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Improving Workers' Performance in Small Firms: A Randomized Experiment on Goal Setting in Ghana*

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Abstract

We report the results of a cost-effective intervention to improve workers' performance in small cassava processing firms in Ghana. We train workers to track their daily output and then randomly assign a sub-sample to set daily production goals. Achieving or missing a goal does not carry monetary consequences.

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Goal setting increases workers' output by 16%, their productivity by 8% and the average product of labor in firms by 13%. Goal setting is particularly effective for piece-rate workers, increasing their output by 32% and productivity by 24%. While not conclusive, evidence suggests that goals serve as a self-regulation device.

Keywords: Behavioral Constraints; Goals Setting; Management Practices; Small Firms; Informal Businesses.

JEL Codes: O12; L26; M20; O31; O33; O35; O17; M50

I Introduction

Small firms are the main source of employment in developing countries (see, e.g. Gollin, 2008). Understanding how to foster their development is thus an important research and policy goal. The vast literature studying this question focuses on three main constraints to growth: capital (De Mel et al., 2008; Banerjee and Duflo, 2014), technology (Alfaro-Serrano et al., 2021; Suri and Udry, 2022; Verhoogen, 2023) and managerial practices (McKenzie, 2021; McKenzie et al., 2023). Less is known about how to directly improve workers' performance, in spite of the fact that this lies at the core of firms' productivity (Bloom and Van Reenen, 2011).[1]

Enhancing workers' performance often hinges on effective motivation strategies. While monetary incentives, like performance-based pay, bonuses, and the threat of job loss are well-understood in western countries, their implementation and effectiveness in developing countries is less obvious (McKenzie and Woodruff, 2017). For example, Davies and Fafchamps (2022) show that identical monetary incentives yield different outcomes in India and the UK. In experiments in Ghana, Bandiera and Fischer (2013) find that performance-based pay does not boost effort supply, and

[1]Capital, technology, managerial practices and labor are the typical factors included in firms' production functions. Some scholars interpret managerial practices as part of the technology shifter of a production function (Bruhn et al., 2010).

Davies and Fafchamps (2021) observe that employers use neither monetary rewards nor punishments to promote effort.[2]

Building on this literature, this paper explores the potential of non-monetary incentives to enhance workers' performance in small firms, in developing countries. In particular, we focus on non-binding production goals due to their low costs and their ease of implementation.[3] Laboratory experiments in western countries have shown that these type of goals can be effective (Locke and Latham, 2002), but there is scant research on whether this holds also in other contexts.

We design and conduct a field experiment with small cassava processing firms in Ghana.[4] A total of 425 firms was assigned to a *No Intervention* group ($N = 110$), a *Production* measurement group ($N = 105$), and a production measurement plus *Goals* setting group ($N = 210$). Firm owners and employees in *Production* and *Goals* were invited to attend a training where they were instructed to measure and record the amount of cassava peeled per employee during a shift. Each trained worker received an aluminum bowl of a standