.

Second, we explore whether agents can be nudged to adopt more effective goals by exploiting experimental variation that influenced the goal magnitudes set by farmer promoters. Specifically, in an attempt to nudge agents to set more realistic goals, we asked a randomly selected subset of farmer promoters first about their last year's performance before eliciting their goals. This question order lowers the goal magnitude (in terms of the number of farmers registered into the input subsidy scheme) by 4% and decreases the likelihood of setting the effective goal by 7.2 percentage points. Using the random ordering of questions as an instrument, we estimate how setting an effective goal affects performance: our second-stage estimates are positive, indicating the possibility that nudging farmer promoters to set more effective goals could improve performance, but the estimates are imprecise. This is a productive area for future research.

This paper makes contributions to several strands of literature. First, our findings expand the evidence on the impact of digital nudges and reminders. Studies have shown that information services and nudges via mobile phones influence individual's behavior in various contexts, including agriculture (Fabregas et al., 2022), finance (Karlan et al., 2016), education (Castleman and Page, 2016), and health (Kaptein et al., 2012). In other contexts, however, text-message reminders have been found to have limited impact, for example, on questionnaire response rates (Keding et al., 2016), court appearance (Cumberbatch and Barnes, 2018), attendance at outpatient appointments (Youssef et al., 2014), or uptake of cancer screening programs (Hirst et al., 2017). Those mixed findings highlight that the effectiveness of digital messages depends on the context, design, and content of the messages. Our study demonstrates that, in the context of government extension work, a few well-targeted messages improve the performance of hard-to-monitor, decentralized public-sector agents. However, the reminders are effective only among the agents who set "ambitious but attainable" goals.

Furthermore, our findings contribute to the goal setting literature by offering insights into the effectiveness of self-set goals. Specifically, our sample size, which is an order of magnitude larger than most studies in this literature, and our novel experimental design allow us to make important advances in isolating the role of goal magnitude of self-set goals. The heterogeneity in effectiveness across different goal magnitudes that we find can help explain the mixed conclusions on the effectiveness of goal setting across recent studies. For example, a recent large scale RCT with Tanzanian students finds that self-set goals are ineffective in increasing learning outcomes (Islam et al., 2022). This finding contrasts with the positive effects on learning outcomes shown in various experimental studies of goal setting involving students in higher-income settings (e.g., Morisano et al. (2010)). One possible explanation for this discrepancy is that a much larger share of students in the Tanzanian study set unrealistically high goals. Our study demonstrates that such overly ambitious self-set goals tend to be ineffective.

The remainder of this paper is organized as follows. Section 2 provides background information on the study setting and Section 3 describes the setup of the experiment. Section 4 presents the data and empirical strategy adopted. Section 5 illustrates the findings of the experiment. Section 6 discusses its policy relevance. We conclude in Section 7.

2 Background

The Rwanda Agriculture and Animal Resources Development Board (RAB) uses a network of approximately 14,500 village-level volunteer agricultural extension workers, called farmer promoters, to promote the adoption of recommended farming inputs and practices. Farmer promoters are resident farmers who are in most cases elected by other farmers in the village. They report to Socio-Economic Development Officers (SEDOs), who are paid government employees that coordinate and monitor the work of all farmer promoters in their area.[3]

Farmer promoters support government agricultural campaigns throughout the year. One of their key responsibilities is to maintain demonstration plots and train farmers on modern inputs and recommended agricultural practices, such as the appropriate use of fertilizer and spacing of planting. Farmer promoters also assist in a range of seasonal campaigns. For example, during the national input subsidy campaign before the start of the main agricultural season, they help farmers to digitally register for the subsidy scheme and purchase subsidized inputs. During the agroforestry campaign, they mobilize farmers to pick up trees on the distribution days and train farmers on how to plant and care for trees. In this study, we focus on three performance outcomes between two of farmer promoters' main activities - the subsidized input promotion campaign and the farmer training via demonstration plots.

Farmer promoters do not receive monetary compensation but receive training and in-kind benefits, such as free inputs and farming tools to be used for their demonstration plots and bicycles for transportation. There is no explicit opportunity for career promotion within the public extension system. Intrinsic motivation therefore plays an important role in their decision to become a farmer promoter. During the baseline survey, 76% of farmer promoters identified "helping others and having a positive impact on the community" as the most important reason for becoming a farmer promoter, while only 20% chose "gaining knowledge and experience and advancing my career" and very few selected "improving social status" or "earning benefits". On average, farmer promoters spend six hours per week delivering agricultural extension services in this role.

[3]Each SEDO usually works with one cell, an administrative jurisdiction consisting of three to ten villages.

3 Experimental Design

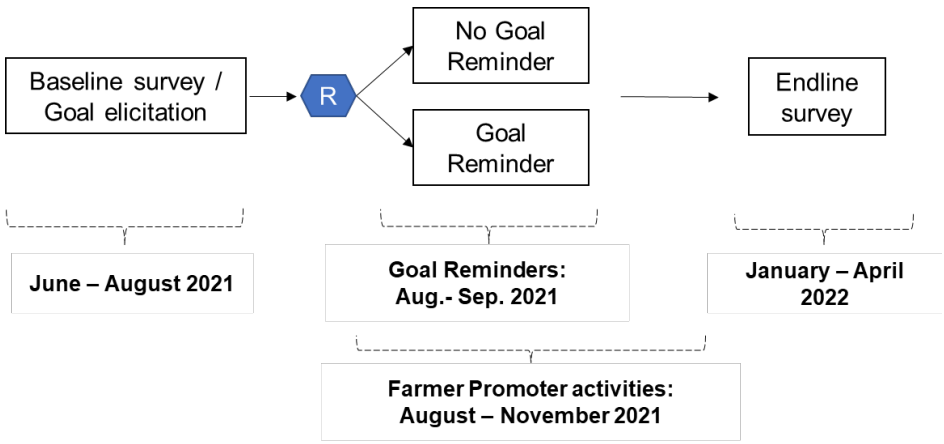
3.1 Study Sample

We recruited farmer promoters for this study by phone between June and August 2021, using One Acre Fund (1AF)'s farmer promoter database, which included 12,638 out of some 14,500 farmer promoters in Rwanda.[4] Farmer promoters were informed that RAB was conducting a survey to better understand their motivation and personality for the purpose of providing better training and support services in the future. This phone recruitment resulted in our final study sample of 10,187 farmer promoters (or 70% of nationwide farmer promoters) who completed the baseline survey and consented to receive Short Messaging Service (SMS) messages.

Table 1 Column 1 summarizes the demographic characteristics of our study sample. On average, farmer promoters are 47 years old, have served in this role for almost 7 years, and have lived in their village for 35 years. 78% of farmer promoters are male and a large majority (85%) have completed primary education. Almost all (95%) were elected to their position rather than being appointed by a government official.

3.2 Randomization

Figure 1: Study Design and Timeline



Note: The figure presents the timing of the study activities and their respective timing. The agricultural season (A) is from September to January.

[4]One Acre Fund is a partner organization of this study and has implemented the intervention and conducted the data collection.

Table 1: Descriptive Statistics and Randomization Balance

	(1) Total		(2) No Reminder		(3) Goal Reminder		(3)-(2) Pairwise t-test	
Variable	N	Mean/(SD)	N	Mean/(SD)	N	Mean/(SD)	N	Mean difference
Age	10181	47.082	5088	47.145	5093	47.018	10181	-0.127
		(10.018)		(9.975)		(10.062)		
Male	10187	0.777	5093	0.783	5094	0.771	10187	-0.012
		(0.416)		(0.412)		(0.420)		
Completed primary education	10187	0.846	5093	0.847	5094	0.846	10187	-0.001
		(0.361)		(0.360)		(0.361)		
FP elected	10187	0.950	5093	0.948	5094	0.952	10187	0.005
		(0.218)		(0.223)		(0.213)		
Experience as FP (yr)	10187	6.649	5093	6.674	5094	6.624	10187	-0.050
		(3.571)		(3.585)		(3.557)		
Live in village (yr)	10187	34.790	5093	34.989	5094	34.590	10187	-0.399
		(17.300)		(17.257)		(17.343)		
Reciprocity score (STPS)	10187	0.000	5093	0.009	5094	-0.009	10187	-0.017
		(1.000)		(0.993)		(1.007)		
Scarcity score (STPS)	10187	-0.000	5093	-0.006	5094	0.006	10187	0.012
		(1.000)		(1.016)		(0.984)		
Authority score (STPS)	10187	-0.000	5093	0.009	5094	-0.009	10187	-0.018
		(1.000)		(0.989)		(1.011)		
Commitment score (STPS)	10187	0.000	5093	-0.008	5094	0.008	10187	0.017
		(1.000)		(1.021)		(0.979)		
Consensus score (STPS)	10187	0.000	5093	-0.002	5094	0.002	10187	0.004
		(1.000)		(0.994)		(1.006)		
Liking score (STPS)	10187	-0.000	5093	0.007	5094	-0.007	10187	-0.015
		(1.000)		(0.995)		(1.005)		
Extraversion score (Big 5)	10187	0.000	5093	0.004	5094	-0.004	10187	-0.007
		(1.000)		(1.007)		(0.993)		
Agreeableness score (Big 5)	10187	0.000	5093	0.002	5094	-0.002	10187	-0.004
		(1.000)		(1.009)		(0.991)		
Neuroticism score (Big 5)	10187	0.000	5093	-0.012	5094	0.012	10187	0.024
		(1.000)		(0.986)		(1.014)		
Conscientiousness score (Big 5)	10187	0.000	5093	0.004	5094	-0.004	10187	-0.009
		(1.000)		(1.007)		(0.993)		
Openness score (Big 5)	10187	-0.000	5093	0.016	5094	-0.016	10187	-0.031
		(1.000)		(0.992)		(1.007)		
Social desirability score	10187	0.000	5093	0.004	5094	-0.004	10187	-0.008
		(1.000)		(1.002)		(0.998)		
Baseline survey version	10187	1.867	5093	1.866	5094	1.867	10187	0.001
		(1.037)		(1.042)		(1.033)		
Number of farmers registered	10181	103.778	5091	102.524	5090	105.032	10181	2.509
		(80.838)		(78.428)		(83.166)		
Number of trainings held	9967	3.589	4980	3.596	4987	3.581	9967	-0.015
		(1.919)		(1.906)		(1.931)		
Number of farmers trained	9918	60.132	4954	60.291	4964	59.974	9918	-0.317
		(39.481)		(39.320)		(39.645)		
F-test of joint significance (P-value)								0.691
F-test, number of observations								9911

Note: Data is from the baseline survey. Strata fixed effects are included in the t-tests and F-test. Standard errors are robust. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level. The baseline survey versions refer to the four versions of survey questions we used to elicit farmer promoters' goals. In all versions, we also asked farmer promoters about their previous performance in terms of absolute magnitudes. In the first and second version of the survey, we asked farmer promoters about their goals in terms of absolute magnitudes. The first version asked about goals first, while the second version asked about previous performances first. In the third and fourth version of surveys, previous performances were asked first, and then goals were asked in terms of percentage compared to the previous performance. The third version used a set of low percentage options (i.e., 5%-15%), while the fourth version used a set of high percentage options (i.e., 20%-40%). Performance variables (i.e., number of farmers registered, number of trainings held, and number of farmers trained) refer to performances in the previous year (2021).

Figure 1 summarizes the study design and the timeline.[5] As part of the baseline survey, we elicited individual goals from *all* farmer promoters in our sample for the upcoming season on three outcomes: the number of farmers to help register into the subsidized input scheme, the number of training meetings to hold on demonstration plots, and the number of farmers to train at the demonstration plot.[6] For a random subset of 5,809 farmer promoters, we randomize whether we first ask respondents about their last year's performance or first ask about their goals of the coming season.[7] This random ordering of survey questions creates an exogenous variation in goal magnitude, which we will explore in our analysis.

After the baseline survey, 50% of farmer promoters were randomly assigned to receive goal reminders. The randomization was conducted at the individual level with stratification by the district and the quartile level of personality traits variation.[8] Columns 2 and 3 in Table 1 report the average characteristics of farmer promoters by experimental assignment, and the last column reports the t-test of two sample means between the treatment and control groups. Baseline characteristics and baseline outcomes are well balanced between the two groups: of the 22 baseline variables we measured, no differences are statistically significant and the p-value for the test of joint significance is 0.691.

[5]The full project has a 2×2 factorial design with 2 intervention components. In addition to goal reminders, we cross-randomized whether farmer promoters receive additional motivational messages (Cialdini, 2001). The objectives of this aspect of the intervention are to examine whether motivational messages can improve farmer promoters' performance and moreover to test whether motivational messages designed to appeal to the specific personality can lead to better farmer promoters' performances and farmer outcomes. For this paper, we focus on the first intervention, goal reminders. While we explore the effect of the second intervention - motivational messages - in a companion paper, we control for the random assignment to motivational messages in analyses of this paper.

[6]Specifically, we ask farmer promoters: i) How many farmers do you plan to help with enrollment for subsidized inputs during the 2022A season? ii) How many meetings do you plan to hold on your demonstration plots during the 2022A season? iii) How many farmers do you plan to train on your demonstration plots during the 2022A season?

[7]The sample for this analysis is smaller because we did not start the order randomization at the start of the data collection.

[8]Stratification on personality trait was based on baseline STPS responses discussed in more detail below. We carried out the (re-)randomization 100 times and selected the one randomization that had the highest lowest p-value of the 24 balance tests checked, following the practice described in Banerjee et al. (2020). The 24 balance tests include balance checks on 4 groups of variables - a) farmer promoters' characteristics, b) farmer promoters' performance in the 2021A season, c) farmer promoters' goals for the 2022A season, and d) farmer promoters' personality trait score - over 6 experimental groups.

3.3 Treatment intervention

Every farmer promoter in our treatment group received three SMS reminders in the local language, one for each of the performance goals that they set. The goal setting literature suggests that goals tend to be most effective if they are specific, measurable, achievable, relevant, and time-bound (SMART) (Doran et al., 1981). We hence designed the reminder messages to refer to individual farmer promoter's specific self-set goals from the baseline survey, which needed to be achieved by the end of the planting season. An example of the goal reminder messages is as follows: "*Remember you said your goal for this season was to help XXX farmers register for subsidized inputs! Keep up with your goal!*"[9]

Goal reminder messages were sent in August and September 2021 following the order of their respective activities.[10] Reminder messages were designed to be delivered before farmer promoters completed their work for each campaign. However, due to logistical hurdles, messages were sent with a delay.[11] To assess the extent of the delay in message delivery for individual farmer promoters, we asked farmer promoters in the endline survey when they conducted their goal-related activities.[12] Table C2 compares the delivery time of goal reminder messages and the time that farmer promoters conducted the majority of their work. We find that about half of farmer promoters had already completed most or all of their activities when they received the goal reminders (Table C3 Column 3).

We thus estimate the effect of goal reminders both for the full sample and separately for farmer promoters that received messages on time or late. We identify farmer promoters that conducted all of their specific goal-related work after receiving the first reminder message of that goal (we refer to this sub-sample as the "on-time" sample) and the remaining farmer promoters who conducted at least some of the work before they received the first reminder message (the "delayed" sample). We highlight two caveats for this analysis. First, Table C4 shows that the timing of task completion is correlated with farmer promoter's characteristics. We thus cannot distinguish whether any difference in the effects of goal reminders between these two sub-samples is due to the timing of their work or due to other factors correlated

[9]The full set of reminder messages are listed in Appendix A.

[10]We use administrative data to verify that messages were delivered successfully.

[11]Messages were sent to all treatment farmers at the same time within the common time window under which the targeted activities were expected to take place.

[12]For example, we asked farmer promoters: "When did you do the majority of your work helping farmers register for subsidized inputs during the 2022A season? Please include the month and times of the month (early, middle, or late)."

with the timing. Second, since the randomization was not stratified by the timing of work completion, characteristics of farmer promoters *within* the "on-time" and "delayed" sub-samples may differ by treatment assignment, which would compromise the internal validity of our results. While we do not find significant imbalance in observed baseline characteristics between the treatment and control groups within the on-time sub-sample (Table C5) and delayed sub-samples (Table C6), we cannot rule out the chance that unobserved differences affect our treatment impact estimates within sub-samples.[13]

4 Data Collection and Empirical Strategy

4.1 Data collection

We utilize four datasets for our analysis: two phone surveys administered before and around seven months after the intervention, field visit data for a sub-set of farmer promoters, and administrative records with additional information on farmer promoters' performance.

4.1.1 Baseline Survey

In the baseline survey, we collected data on farmer promoters' demographic characteristics, their experience and last year's performance as farmer promoters, and their performance goals for the coming season, as explained in Section 3. We also gathered data on farmer promoters' psychometric characteristics. Specifically, we designed 27 questions that aim to measure the six traits of Susceptibility to Persuasive Strategies (STPS), drawing on the seminal work by Cialdini (2001). The six traits measured were susceptibility to persuasion by authority, commitment, scarcity, reciprocity, consensus, and liking. In addition, we used an abbreviated version of the test to measure the Big Five personality traits (Big Five Inventory-10), two questions per trait - extroversion, agreeableness, neuroticism, conscientiousness, and openness (Rammstedt and John, 2007).[14] The descriptive statistics on the standardized psychometric measurements are shown in Table 1.

[13] A related potential concern is that the reminders themselves changed the timing of when people completed work. We do not find that there are systematic differences in timing by treatment assignment across our three tasks (Table C3). However, there is a small difference for the registration of farmers task that we will discuss in the interpretation of our results.

[14] For psychometric measurements, some questions were written as *reverse scoring* questions to reduce response bias.

To address concerns about social desirability bias in self-reported responses, we utilize the Marlowe-Crowne social desirability scale (Crowne and Marlowe, 1960) and included a subset of 5 questions (out of 33 questions in the original scale) in our baseline survey, to measure farmer promoters' self-evaluation of positive behaviors, such as being intrinsically motivated for work and doing favors for others. Farmer promoters who report consistently acting in these ways are considered to have a higher possibility of providing socially desirable responses to surveys.

4.1.2 Endline Survey

Of the 10,187 participants in our study sample, surveyors administered an endline survey with 9,615 farmer promoters in February to April 2022, translating to a low attrition rate of 5.6%. Table C1 shows that attrition rates are almost identical for treatment and control groups.

The endline survey collected performance data which we use as our main outcomes. As specified in the pre-analysis plan, our main outcomes correspond to the three performance goals we elicited and an aggregate performance index. For the subsidized inputs campaign, the outcome is the number of farmers that farmer promoters helped with the registration of subsidized inputs. For the demonstration plots and farmers training campaign, we measure the number of training sessions that farmer promoters have held on their demonstration plot and the number of farmers that they have trained on their demonstration plot. Because of the noise in self-reported measures, we winsorize outcome variables at the 99 percentile in our main specification. To increase the precision and address concerns about multiple hypothesis testing, we also construct a standardized summary index using these three outcomes following Kling et al. (2007).

4.1.3 Field Visit and Administrative Data

We complement self-reported data with observational data from field visits and administrative records. Specifically, for a subset of farmer promoters (2,403), their supervisors (SEDOs) visited their demonstration plots and collected data on the quality of those plots and whether farmer promoters followed guidelines.[15] Also, for the agroforestry campaign, information on

[15]SEDOs observed and recorded a set of features of the plot and practices adopted on the plot, ranging between 9 and 45 features and practices depending on the number of crops were grown. For example, is the demonstration plot located in an accessible land, and what is the inter-lines spacing used for maize? The

the number of farmers who picked up and planted trees was recorded.[16] We use those supplementary data to examine implications for multi-tasking by testing the treatment effects on the quality of farmer promoters' work and their performance on tasks for which no goal was set.

4.2 Empirical Strategy

To examine the effect of goal reminders, we estimate the following main specification:

$$y_i = \beta_0 + \beta_1 Reminder_i + \beta_2 X_i + \lambda_l + \epsilon_i. \tag{1}$$

Our coefficient of interest β_1 measures the intention-to-treat effect of receiving a goal reminder on outcomes y_i for farmer promoter i. To increase the precision of our estimates, we control for covariates X_i, which is a vector of farmer promoters' characteristics measured at baseline as listed in Table 1, and strata fixed effects λ_l. We report robust standard errors.

To investigate the role of goal magnitude, we estimate the following specification:

$$y_i = \beta_0 + \beta_1 Goal_i + \beta_2 Reminder_i + \beta_3 Goal_i \times Reminder_i + \beta_4 X_i + \lambda_l + \epsilon_i. \tag{2}$$

β_1 measures the effect of setting a goal with magnitude $Goal_i$. Since the goals are self-set, this estimate likely suffers from omitted variable bias. The sign of the bias is unclear as more productive farmer promoters may set higher or lower goals. The benefit of our design is that by collecting goals for the entire sample, we can test the effect of increasing goal salience while holding constant characteristics of farmer promoters that are correlated with the type of goals they set. $\beta_2+\beta_3$ thus measures the *causal* effect of sending reminders to farmer promoters who set a goal of magnitude $Goal_i$. However, since goals are self-set, goal magnitude $Goal_i$ may be correlated with other characteristics that influence the effectiveness of reminders. For example, farmer promoters who set ambitious yet realistic goals may have personality traits that make them more responsive to any type of intervention. We will

quality outcome variable is constructed as the average score across those observations.

[16] There are two subprograms under this agroforestry tree campaign. One is called the individual land planting program, in which farmers pick up trees from a distribution location and plant trees at locations of their own preference. The other is called the consolidated land planting program, in which farmers come to a designated government land (i.e., a site) and plant trees together. Farmers promoters are tasked to help with both programs and have received training and guidelines in advance. Administrative records on the number of trees picked up or planted and number of farmers participated were collected during the distribution days.

address this possibility by testing the effect of motivational messages across different $Goal_i$ that do not mention goals, as discussed in more detail below.

The literature suggests a non-linear relationship between goal magnitude and performance. We thus estimate the above relationship non-parametrically by dividing farmer promoters into goal ambition quartiles and examining the treatment impact within each quartile. Goal ambition is defined as the relative change in performance for the coming season, i.e., the ratio between self-set goal magnitude and self-reported performance in the previous year.

Finally, we carry out two sets of analyses to investigate effective goal-setting, defined as whether farmer promoters' goals fall in the second or the third quartile of the goal magnitude distribution. We first examine farmer characteristics that are correlated with whether a farmer promoter sets an effective goal, using linear regressions and a random forest model. Second, as described in the Subsection 3.2, we created exogenous variation in farmer promoters' self-set goal magnitudes by randomizing whether we first asked them to recall their last year's performance before setting their goal for the upcoming season. We adopt a two-stage least-squares method to examine the impact of setting an effective goal on performance, using the assignment for survey question order as an instrument for the endogenously set goals.

5 Results

5.1 Average Effect of Goal Reminders

We start by estimating the average intent-to-treat effects of goal reminders on farmer promoters' performance. Figure 2 presents the average effects of goal reminders on the number of farmers registered for the subsidized input scheme, the number of on-farm demonstration trainings held, the number of farmers trained on these demonstrations, and the standardized index across those three outcomes. For each outcome, we show treatment effects for the full sample, on-time message sample, and delayed message samples as defined earlier. Appendix Table C7 reports the corresponding regression results.

The effects of goal reminders observed in the full sample are positive but insignificant. The magnitude of treatment effects is less than 2% for each of the three outcomes and 0.03 standard deviations for the standardized index (Column 1, 4, 7, 10 in Table C7).

Figure 2: The Treatment Impact of Goal Reminders

Note: The figure reports the effect of goal reminders on self-reported outcomes collected in the endline survey. Outcomes are winsorized at the 99% level. For each outcome, analyses are conducted with 3 samples: full sample, on-time message sample, and delayed message sample. Bars and numbers stand for point estimates of treatment impact and capped spikes stand for the 95% confidence interval.

These aggregate effects mask important differences based on the timing of reminders. Focusing on the sample of farmer promoters who received messages on time (red bars in the figures and Column 2, 5, 8, 11 in Table C7), we find that the goal reminders have positive impacts on farmer promoters' performance. The impacts for the three individual outcomes are moderate in size, ranging between 2% and 4%, and estimated with varying levels of precision. When these outcomes are aggregated into a standardized index, we observe a statistically significant improvement in overall performance, with a point estimate of 0.08 standard deviations at the 1% significance level. By contrast, we find that the goal reminders do not have any effects when farmer promoters receive the messages after they complete their tasks.

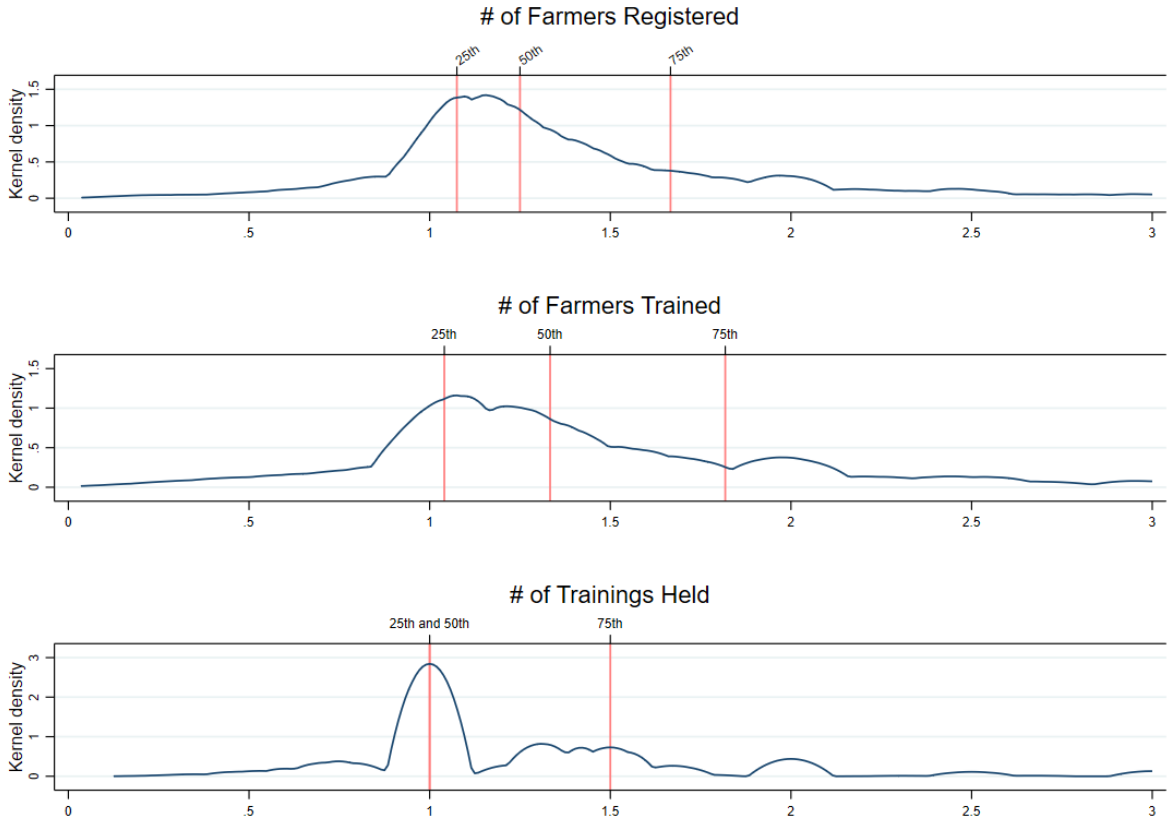
The observed patterns suggest that goal reminders have a positive impact on performance when farmer promoters are still working on those tasks, but once farmer promoters decide their tasks have been completed, goal reminders do not motivate them to go back to the task and work more. However, as we noted earlier, one important caveat of these analyses is that the reminder message randomization was not stratified by the timing of when farmer promoters undertook their work. Therefore, our results do not necessarily imply that the difference in treatment effects between those two samples is due to the variation in message timing.[17]

One important question in assessing the overall effects of goal-setting on performance is whether goal-setting affects behaviors not linked to the goals. The direction of these spillover effects is theoretically ambiguous. Agents may direct effort away from other activities (Holmstrom and Milgrom, 1991). Alternatively, we may observe an increased effort in other activities due to either task complementarities or an overall increase in the level of motivation. We explore such effects by testing whether the intervention affects farmer promoters' performance in an agroforestry campaign, another extension program which took place in the same agricultural season but was not part of this goal-setting experiment. In Appendix Table C9, we show that the goal reminders do not lead to a significant change in the number of farmers mobilized for tree planting and collection. We further analyze the potential trade-off between quantity and quality of performance using the information on the quality of demonstration plots collected during field visits by SEDOs. We find no difference in quality measures of how demonstration plots were maintained between the treatment and control groups. Overall, these results suggest that improved performance resulting from goal reminders does not come at the cost of reducing farmer promoters' effort on other dimensions of their performance.[18]

[17] For example, it is possible that the type of farmer promoters that start their tasks late are more responsive to reminder messages, driving the results for the on-time message sample. We further note that there is a small imbalance in the share completing the work on time for the input goal reminder (Table C3), which may help explain why we do not observe a significant treatment effect for this outcome.

[18] An additional concern is that this analysis relies of self-reported outcomes and that people who receive reminders may feel obliged to report higher performance metrics. To address this concern, we follow Dhar et al. (2022) and interact farmer promoters' social desirability score with the goal reminder treatment. We find that respondents with high social desirability scores do not have larger treatment effects (Table C8). Lastly, the null result for the sample who receive reminders late further assuages concerns about surveyor demand effects as it suggests that merely receiving a goal reminder does not change self-reported outcomes.

Figure 3: The Distribution of Goal Ambitions



Note: The figure plots the distribution of farmer promoters' goal ambitions for the three goals they set. Goal ambitions are defined as the intended *increase* in performance over last year's respective outcomes. Red vertical lines show the values of 25th, 50th, and 75th percentiles of the full distribution. The distribution curves plot values up to 3 for a better presentation. The shares of observations that have values equal or smaller than 3 are 95%, 100%, and 93% for outcome "# of farmers registered", "# of farmers trained", "# of trainings held", respectively.

5.2 Effect of Goal Magnitude

The literature has postulated that goals are most effective if they are ambitious but attainable (Locke and Latham, 2002). One challenge with isolating the effect of goal ambition is that the magnitude of goals is highly endogenous (Falk and Knell, 2004). For example, Lee et al. (2003) show that people with low self-efficacy tend to set lower goals. It is thus unclear whether ambitious goals themselves are effective or whether the goal setting is effective for the type of person who sets ambitious goals. We address this endogeneity problem by eliciting goals for everyone in an inconspicuous manner as part of the baseline survey

and then reminding a random subset of participants of their goals. We then examine the heterogeneous effects of reminder messages by goal magnitude.

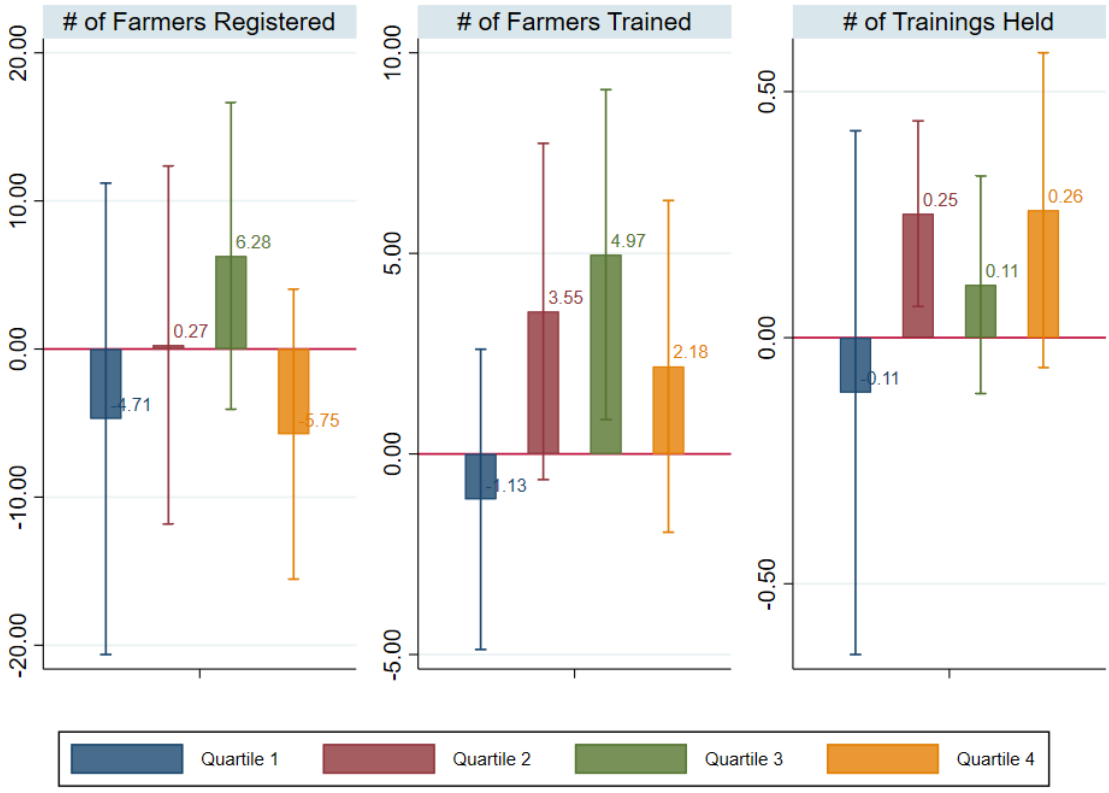
We categorize farmer promoters into quartiles based on their level of goal ambition, measured as the change relative to last year's performance. Figure 3 plots the distribution of farmer promoters' goal ambitions for the three performance goals they set. We first focus on the two continuous outcomes: for both the numbers of farmers registered and trained, we find that farmer promoters in the first quartile set goals at levels similar to or below last year's performance. The second quartile of goal ambition includes reaching up to around 25-33% more farmers and the third quartile includes increasing performance by up to 70-80%. Most goals in the fourth quartile include more than doubling the performance, with an average increase of more than 150%.

Figure 4 shows treatment effect sizes for each quartile using the on-time sample. We find that treatment impacts for the two continuous outcomes follow an inverted U-shape pattern with insignificant negative effects for the first quartile and a peak at the third quartile, for which the number of farmers registered and trained increase by 6.3 (7.6%) and 5 (9%), respectively.[19] Table C10 reports corresponding regression results. It is notable that while these ambitious goals are most effective in increasing performance, agents still fall far short of achieving their goals.[20] As a robustness check, we examine the effect of goal magnitude for the delayed sample. Similar to the average treatment impact analysis, we find neither an inverted-U shape relation nor any significant treatment impact for farmer promoters who received reminder messages after completing their activities (Figure B2 and Table C11).

[19]Results, available upon request, are qualitatively similar when we categorize goal ambition by percent change thresholds rather than percentile thresholds.

[20]This finding is consistent with other studies. For example, Abel et al. (2019) find that while a goal setting and action planing intervention helps job seekers to change behavior it only partially closes the intention-behavior gap.

Figure 4: The Role of Goal Magnitude (On-Time Sample)



Note: The figure reports the effect of goal reminders on self-reported outcomes of the on-time sample. For each outcome, analyses are conducted with four samples, defined by farmer promoters' goal ambition quartile. Outcomes are winsorized at the 99% level. Bars and numbers stand for point estimates of treatment impact and capped spikes stand for the 95% confidence interval.

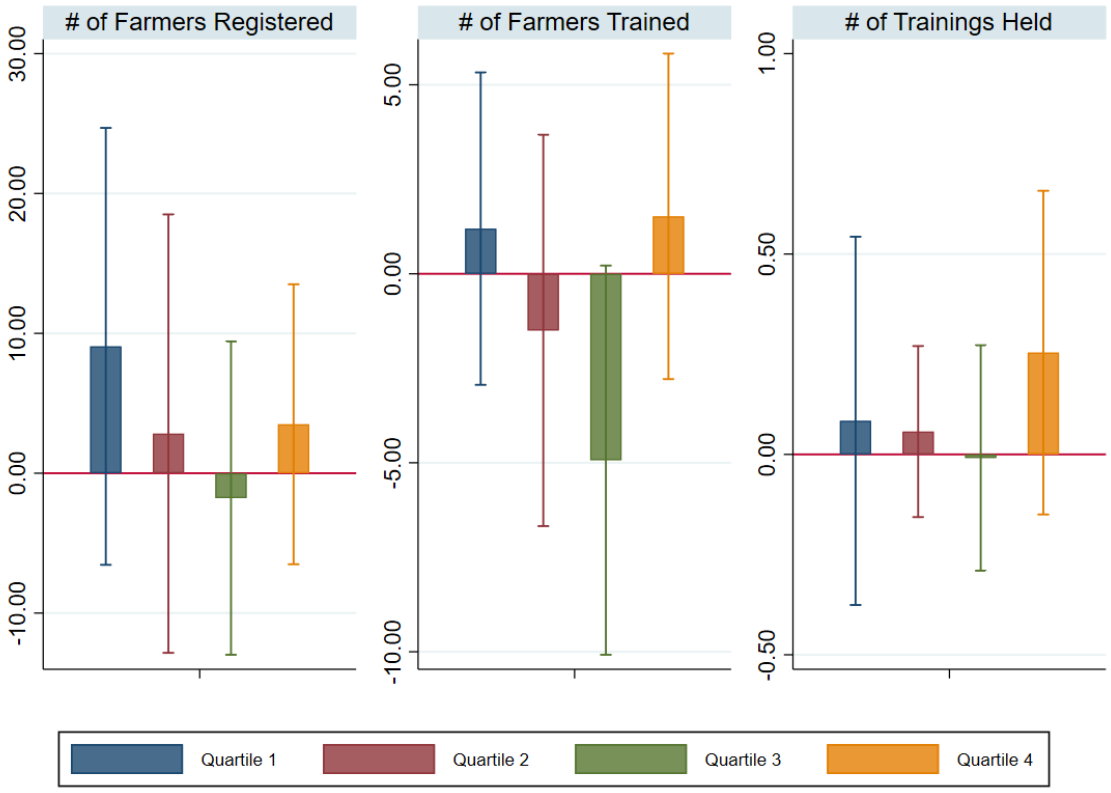
For the discrete outcome - the number of trainings held - we find a similar pattern for the first three quartiles. However, quartile four shows a positive (insignificant) treatment effect. One possible explanation is that farmer promoters set overall more realistic goals for this goal with quartile four starting at a performance increase of 50%.[21]

As discussed in Section 4.2, while these estimates measure the causal effect of reminders for farmer promoters with varying goals, it is unclear whether treatment effects vary because of the goal magnitude or some other factors correlated with goal magnitude. We address this concern by estimating how the effect of a motivational message that does not mention

[21] In addition, there is limited variation in goal ambition of this outcome as 45% of farmer promoters have set a goal with the magnitude to be the same of previous performance.

goals varies across farmer promoters' goal magnitudes. Figure 5 shows that these messages do not lead to an increase in performance for farmer promoters in the second and third goal ambition quartiles. Although this test is not conclusive, it provides evidence that the treatment effect heterogeneity we observe is not driven by factors that make farmer promoters more responsive to any type of text message intervention aimed at increasing performance.[22]

Figure 5: The Treatment Impact of Motivational Messages by Goal Magnitude (On-Time Sample)



Note: The figure reports the effect motivational messages on self-reported outcomes, using the on-time sample. For each outcome, analyses are conducted with four samples, defined by farmer promoters' goal ambition quartile. Outcomes are winsorized at the 99% level. Bars and numbers stand for point estimates of treatment impact and capped spikes stand for the 95% confidence interval.

[22]When we describe our finding that ambitious but realistic self-set goals are most effective under "certain assumption", this is what we are assuming — no unobservables that are correlated with both goal ambition and responsiveness toward digital nudges.

5.3 Why Are Goal Reminders Effective?

One open question in the goal setting literature is what underlying mechanisms can explain the effectiveness (Locke and Latham, 2006). Proposed explanations include that goals foster commitments towards desired outcomes (Heath et al., 1999; Kaur et al., 2015), create accountability (Travers et al., 2015), or assist in organizing steps to achieve behavior change (Webb et al., 2007). To test the importance of these potential mechanisms, we collected data on participants' Susceptibility to Persuasive Strategies (STPS) including commitment and authority (Cialdini, 2001), and Big Five personality traits including conscientiousness, which measures people's tendency to be organized. As a test of mechanisms, we hypothesize that goal reminders have more positive effects for agents who are more susceptible to authority and consider the reminders as external monitoring, for agents who are more influenced by commitments they made, or for less conscientious agents who are less organized and may not set goals on their own (Webb et al., 2007).

We empirically test whether the effectiveness of our intervention varies based on these personality traits by interacting their respective STPS scores or Big Five score with the goal reminder treatment. Table 2 shows that the effects of goal reminders on farmer promoters' performance measured by the standardized index. We find that the effect does not differ by farmer promoter's susceptibility to be convinced by commitments they made (Column 1-3), their inclination to be affected by authorities (Column 4-6), or by their conscientiousness level (Column 7-9). Table 2 shows a positive (albeit insignificant) correlation between performance and high STPS scores for commitments and authorities in the control group, suggesting that reminders may not have an additional, large effect on performance for those who have strong motivations for commitments and authorities to begin with in our setting. It is plausible the effect of goal reminders among farmer promoters who are susceptible to persuasion strategies may vary by the effectiveness of goals they set, we do not have a sufficient large sample to test the heterogeneous treatment effects by personality type across goal magnitude quartiles.

Table 2: The Treatment Impact of Goal Reminders Interacting with Personality Traits

	Commitment (STPS)			Authority (STPS)			Conscientious (Big 5)		
	(1) Full	(2) On-Time	(3) Delayed	(4) Full	(5) On-Time	(6) Delayed	(7) Full	(8) On-Time	(9) Delayed
Goal Reminders	0.029	0.080***	-0.029	0.029	0.081***	-0.029	0.028	0.080***	-0.031
	(0.020)	(0.027)	(0.028)	(0.020)	(0.027)	(0.028)	(0.020)	(0.027)	(0.028)
Commitment (STPS)	0.034	0.059	0.037						
	(0.044)	(0.048)	(0.079)						
Commitment x Reminder	-0.011	0.012	-0.055						
	(0.057)	(0.072)	(0.083)						
Authority (STPS)				0.040	0.065*	0.020			
				(0.030)	(0.037)	(0.053)			
Authority x Reminder				-0.068	-0.068	-0.067			
				(0.042)	(0.057)	(0.064)			
Conscientiousness (Big 5)							0.012	-0.012	0.010
							(0.033)	(0.048)	(0.050)
Conscientious x Reminder							-0.029	-0.020	-0.010
							(0.046)	(0.072)	(0.067)
N	9615	5079	4516	9615	5079	4516	9615	5079	4516
R^2	0.025	0.034	0.021	0.025	0.034	0.021	0.026	0.035	0.021
Control mean	-0.004	-0.100	0.111	-0.004	-0.100	0.111	-0.004	-0.100	0.111
Control sd	1.039	0.988	1.081	1.039	0.988	1.081	1.039	0.988	1.081

Note: The table presents how the effects of goal reminder on the standardized outcome index vary by farmer promoters' inclination to be persuaded by commitment (Column 1-3), authority (Column 4-6), and conscientious (Column 7-9). Additional controls include motivational message randomization, farmer promoters' age, gender, education level, elected method, experience as farmer promoters, years lived in the village, and baseline survey version numbers, as listed in Table 1. Strata fixed effects are included. Standard errors are robust. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

We also find it unlikely that the treatment was effective by simply bringing the goals to the top of mind as this could not explain the heterogeneous treatment effects by goal ambition we observe. We instead believe that, in line with the literature on externally set goals, the most likely explanation is that increasing the salience of goals that are too low is not motivating agents while unrealistically high goals may trigger negative reactions and deter agents from taking action. However, we do not have data to conclusively test what emotional reaction agents associate with their goals to test these exact psychological mechanisms.

6 Discussion: Setting Effective Goals

The previous section shows that goal reminders improve performance *conditional* on having set ambitious but not overly ambitious goals. This raises two direct questions for principals. First, given that the effect of self-set goals varies by goal magnitude, can we identify the characteristics of agents that set more effective goals? Second, can agents be nudged to adopt more effective goals?

6.1 Who sets effective goals?

Identifying observable characteristics of agents that tend to set more effective goals would allow principals to decide whether to encourage a selective set of agents to set goals for themselves. To answer this question, we examine the correlation between farmer promoters' characteristics and the type of goals they set. Specifically, we regress an indicator for setting effective goals on farmer promoters' characteristics. As shown in Table 3, farmer promoters who are female and have higher levels of education are more likely to set effective goals.[23] On the contrary to our initial conjecture, the influence of psychometric characteristics appears to be limited.

To explore this question further, we adopt a random forest model to predict the setting of effective goals.[24] Figure B3 presents the predictor factors that are included in the model

[23] We will discuss the variable "ask previous performance first" in the next subsection.

[24] This analysis contributes to a recent, growing literature that examines heterogeneous treatment effects using machine learning methods and presents the importance of targeting for policies. For example, Gharad T. Bryan and Osman (2023) finds that there is significant heterogeneity in treatment impacts of larger loans and suggests that standard approaches of credit allocations are inefficient, while machine learning models using psychometric data are able to identify "top-performers" who would achieve substantially profit increase

Table 3: Farmer Promoters' Characteristics Associated with Setting "Effective Goals"

	Set effective goals			
	(1)	(2)	(3)	(4)
	Demographic	Psychometric	Demo + Psyc	Demo + Psyc + SD
Age	-0.001		-0.001	-0.001
	(0.000)		(0.000)	(0.000)
Imputed age	-0.028		-0.033	-0.034
	(0.208)		(0.207)	(0.209)
Male	-0.018*		-0.018*	-0.017*
	(0.010)		(0.010)	(0.010)
Primary education	0.040***		0.040***	0.039***
	(0.012)		(0.012)	(0.012)
Experience FP (yr)	0.001		0.001	0.001
	(0.001)		(0.001)	(0.001)
Commitment (STPS)		0.008*	0.008*	0.008
		(0.005)	(0.005)	(0.005)
Authority (STPS)		-0.005	-0.005	-0.005
		(0.005)	(0.005)	(0.005)
Conscientious (Big 5)		-0.003	-0.003	-0.004
		(0.005)	(0.005)	(0.005)
Social desirability score				0.007*
				(0.004)
Ask previous performance first	-0.039***	-0.040***	-0.038***	-0.037***
	(0.008)	(0.008)	(0.008)	(0.008)
Goal Reminders	0.001	0.001	0.001	0.001
	(0.008)	(0.008)	(0.008)	(0.008)
Motivational Messages	0.006	0.005	0.006	0.006
	(0.010)	(0.010)	(0.010)	(0.010)
N	15639	15639	15639	15639
R^2	0.003	0.002	0.003	0.003
Control mean	0.571	0.571	0.571	0.571

Note: The table presents the correlation between farmer promoters' characteristics and whether farmer promoters' set effective goals. The analysis sample includes the three goals set in baseline survey for each farmer promoter. Strata fixed effects are included. Standard errors are clustered at the farmer promoter level. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

and their corresponding importance scores. While those importance scores do not stand for causal impact, to obtain more insights, we compare the five most important predictors between farmer promoters who set effective goals vs. who did not. Table C12 shows that farmer promoters who set effective goals are significantly younger and more likely to be female, similar to the patterns observed in ordinary least squares regression results.[25]

After tuning hyper-parameters[26], our final random forest model has an accuracy rate of 0.55. Table C14 shows the confusion matrix and Table C15 presents the classification report of the model. Both the accuracy of detecting one class (i.e., precision) and the accuracy of predicting one class (i.e., recall) are around 0.5. The harmonic mean of precision and recall (i.e., F-1 score) is also around 0.5. While the current random forest model predicts the "effective-goal" class slightly better compared to the "ineffective-goal" class, the overall performance of the model would require a substantial improvement for effective targeting, suggesting that even with rich personality data it is difficult to identify which agent will set effective goals in our setting.

6.2 How to nudge farmer promoters to set effective goals?

The next key question is whether it is possible and advisable to encourage agents to set effective goals. The scant existing evidence suggests that nudging people to set more ambitious goals is challenging. van Lent and Souverijn (2020) find that convincing students to adopt higher goals has detrimental effects on learning outcomes. One explanation is that students may not "own" these goals and are thus less committed and intrinsically motivated (Hollenbeck et al., 1989). We implemented a novel light-touch approach that aims to exogenously change the magnitude of goals that agents set for themselves by randomizing whether we first asked respondents to recall their last year's performance before setting their goal for the upcoming season. We anticipate that asking respondents about their previous performance first would make them set lower goals that are more realistic to achieve.

Table 4 shows the effect of this survey order randomization. Columns 1-3 present

from larger loans.

[25]We also compared farmers promoters' characteristics descriptively by the quartile of goals, shown in Table C13. We observe that farmer promoters who have higher goal ambitions are different from those who have lower goal ambitions, both in terms of demographic characteristics and psychometric characteristics when those characteristics are considered one by one.

[26]Our final model has an out-of-bag error rate of 0.468 and a validation error rate of 0.453.

the effect on the goal magnitude, specifically the number of farmers that farmer promoters intended to help with the registration of subsidized inputs. We indeed find that farmer promoters set *lower* goals if the survey first asked about last year's performance. On average, farmer promoters state that they plan to register 5 (4%) fewer farmers.[27] While first asking about last year's performance leads to a more realistic goal, has it helped farmer promoters set more effective goals? Columns 4-5 show that this benchmarking in fact *decreases* the probability of setting goals in the range that our analysis suggests is most effective by around 7.3 percentage points (14.5%). One explanation is that the survey order assists the attainable and realistic aspect but overlooks the ambitious requirement of effective goals.

Table 4: The Effect of Survey Order on Goal Setting (IV First Stage)

	Goal on # of Farmers Registered			Set Effective Goal on # of Farmers Registered	
	(1)	(2)	(3)	(4)	(5)
Ask previous performance first	-5.853***	-5.774***	-5.000***	-0.072***	-0.073***
	(2.166)	(2.093)	(1.523)	(0.013)	(0.013)
Previous performance (2021)			0.793***		
			(0.012)		
N	5330	5330	5328	5220	5220
R^2	0.001	0.035	0.606	0.005	0.011
Control mean	134.278	134.278	134.283	0.504	0.504
Control sd	83.431	83.431	83.447	0.500	0.500
Include covariates	N	Y	Y	N	Y
Include baseline value	N	N	Y	N	N

Note: The table reports the first stage estimations of the effect of being asked about the previous performance first on farmer promoters' goal magnitude and setting an effective goal or not for the number of farmers registered outcome. Additional controls include motivational message randomization, farmer promoters' age, gender, education level, elected method, experience as farmer promoters, years lived in the village, 6 STPS scores, 5 Big 5 scores, and social desirability score, as listed in Table 1. Strata fixed effects are included. Standard errors are robust. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

[27] We also randomized the order for the number of meetings held and the number of farmers trained. For the number of meetings held, the coefficient is insignificant, possibly because this discrete measure is harder to move as 80% of farmer promoters report between two and four meetings. For the number of farmers trained, the first stage is significant but does not meet the criteria for strong instruments.

This exogenous variation in goal magnitude provides an opportunity to test for the causal effect of setting effective goals. Specifically, we instrument for the goal magnitude and effectiveness with our random survey order indicator in the first stage and then estimate whether adopting effective goals has an effect on performance in the second stage. Table C16 shows that adopting effective goals increases performance by 7.7% (Table C16 Column 2). While this estimate is consistent with our previous results, it is estimated imprecisely and is not statistically significant. Unfortunately, the F-stat in the first stage is too small to conduct subgroup analysis for the effectiveness of reminders or how effects differ by goal magnitude. Overall, we interpret results in this section as suggestive evidence that it is possible to nudge people to set different goals for themselves, but that one needs to carefully assess whether these nudged new goals are more or less likely to be in the range that is effective.

7 Conclusion

Using a randomized controlled trial, we demonstrate that goal reminders are effective in improving agents' performance in the context of agricultural extension volunteers in Rwanda. Sending three text messages to remind farmer promoters about their goals leads to increases of around 2% to 4% in the numbers of farmers registered for subsidized inputs, trainings held, and farmers trained, or a 0.08 standard deviation increase in an aggregate performance index. Importantly, our study shows that the seminal finding from the studies of externally set goals that ambitious but realistic goals are most effective extends to self-set goals. The relationship between goal magnitude and treatment effects follows an inverted U-shape.

We further explore which type of farmer promoters set effective goals and whether farmer promoters can be nudged to set different goals. We identify a set of demographic characteristics that are associated with setting effective goals, but our random forest analysis suggests that our baseline data from a 30-min phone survey are insufficient to identify effective targeting. Additionally, we observe that a simple survey tweak could influence the likelihood of agents setting an effective goal. We find a positive and imprecise effect of the induced increase in the likelihood of setting an effective goal via survey design on farmer promoters' performance. However, the study was not sufficiently powered to detect a small performance improvement with statistical significance.

The magnitude of the average impact of this goal intervention is modest. Nevertheless, the cost of the intervention is extremely small, making it highly cost-effective. Considering that the marginal cost associated with sending out all three text messages is only $0.005 dollar, sending $1 dollar worth of goal reminder messages could lead to 362 more farmers being trained. While cost-effectiveness analyses of extension initiatives are limited, this figure compares favorably to studies showing that providing a bag of legume seeds worth approximately $16 dollars as a performance incentive to local communicators in Malawi leads to 191 more farmers being trained (BenYishay and Mobarak, 2019),[28] and especially to direct in-person farmer training programs, such as farmer field days typically targeting 100-300 farmers per session, which cost about $9 dollars in Kenya (Fabregas et al., 2022) and $5.58 dollars in India (Emerick and Dar, 2021) per farmer.

The lessons learned from this study are relevant for other decentralized systems where it is either not feasible or not advisable for principals to set individual goals for agents. This may, for example, include volunteer health workers and teachers in rural areas. Our findings are also relevant for other work settings including the increasing share of jobs that include team work, for which it is difficult to measure contributions of individual group members. Going beyond settings with principal-agent relationships, self-set goals are of paramount importance for aspects of people's personal life. Our results suggest that it is the act of setting effective goals itself, and not (only) the type of person, that makes goal-setting a powerful tool to change behavior. However, whether and how people can be influenced to set more effective goals for themselves remains an open question that requires additional research.

[28]The intervention was having 5 communicators (i.e., peer farmers) per village to train farmers on new practices. Each peer farmer received a package of legume seeds as an incentive, with the maximum award value per village as 12,000 MWK (i.e., US$80).

References

Abel, M., R. Burger, E. Carranza, and P. Piraino (2019): "Bridging the intention-behavior gap? The effect of plan-making prompts on job search and employment," *American Economic Journal: Applied Economics*, 11, 284–301.

Adams, M. A., J. C. Hurley, M. Todd, N. Bhuiyan, C. L. Jarrett, W. J. Tucker, K. E. Hollingshead, and S. S. Angadi (2017): "Adaptive goal setting and financial incentives: A 2 $\times$ 2 factorial randomized controlled trial to increase adults' physical activity," *BMC Public Health*, 17.

Banerjee, A. V., S. Chassang, S. Montero, and E. Snowberg (2020): "A theory of experimenters: Robustness, randomization, and balance," *American Economic Review*, 110, 1206–30.

BenYishay, A. and A. M. Mobarak (2019): "Social learning and incentives for experimentation and communication," *The Review of Economic Studies*, 86, 976–1009.

Castleman, B. L. and L. C. Page (2016): "Freshman year financial aid nudges: An experiment to increase FAFSA renewal and college persistence," *The Journal of Human Resources*, 51, 389–415.

Cialdini, R. B. (2001): "The science of persuasion," *Scientific American*, 284, 76–81.

Crowne, D. P. and D. Marlowe (1960): "A new scale of social desirability independent of psychopathology," *Journal of Consulting Psychology*, 24, 349–354.

Cumberbatch, J. R. and G. C. Barnes (2018): "This nudge was not enough: A randomised trial of text message reminders of court dates to victims and witnesses," *Cambridge Journal of Evidence-Based Policing*, 2, 35–51.

Deci, E. L. and R. M. Ryan (2000): "The" what" and" why" of goal pursuits: Human needs and the self-determination of behavior," *Psychological inquiry*, 11, 227–268.

Dhar, D., T. Jain, and S. Jayachandran (2022): "Reshaping adolescents' gender attitudes: Evidence from a school-based experiment in India," *American economic review*, 112, 899–927.

Dobronyi, C., P. Oreopoulos, and U. Petronijevic (2017): "Goal setting, academic reminders, and college success: A large-Scale field experiment," *NBER Working Paper*, w23738.

Doran, G. T. et al. (1981): "There's a SMART way to write management's goals and objectives," *Management review*, 70, 35–36.

Drach-Zahavy, A. and M. Erez (2002): "Challenge versus threat effects on the goal-performance relationship," *Organizational Behavior and Human Decision Processes*, 88, 667–682.

Dweck, C. S. (2006): *Mindset: The new psychology of success*, Random house.

Emerick, K. and M. H. Dar (2021): "Farmer field days and demonstrator selection for increasing technology adoption," *The Review of Economics and Statistics*, 103, 680–693.

Fabregas, R., M. Kremer, M. Lowes, R. On, and G. Zane (2022): "Digital information provision and behavior change: Lessons from six experiments in East Africa," *Working Paper*.

Falk, A. and M. Knell (2004): "Choosing the Joneses: Endogenous goals and reference standards," *The Scandinavian Journal of Economics*, 106, 417–435.

Gharad T. Bryan, D. K. and A. Osman (2023): "Big loans to small businesses: Predicting winners and losers in an entrepreneurial lending experiment," *NBER Working Paper*, w29311.

Goerg, S. J. (2015): "Goal setting and worker motivation," *IZA World of Labor*.

Grohmann, A., T. Lakemann, and H. Seitz (2020): "Savings goal calendars as soft commitment devices: Evidence from small business owners in Uganda," *DIW Berlin Discussion Paper*, 1919.

Heath, C., R. P. Larrick, and G. Wu (1999): "Goals as reference points," *Cognitive psychology*, 38, 79–109.

Hirst, Y., H. Skrobanski, R. S. Kerrison, L. C. Kobayashi, N. Counsell, N. Djedovic, J. Ruwende, M. Stewart, and C. von Wagner (2017): "Text-message reminders in colorectal cancer screening (TRICCS): A randomised controlled trial," *British Journal of Cancer*, 116, 1408–1414.

Hollenbeck, J. R., C. R. Williams, and H. J. Klein (1989): "An empirical examination of the antecedents of commitment to difficult goals," *Journal of applied psychology*, 74, 18.

Holmstrom, B. and P. Milgrom (1991): "Multitask principal-agent analyses: Incentive contracts, asset ownership, and job design," *Journal of Law, Economics, & Organization*, 7, 24–52.

Islam, A., S. Kwon, E. Masood, N. Prakash, S. Sabarwal, and D. Saraswat (2022): "When goal-setting forges ahead but stops short: Evidence from an at scale experiment in Tanzania," *IZA Discussion Paper*.

Kaptein, M., B. De Ruyter, P. Markopoulos, and E. Aarts (2012): "Adaptive persuasive systems: A study of tailored persuasive text messages to reduce snacking," *ACM Transactions on Interactive Intelligent Systems*, 2, 1–25.

Karlan, D., M. McConnell, S. Mullainathan, and J. Zinman (2016): "Getting to the top of mind: How reminders increase saving," *Management Science*, 62, 3393–3411.

Kaur, S., M. Kremer, and S. Mullainathan (2015): "Self-control at work," *Journal of Political Economy*, 123, 1227–1277.

Keding, A., S. Brabyn, H. MacPherson, S. Richmond, and D. Torgerson (2016): "Text message reminders to improve questionnaire response rates," *Journal of Clinical Epidemiology*, 79, 90–95.

Kling, J. R., J. B. Liebman, and L. F. Katz (2007): "Experimental analysis of neighborhood effects," *Econometrica*, 75, 83–119.

Latham, G. P. (2012): "Motivate employee performance through goal setting," in *Handbook of Principles of Organizational Behavior: Indispensable Knowledge for Evidence-Based Management*, ed. by E. A. Locke, Wiley.

Lee, F. K., K. M. Sheldon, and D. B. Turban (2003): "Personality and the goal-striving process: the influence of achievement goal patterns, goal level, and mental focus on performance and enjoyment," *Journal of Applied Psychology*, 88, 256.

Locke, E. A. and G. P. Latham (2002): "Building a practically useful theory of goal setting and task motivation: A 35-year odyssey." *American psychologist*, 57, 705.

——— (2006): "New directions in goal-setting theory," *Current Directions in Psychological Science*, 15, 265–268.

Löschel, A., M. Rodemeier, and M. Werthschulte (2023): "Can self-set goals encourage resource conservation? Field experimental evidence from a smartphone app," *European Economic Review*, 160.

Morisano, D., J. B. Hirsh, J. B. Peterson, R. O. Pihl, and B. M. Shore (2010): "Setting, elaborating, and reflecting on personal goals improves academic performance." *Journal of applied psychology*, 95, 255.

Rammstedt, B. and O. P. John (2007): "Measuring personality in one minute or less: A 10-item short version of the Big Five Inventory in English and German," *Journal of Research in Personality*, 41, 203–212.

Teo, T. C. and K. C. P. Low (2016): "The impact of goal setting on employee effectiveness to improve organisation effectiveness: Empirical study of a high-tech company in Singapore," *Journal of Business & Economic Policy*, 3, 1–16.

Travers, C. J., D. Morisano, and E. A. Locke (2015): "Self-reflection, growth goals, and academic outcomes: A qualitative study," *British journal of educational psychology*, 85, 224–241.

van Lent, M. (2019): "Goal setting, information, and goal revision: A field experiment," *German Economic Review*, 20, 949–972.

van Lent, M. and M. Souverijn (2020): "Goal setting and raising the bar: A field experiment," *Journal of Behavioral and Experimental Economics*, 87, 101570.

Webb, T. L., J. Christian, and C. J. Armitage (2007): "Helping students turn up for class: Does personality moderate the effectiveness of an implementation intention intervention?" *Learning and individual differences*, 17, 316–327.

Youssef, A., H. Alharthi, O. A. Khaldi, F. Alnaimi, N. Alsubaie, and N. Alfariss (2014): "Effectiveness of text message reminders on nonattendance of outpatient clinic appointments in three different specialties: A randomized controlled trial in a Saudi hospital," *Journal of Taibah University Medical Sciences*, 9, 23–29.

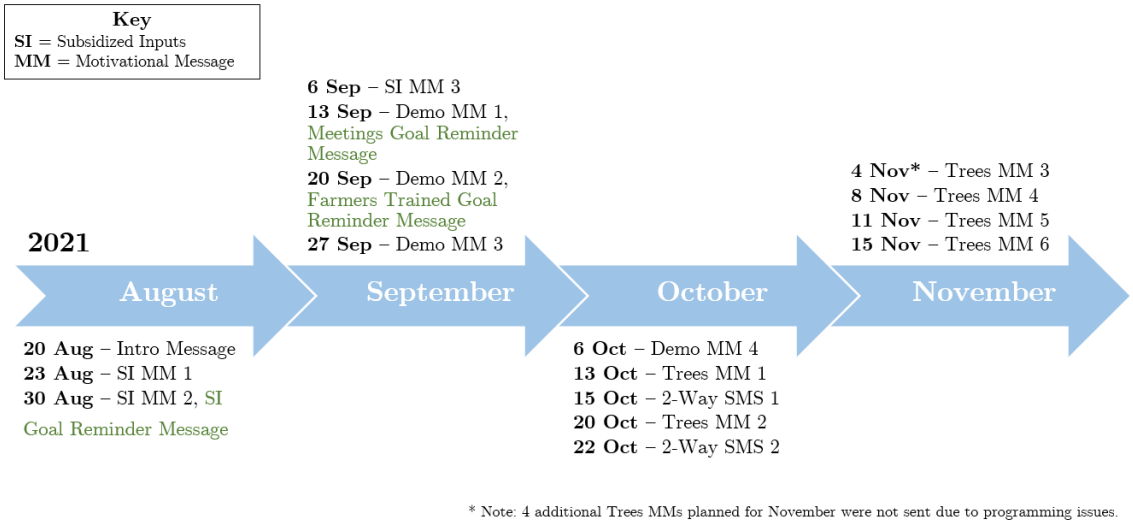
Appendix

A Reminder Messages

- **Subsidized Inputs - Registering Farmers** - Remember you said your goal for this season was to help XXX farmers register for subsidized inputs! Keep up with your goal!
- **Demo Plots - Training Meetings** - Remember you said your goal for this season was to hold X training meetings on your demonstration plot! Keep up with your goal!
- **Demo Plots - Farmers Trained** - Remember you said your goal for this season was to train XXX farmers on your demonstration plot! Keep up with your goal!

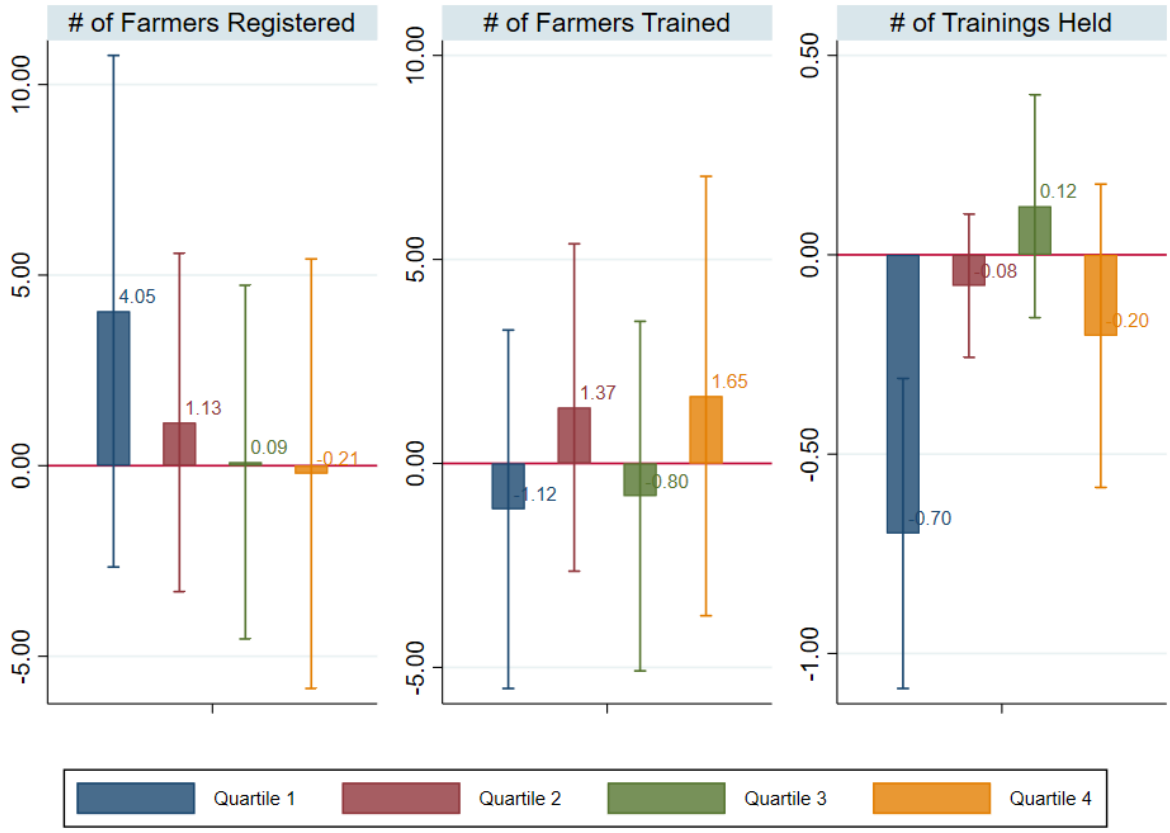
B Additional Figures

Figure B1: Timeline of Intervention Messages



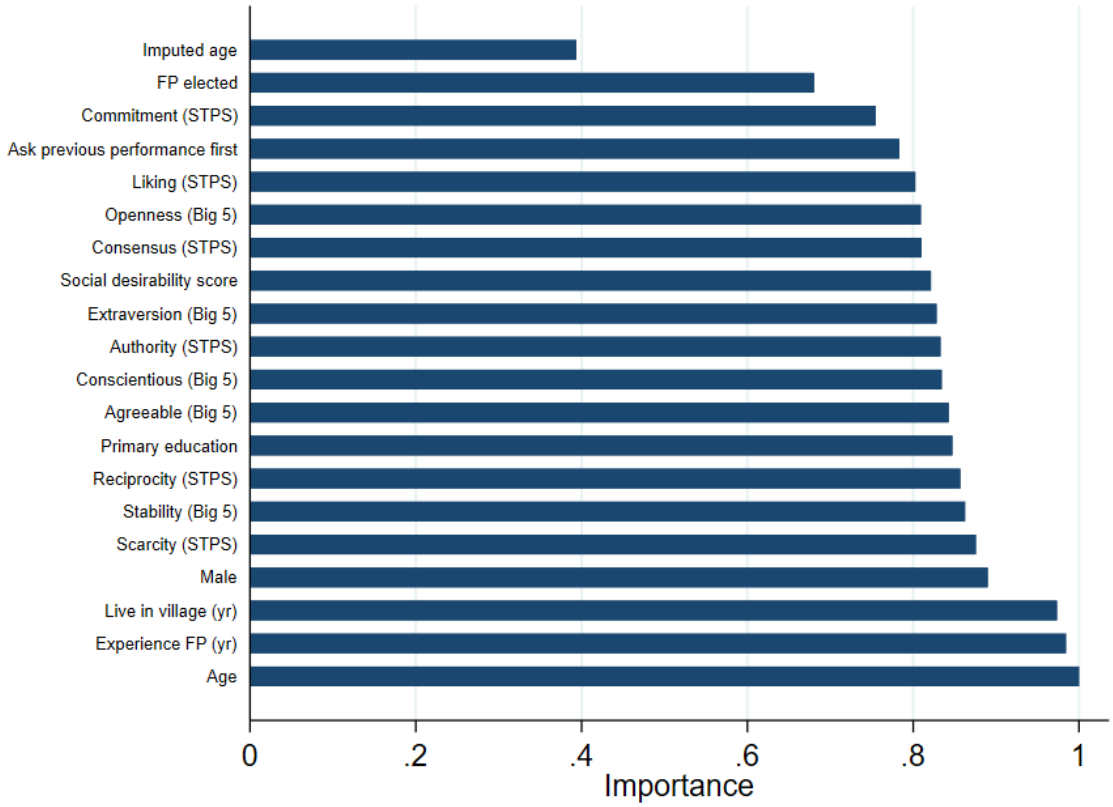
Note: The figure presents the timing of all messages sent in this 2 × 2 full project. Goal reminder messages are listed in green.

Figure B2: The Role of Goal Magnitude (Delayed Sample)



Note: The figure reports the effect of goal reminders on self-reported outcomes of the delayed sample. For each outcome, analyses are conducted with four samples, defined by farmer promoters' goal ambition quartile. Outcomes are winsorized at the 99% level. Bars and numbers stand for point estimates of treatment impact and capped spikes stand for the 95% confidence interval.

Figure B3: Prediction of Setting Effective Goals: Importance Scores of Predictors



Note: The figure reports the importance scores of predictors used in the random forest model that aims to predict which farmer promoters set effective goals. The variable importance scores are normalized by dividing over the maximum score, such as the score of the most important variable is 1.

C Additional Tables

Table C1: Endline Survey Attrition: Goal Reminder Treatment

	(1) Call Attempted	(2) Call Received	(3) Consented	(4) Completed Survey
Received goal reminder	0.002	0.002	-0.001	-0.001
	(0.003)	(0.003)	(0.003)	(0.003)
N	10187	9924	9924	9924
R^2	0.000	0.000	0.000	0.000
Control Mean	0.975	0.980	0.968	0.968

Note: This table compares the survey attrition between farmer promoters in the goal reminder message control group and in the treatment group. Call attempted indicates that the enumerators attempted to reach the individual. Call received indicates that the individual answered the phone. Consented indicates that the individual consented to take the survey. Completed survey indicates that the individual completed the survey as marked by the enumerator. Strata fixed effects are included. Standard errors are robust. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Table C2: Comparison between the Timing of Goal Reminders and the Timing of Farmer Promoters' Work

	(1)	(2)	(3)	(4)
	Subsidized inputs	Demo. plot: # of meetings	Demo. plot: # of farmers trained	Overall
Timing of goal reminder messages and timing of farmer promoters' work				
1st goal reminder	August 30	September 13	September 20	
Work time	Asked in EL	N/A	Asked in EL	
Construction of "on-time sample" indicator variables				
Definition	Input registration works were conducted after Aug. 30	Farmer training works were conducted after Sept. 20		Received either input message or demo. plot message on time
Sample size	1,869 (20%)	4,512 (49%)		5,079 (53%)

Note: "EL" stands for the endline survey. "Sample size" row shows the numbers of farmer promoters who received the goal reminder messages before conducting their works and their corresponding share of the sample that reported work time.

Table C3: The Timing of Farmer Promoters' Work between Experimental Groups

		(1)		(2)		(3)		(3)-(2)
		Total		No Reminder		Goal Reminder		Pairwise t-test
Variable	N	Mean/(SD)	N	Mean/(SD)	N	Mean/(SD)	N	Mean difference
Received input goal reminders on time	9454	0.198	4720	0.207	4734	0.189	9454	-0.018**
		(0.398)		(0.405)		(0.391)		
Received demo. plot goal reminders on time	9186	0.491	4591	0.494	4595	0.488	9186	-0.006
		(0.500)		(0.500)		(0.500)		
Received any goal reminders on time	9595	0.529	4794	0.534	4801	0.525	9595	-0.009
		(0.499)		(0.499)		(0.499)		
F-test of joint significance (P-value)								0.166
F-test, number of observations								9045

Note: The table presents the shares of farmer promoters that received goal reminder messages on-time in the full sample, control group, and treatment group. Standard errors are robust in the t-tests and F-tests. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Table C4: Descriptive Statistics of the On-Time Sample and Delayed Sample

	(1) Total		(2) On-Time Sample		(3) Delayed Sample		(3)-(2) Pairwise t-test	
Variable	N	Mean/(SD)	N	Mean/(SD)	N	Mean/(SD)	N	Mean difference
Age	9590	47.102	5077	47.238	4513	46.949	9590	-0.289
		(9.993)		(10.108)		(9.862)		
Male	9595	0.779	5079	0.780	4516	0.779	9595	-0.001
		(0.415)		(0.414)		(0.415)		
Completed primary education	9595	0.846	5079	0.842	4516	0.850	9595	0.008
		(0.361)		(0.365)		(0.357)		
FP elected	9595	0.950	5079	0.945	4516	0.955	9595	0.011**
		(0.218)		(0.229)		(0.206)		
Experience as FP (yr)	9595	6.656	5079	6.510	4516	6.821	9595	0.311***
		(3.574)		(3.545)		(3.600)		
Live in village (yr)	9595	34.848	5079	34.652	4516	35.069	9595	0.418
		(17.284)		(17.437)		(17.111)		
Reciprocity score (STPS)	9595	-0.003	5079	0.003	4516	-0.010	9595	-0.013
		(0.998)		(1.000)		(0.995)		
Scarcity score (STPS)	9595	-0.005	5079	0.001	4516	-0.012	9595	-0.013
		(1.003)		(1.013)		(0.991)		
Authority score (STPS)	9595	0.000	5079	0.003	4516	-0.003	9595	-0.005
		(1.000)		(1.002)		(0.998)		
Commitment score (STPS)	9595	-0.004	5079	-0.011	4516	0.005	9595	0.016
		(1.000)		(1.017)		(0.982)		
Consensus score (STPS)	9595	-0.003	5079	-0.014	4516	0.009	9595	0.023
		(1.002)		(1.016)		(0.985)		
Liking score (STPS)	9595	-0.000	5079	-0.016	4516	0.017	9595	0.032
		(0.999)		(1.017)		(0.978)		
Extraversion score (Big 5)	9595	0.002	5079	0.008	4516	-0.006	9595	-0.014
		(0.994)		(0.985)		(1.003)		
Agreeableness score (Big 5)	9595	0.003	5079	0.006	4516	0.000	9595	-0.006
		(0.998)		(1.005)		(0.991)		
Neuroticism score (Big 5)	9595	0.001	5079	0.006	4516	-0.005	9595	-0.011
		(1.000)		(1.007)		(0.992)		
Conscientiousness score (Big 5)	9595	-0.002	5079	0.009	4516	-0.015	9595	-0.024
		(0.999)		(0.988)		(1.011)		
Openness score (Big 5)	9595	0.002	5079	0.011	4516	-0.008	9595	-0.019
		(0.998)		(0.997)		(0.999)		
Social desirability score	9595	-0.002	5079	0.006	4516	-0.012	9595	-0.019
		(1.000)		(1.006)		(0.994)		
Baseline survey version	9595	1.862	5079	1.839	4516	1.887	9595	0.048**
		(1.036)		(1.035)		(1.035)		
Number of farmers registered	9589	104.221	5073	99.771	4516	109.220	9589	9.449***
		(80.975)		(79.020)		(82.841)		
Number of trainings held	9394	3.581	4953	3.582	4441	3.580	9394	-0.002
		(1.916)		(1.905)		(1.927)		
Number of farmers trained	9349	60.348	4932	58.851	4417	62.020	9349	3.168***
		(39.536)		(39.101)		(39.954)		
F-test of joint significance (P-value)								0.000***
F-test, number of observations								9343

Note: Data is from the baseline survey. On-time sample and delayed sample are defined based on the overall categorization (i.e., Table C2 Column 4). Strata fixed effects are included in the t-tests and F-test. Standard errors are robust. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level. The baseline survey versions refer to the four versions of survey questions we used to elicit farmer promoters' goals. In all versions, we also asked farmer promoters about their previous performance in terms of absolute magnitudes. In the first and second version of survey, we asked farmer promoters about their goals in terms of absolute magnitudes. The first version asked about goals first, while the second version asked about previous performances first. In the third and fourth version of surveys, previous performances were asked first, and then goals were asked in terms of percentage compared to the previous performance. The third version used a set of low percentage options (i.e., 5%-15%), while the fourth version used a set of high percentage options (i.e., 20%-40%). Performance variables (i.e., number of farmers registered, number of trainings held, and number of farmers trained) refer to performances in the previous year (2021).

Table C5: Descriptive Statistics and Randomization Balance within the On-Time Sample

		(1)		(2)		(3)		(3)-(2)
		Total		No Reminder		Goal Reminder		Pairwise t-test
Variable	N	Mean/(SD)	N	Mean/(SD)	N	Mean/(SD)	N	Mean difference
Age	5077	47.238	2557	47.105	2520	47.373	5077	0.268
		(10.108)		(10.060)		(10.157)		
Male	5079	0.780	2559	0.781	2520	0.779	5079	-0.002
		(0.414)		(0.414)		(0.415)		
Completed primary education	5079	0.842	2559	0.841	2520	0.843	5079	0.002
		(0.365)		(0.365)		(0.364)		
FP elected	5079	0.945	2559	0.941	2520	0.949	5079	0.008
		(0.229)		(0.236)		(0.220)		
Experience as FP (yr)	5079	6.510	2559	6.495	2520	6.525	5079	0.031
		(3.545)		(3.577)		(3.514)		
Live in village (yr)	5079	34.652	2559	34.688	2520	34.615	5079	-0.072
		(17.437)		(17.364)		(17.513)		
Reciprocity score (STPS)	5079	0.003	2559	0.002	2520	0.005	5079	0.003
		(1.000)		(0.999)		(1.001)		
Scarcity score (STPS)	5079	0.001	2559	-0.010	2520	0.013	5079	0.022
		(1.013)		(1.043)		(0.981)		
Authority score (STPS)	5079	0.003	2559	-0.001	2520	0.007	5079	0.008
		(1.002)		(0.998)		(1.007)		
Commitment score (STPS)	5079	-0.011	2559	-0.026	2520	0.004	5079	0.030
		(1.017)		(1.043)		(0.990)		
Consensus score (STPS)	5079	-0.014	2559	-0.029	2520	0.001	5079	0.030
		(1.016)		(1.008)		(1.024)		
Liking score (STPS)	5079	-0.016	2559	-0.015	2520	-0.016	5079	-0.000
		(1.017)		(1.017)		(1.018)		
Extraversion score (Big 5)	5079	0.008	2559	0.009	2520	0.007	5079	-0.002
		(0.985)		(0.983)		(0.988)		
Agreeableness score (Big 5)	5079	0.006	2559	-0.000	2520	0.012	5079	0.012
		(1.005)		(1.019)		(0.990)		
Neuroticism score (Big 5)	5079	0.006	2559	-0.006	2520	0.019	5079	0.026
		(1.007)		(0.991)		(1.023)		
Conscientiousness score (Big 5)	5079	0.009	2559	0.004	2520	0.015	5079	0.011
		(0.988)		(0.999)		(0.977)		
Openness score (Big 5)	5079	0.011	2559	0.024	2520	-0.003	5079	-0.027
		(0.997)		(0.990)		(1.003)		
Social desirability score	5079	0.006	2559	0.008	2520	0.004	5079	-0.004
		(1.006)		(1.005)		(1.007)		
Baseline survey version	5079	1.839	2559	1.847	2520	1.831	5079	-0.015
		(1.035)		(1.048)		(1.022)		
Number of farmers registered	5073	99.771	2557	97.965	2516	101.607	5073	3.643
		(79.020)		(77.260)		(80.744)		
Number of trainings held	4953	3.582	2487	3.556	2466	3.609	4953	0.053
		(1.905)		(1.863)		(1.948)		
Number of farmers trained	4932	58.851	2477	58.192	2455	59.517	4932	1.325
		(39.101)		(38.527)		(39.669)		
F-test of joint significance (P-value)								0.978
F-test, number of observations								4929

Note: Data is from the baseline survey. On-time sample and delayed sample are defined based on the overall categorization (i.e., Table C2 Column 4). Strata fixed effects are included in the t-tests and F-test. Standard errors are robust. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level. The baseline survey versions refer to the four versions of survey questions we used to elicit farmer promoters' goals. In all versions, we also asked farmer promoters about their previous performance in terms of absolute magnitudes. In the first and second version of survey, we asked farmer promoters about their goals in terms of absolute magnitudes. The first version asked about goals first, while the second version asked about previous performances first. In the third and fourth version of surveys, previous performances were asked first, and then goals were asked in terms of percentage compared to the previous performance. The third version used a set of low percentage options (i.e., 5%-15%), while the fourth version used a set of high percentage options (i.e., 20%-40%). Performance variables (i.e., number of farmers registered, number of trainings held, and number of farmers trained) refer to performances in the previous year (2021).

Table C6: Descriptive Statistics and Randomization Balance within the Delayed Sample

		(1)		(2)		(3)		(3)-(2)
		Total		No Reminder		Goal Reminder		Pairwise t-test
Variable	N	Mean/(SD)	N	Mean/(SD)	N	Mean/(SD)	N	Mean difference
Age	4513	46.949	2233	47.216	2280	46.688	4513	-0.529**
		(9.862)		(9.895)		(9.824)		
Male	4516	0.779	2235	0.792	2281	0.765	4516	-0.027*
		(0.415)		(0.406)		(0.424)		
Completed primary education	4516	0.850	2235	0.847	2281	0.852	4516	0.005
		(0.357)		(0.360)		(0.355)		
FP elected	4516	0.955	2235	0.954	2281	0.957	4516	0.003
		(0.206)		(0.210)		(0.203)		
Experience as FP (yr)	4516	6.821	2235	6.875	2281	6.769	4516	-0.106
		(3.600)		(3.600)		(3.599)		
Live in village (yr)	4516	35.069	2235	35.383	2281	34.762	4516	-0.621
		(17.111)		(17.162)		(17.058)		
Reciprocity score (STPS)	4516	-0.010	2235	0.002	2281	-0.022	4516	-0.024
		(0.995)		(0.984)		(1.005)		
Scarcity score (STPS)	4516	-0.012	2235	-0.015	2281	-0.009	4516	0.005
		(0.991)		(0.991)		(0.992)		
Authority score (STPS)	4516	-0.003	2235	0.010	2281	-0.015	4516	-0.025
		(0.998)		(0.975)		(1.020)		
Commitment score (STPS)	4516	0.005	2235	-0.006	2281	0.016	4516	0.021
		(0.982)		(1.006)		(0.957)		
Consensus score (STPS)	4516	0.009	2235	0.017	2281	0.001	4516	-0.015
		(0.985)		(0.986)		(0.985)		
Liking score (STPS)	4516	0.017	2235	0.035	2281	-0.001	4516	-0.036
		(0.978)		(0.962)		(0.993)		
Extraversion score (Big 5)	4516	-0.006	2235	0.003	2281	-0.014	4516	-0.017
		(1.003)		(1.021)		(0.985)		
Agreeableness score (Big 5)	4516	0.000	2235	0.018	2281	-0.018	4516	-0.036
		(0.991)		(0.994)		(0.989)		
Neuroticism score (Big 5)	4516	-0.005	2235	-0.008	2281	-0.001	4516	0.007
		(0.992)		(0.985)		(0.998)		
Conscientiousness score (Big 5)	4516	-0.015	2235	-0.005	2281	-0.024	4516	-0.019
		(1.011)		(1.016)		(1.007)		
Openness score (Big 5)	4516	-0.008	2235	0.009	2281	-0.026	4516	-0.035
		(0.999)		(0.989)		(1.009)		
Social desirability score	4516	-0.012	2235	-0.014	2281	-0.011	4516	0.002
		(0.994)		(0.999)		(0.988)		
Baseline survey version	4516	1.887	2235	1.886	2281	1.888	4516	0.001
		(1.035)		(1.037)		(1.034)		
Number of farmers registered	4516	109.220	2235	107.680	2281	110.730	4516	3.050
		(82.841)		(78.947)		(86.477)		
Number of trainings held	4441	3.580	2200	3.615	2241	3.546	4441	-0.069
		(1.927)		(1.943)		(1.911)		
Number of farmers trained	4417	62.020	2187	62.796	2230	61.259	4417	-1.537
		(39.954)		(40.196)		(39.711)		
F-test of joint significance (P-value)								0.364
F-test, number of observations								4414

Note: Data is from the baseline survey. On-time sample and delayed sample are defined based on the overall categorization (i.e., Table C2 Column 4). Strata fixed effects are included in the t-tests and F-test. Standard errors are robust. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level. The baseline survey versions refer to the four versions of survey questions we used to elicit farmer promoters' goals. In all versions, we also asked farmer promoters about their previous performance in terms of absolute magnitudes. In the first and second version of survey, we asked farmer promoters about their goals in terms of absolute magnitudes. The first version asked about goals first, while the second version asked about previous performances first. In the third and fourth version of surveys, previous performances were asked first, and then goals were asked in terms of percentage compared to the previous performance. The third version used a set of low percentage options (i.e., 5%-15%), while the fourth version used a set of high percentage options (i.e., 20%-40%). Performance variables (i.e., number of farmers registered, number of trainings held, and number of farmers trained) refer to performances in the previous year (2021).

Table C7: The Treatment Impact of Goal Reminders

	# of Farmers Registered			# of Farmers Trained			# of Trainings Held			Overall Performance (Index)		
	(1) Full	(2) On-Time	(3) Delayed	(4) Full	(5) On-Time	(6) Delayed	(7) Full	(8) On-Time	(9) Delayed	(10) Full	(11) On-Time	(12) Delayed
Goal Reminders	1.221	1.640	0.500	0.985	1.814*	0.159	0.028	0.155**	-0.105*	0.029	0.080***	-0.030
	(1.055)	(2.471)	(1.247)	(0.675)	(0.920)	(0.966)	(0.046)	(0.062)	(0.064)	(0.020)	(0.027)	(0.028)
N	9606	1869	7580	9590	4487	4674	9600	4497	4674	9615	5079	4516
R^2	0.021	0.046	0.016	0.026	0.035	0.024	0.005	0.009	0.007	0.026	0.036	0.022
Control mean	94.394	85.949	98.338	60.243	58.011	62.838	3.764	3.625	3.952	-0.004	-0.100	0.111
Control sd	60.674	62.257	59.218	35.092	33.605	36.775	2.248	2.082	2.424	1.039	0.988	1.081

Note: The table reports the effect of goal reminders on self-reported outcomes collected in the endline survey. Outcomes are winsorized at the 99% level. Sample indicates whether farmer promoters received goal reminders before (on-time) or after (delayed) they completed the majority of their activities. Column (1)-(3) use the timing of goal reminders of the subsidized input setting, column (4)-(9) use the timing of goal reminders of the demonstration plot setting, and column (10)-(12) use the combination of the timings from those two settings, such as on-time indicating on-time in either settings. Additional controls include motivational message randomization, farmer promoters' age, gender, education level, elected method, experience as farmer promoters, years lived in the village, 6 STPS scores, 5 Big 5 scores, social desirability score, and baseline survey version numbers, as listed in Table 1. Strata fixed effects are included. Standard errors are robust. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Table C8: The Treatment Impact of Goal Reminders Interacting with Social Desirability

	Overall Performance Index		
	(1)	(2)	(3)
	Full	On-Time	Delayed
Goal Reminders	0.029	0.080***	-0.030
	(0.020)	(0.027)	(0.028)
Social desirability score	-0.000	-0.036*	0.043*
	(0.015)	(0.021)	(0.024)
Social desirability x Reminder	0.000	0.038	-0.047*
	(0.020)	(0.028)	(0.028)
N	9615	5079	4516
R^2	0.026	0.036	0.022
Control mean	-0.004	-0.100	0.111
Control sd	1.039	0.988	1.081

Note: The table presents how the effects of goal reminder on the standardized outcome index vary by farmer promoters' social desirability. Additional controls include motivational message randomization, farmer promoters' age, gender, education level, elected method, experience as farmer promoters, years lived in the village, and baseline survey version numbers, as listed in Table 1. Strata fixed effects are included. Standard errors are robust. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Table C9: The Impact of Goal Reminders on Task Completion Quality and Non-Goal-Setting Tasks

	Demonstration Plot	Individual Tree		Consolidated Land Tree	
	(1) Practice adoption score	(2) # of farmers picked up	(3) # of trees picked up	(4) # of farmers planted	(5) # of trees planted
Goal Reminders	0.006	-0.730	-1.551	1.512	-52.470
	(0.006)	(1.462)	(12.544)	(1.301)	(157.840)
N	1766	6298	6850	6238	642
R^2	0.018	0.010	0.006	0.003	0.055
Control mean	0.787	114.262	1191.440	41.453	3017.303
Control std dev	0.132	57.679	570.190	53.058	2178.653

Note: The table presents how the effect of goal reminders on work quality and activities that have not been set goals. Additional controls include motivational message randomization, farmer promoters' age, gender, education level, elected method, experience as farmer promoters, years lived in the village, 6 STPS scores, 5 Big 5 scores, social desirability score, and baseline survey version numbers, as listed in Table 1. Strata fixed effects are included. Standard errors are robust. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Table C10: The Role of Goal Magnitude (On-Time Sample)

	# of Farmers Registered				# of Farmers Trained				# of Trainings Held			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Goal Reminders	-4.712	0.271	6.283	-5.752	-1.132	3.551*	4.969**	2.183	-0.112	0.252***	0.107	0.259
	(8.027)	(6.097)	(5.226)	(4.939)	(1.890)	(2.116)	(2.077)	(2.088)	(0.269)	(0.095)	(0.112)	(0.161)
N	421	429	484	469	1070	1049	1101	1142	518	1922	1200	730
R^2	0.104	0.105	0.086	0.058	0.060	0.072	0.047	0.044	0.074	0.014	0.022	0.071
Control mean	97.739	94.668	82.959	77.305	60.237	59.964	58.197	54.955	3.942	3.540	3.709	3.499
Control sd	67.576	66.036	59.686	54.792	33.740	34.314	33.032	33.090	2.262	1.969	2.259	1.889
Goal magnitude	0.875	1.172	1.443	2.803	0.827	1.177	1.513	2.880	0.672	1.000	1.381	2.102

Note: The table reports the effect of goal reminders on performance using the on-time sample. Outcomes are winsorized at the 99% level. Farmer promoters are divided into goal ambition quartiles. Additional controls include motivational message randomization, farmer promoters' age, gender, education level, elected method, experience as farmer promoters, years lived in the village, 6 STPS scores, 5 Big 5 scores, social desirability score, and baseline survey version numbers, as listed in Table 1. Strata fixed effects are included. Standard errors are robust. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Table C11: The Role of Goal Magnitude (Delayed Sample)

	# of Farmers Registered				# of Farmers Trained				# of Trainings Held			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Goal Reminders	4.052	1.133	0.093	-0.211	-1.124	1.370	-0.802	1.652	-0.699***	-0.078	0.122	-0.203
	(3.390)	(2.241)	(2.343)	(2.845)	(2.218)	(2.025)	(2.163)	(2.719)	(0.196)	(0.091)	(0.141)	(0.192)
N	1873	1914	1975	1664	1150	1156	1186	1070	566	2065	1249	682
R^2	0.029	0.031	0.031	0.034	0.058	0.055	0.046	0.028	0.062	0.014	0.024	0.032
Control mean	106.548	101.425	96.096	88.336	65.235	62.852	62.470	61.457	4.405	3.806	3.915	4.069
Control sd	65.516	57.896	55.727	55.627	37.395	36.770	36.578	36.162	2.823	2.309	2.274	2.568
Goal magnitude	0.881	1.168	1.436	2.607	0.836	1.175	1.510	2.831	0.670	1.000	1.385	2.111

Note: The table reports the effect of goal reminders on performance using the delayed sample. Outcomes are winsorized at the 99% level. Farmer promoters are divided into goal ambition quartiles. Additional controls include motivational message randomization, farmer promoters' age, gender, education level, elected method, experience as farmer promoters, years lived in the village, 6 STPS scores, 5 Big 5 scores, social desirability score, and baseline survey version numbers, as listed in Table 1. Strata fixed effects are included. Standard errors are robust. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Table C12: Comparisons of Baseline Characteristics among Farmer Promoters

	Mean (SD)	Coefficient (SE)	N. of Observations
	(1)	(2)	(3)
	Ineffective goals	Effective goals	
Age	47.9	-0.352**	15,639
	(10.1)	(0.172)	
Experience FP (yr)	6.961	0.063	15,639
	(3.471)	(0.058)	
Live in village (yr)	36.2	0.358	15,639
	(17.8)	(0.299)	
Male	0.780	-0.015**	15,639
	(0.414)	(0.007)	
Scarcity (STPS)	0.005	0.017	15,639
	(0.987)	(0.017)	

Note: This table compares the baseline characteristics that are the top five predictors of the random forest model between farmer promoters who set ineffective goals vs who set effective goals. Standard errors are clustered at the farmer promoter level. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Table C13: Descriptive Statistics on Farmer Promoters' Characteristics by Their Goal Ambition Levels

	(1)		(2)		(3)		(4)		(2)-(1)		(3)-(1)		(4)-(1)	
	Q1		Q2		Q3		Q4		Pairwise t-test					
Variable	N/Clusters	Mean/(SD)	N/Clusters	Mean/(SD)	N/Clusters	Mean/(SD)	N/Clusters	Mean/(SD)	N/Clusters	Mean difference	N/Clusters	Mean difference	N/Clusters	Mean difference
Age	6169	48.053	9409	47.555	7833	46.674	6339	46.676	15578	-0.499***	14002	-1.380***	12508	-1.377***
	4621	(12.891)	6697	(13.000)	5747	(12.079)	4683	(12.627)	8470		8367		7750	
Male	6173	0.780	9417	0.774	7836	0.779	6342	0.788	15590	-0.006	14009	-0.001	12515	0.009
	4623	(0.520)	6701	(0.540)	5750	(0.524)	4685	(0.511)	8475		8372		7753	
Completed primary education	6173	0.838	9417	0.853	7836	0.859	6342	0.839	15590	0.015**	14009	0.021***	12515	0.000
	4623	(0.462)	6701	(0.452)	5750	(0.440)	4685	(0.466)	8475		8372		7753	
FP elected	6173	0.960	9417	0.959	7836	0.955	6342	0.943	15590	-0.001	14009	-0.004	12515	-0.017***
	4623	(0.243)	6701	(0.250)	5750	(0.258)	4685	(0.298)	8475		8372		7753	
Experience as FP (yr)	6173	6.927	9417	6.883	7836	6.732	6342	6.492	15590	-0.045	14009	-0.196***	12515	-0.435***
	4623	(4.370)	6701	(4.471)	5750	(4.341)	4685	(4.529)	8475		8372		7753	
Live in village (yr)	6173	35.307	9417	35.530	7836	34.562	6342	34.381	15590	0.223	14009	-0.745**	12515	-0.926***
	4623	(22.516)	6701	(22.106)	5750	(21.053)	4685	(21.763)	8475		8372		7753	
Reciprocity score (STPS)	6173	0.012	9417	0.017	7836	-0.011	6342	-0.018	15590	0.005	14009	-0.023	12515	-0.029
	4623	(1.263)	6701	(1.249)	5750	(1.282)	4685	(1.361)	8475		8372		7753	
Scarcity score (STPS)	6173	-0.015	9417	0.030	7836	0.014	6342	-0.043	15590	0.045***	14009	0.029	12515	-0.028
	4623	(1.211)	6701	(1.276)	5750	(1.283)	4685	(1.314)	8475		8372		7753	
Authority score (STPS)	6173	0.006	9417	0.016	7836	-0.007	6342	-0.008	15590	0.010	14009	-0.013	12515	-0.014
	4623	(1.251)	6701	(1.247)	5750	(1.303)	4685	(1.277)	8475		8372		7753	
Commitment score (STPS)	6173	-0.028	9417	0.026	7836	0.006	6342	-0.007	15590	0.053***	14009	0.034*	12515	0.021
	4623	(1.323)	6701	(1.237)	5750	(1.266)	4685	(1.329)	8475		8372		7753	
Consensus score (STPS)	6173	-0.021	9417	0.040	7836	-0.020	6342	-0.019	15590	0.061***	14009	0.001	12515	0.002
	4623	(1.275)	6701	(1.263)	5750	(1.284)	4685	(1.284)	8475		8372		7753	
Liking score (STPS)	6173	0.024	9417	0.014	7836	-0.009	6342	-0.031	15590	-0.010	14009	-0.033*	12515	-0.055***
	4623	(1.196)	6701	(1.275)	5750	(1.301)	4685	(1.324)	8475		8372		7753	
Extraversion score (Big 5)	6173	0.011	9417	0.005	7836	0.014	6342	-0.033	15590	-0.006	14009	0.004	12515	-0.044**
	4623	(1.258)	6701	(1.291)	5750	(1.221)	4685	(1.304)	8475		8372		7753	
Agreeableness score (Big 5)	6173	-0.019	9417	0.027	7836	0.002	6342	-0.027	15590	0.046***	14009	0.021	12515	-0.008
	4623	(1.268)	6701	(1.267)	5750	(1.257)	4685	(1.295)	8475		8372		7753	
Neuroticism score (Big 5)	6173	-0.028	9417	-0.005	7836	0.009	6342	0.008	15590	0.023	14009	0.037**	12515	0.036*
	4623	(1.231)	6701	(1.263)	5750	(1.288)	4685	(1.280)	8475		8372		7753	
Conscientiousness score (Big 5)	6173	-0.003	9417	-0.000	7836	0.010	6342	-0.002	15590	0.003	14009	0.014	12515	0.001
	4623	(1.238)	6701	(1.318)	5750	(1.259)	4685	(1.267)	8475		8372		7753	
Openness score (Big 5)	6173	-0.023	9417	0.016	7836	0.020	6342	-0.031	15590	0.039**	14009	0.043**	12515	-0.007
	4623	(1.338)	6701	(1.264)	5750	(1.230)	4685	(1.248)	8475		8372		7753	
Social desirability score	6173	-0.037	9417	0.035	7836	-0.012	6342	-0.018	15590	0.071***	14009	0.025	12515	0.019
	4623	(1.238)	6701	(1.259)	5750	(1.267)	4685	(1.281)	8475		8372		7753	
Baseline survey version	6173	1.874	9417	1.995	7836	1.721	6342	1.820	15590	0.121***	14009	-0.153***	12515	-0.054***
	4623	(1.148)	6701	(1.431)	5750	(1.182)	4685	(1.371)	8475		8372		7753	
Number of farmers registered	6173	127.407	9417	107.364	7836	101.663	6340	88.256	15590	-20.043***	14009	-25.744***	12513	-39.151***
	4623	(126.612)	6701	(91.782)	5750	(86.777)	4684	(87.625)	8475		8372		7752	
Number of trainings held	6153	4.235	9403	3.564	7822	3.444	6328	3.247	15556	-0.670***	13975	-0.790***	12481	-0.988***
	4603	(3.291)	6687	(2.149)	5736	(2.063)	4671	(2.027)	8441		8338		7719	
Number of farmers trained	6149	71.629	9393	62.813	7818	58.002	6317	47.888	15542	-8.817***	13967	-13.627***	12466	-23.741***
	4599	(63.067)	6677	(48.865)	5732	(42.407)	4660	(39.283)	8427		8330		7704	
F-test of joint significance (P-value)										0.000***		0.000***		0.000***
F-test, number of observations										15530		13960		12457
F-test, number of clusters										8422		8325		7700

Note: This tables shows how farmer promoters characteristics vary across goal ambitions. The analysis sample includes the three goals set in baseline survey for each farmer promoter. Strata fixed effects are included. Standard errors are clustered at farmer promoter level. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Table C14: Confusion Matrix of the Random Forest Model

	Predicted goal types		
True goal types	Ineffective goals	Effective goals	Total
Ineffective goals	1,255	2,065	3,320
Effective goals	1,475	3,024	4,499
Total	2,730	5,089	7,819

Note: This tables shows the confusion matrix of the validation sample of the random forest model, which aims to predict which farmer promoters set effective goals. The analysis sample includes the three goals set in baseline survey for each farmer promoter.

Table C15: Classification Report of the Random Forest Model

True goal types	Precision	Recall	F-1	Support
Ineffective goals	0.460	0.378	0.415	3,320
Effective goals	0.594	0.672	0.631	4,499
Macro average	0.527	0.525	0.523	
Weighted average	0.537	0.547	0.539	

Note: This tables shows the classification report of the validation sample of the random forest model, which aims to predict which farmer promoters set effective goals. The analysis sample includes the three goals set in baseline survey for each farmer promoter.

Table C16: The Impact of "Goal Effectiveness" on Performance (IV Second Stage)

	# of Farmers Registered	
	(1)	(2)
Goal on # of farmers registered	0.095	
	(0.275)	
Set effective goals on # of farmers registered		7.685
		(19.759)
N	5051	4949
R^2	0.357	0.340
F-statistics	12.462	26.001
Control mean	98.525	99.035
Control sd	61.701	61.693

Note: The table presents the 2SLS estimates using the random order of questions as instruments for (1) goal magnitude and (2) effective goal dummy indicator. Additional controls include number of farmers registered in the previous year, motivational message randomization, farmer promoters' age, gender, education level, elected method, experience as farmer promoters, years lived in the village, 6 STPS scores, 5 Big 5 scores, and social desirability score, as listed in Table 1. Strata fixed effects are included. Standard errors are robust. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.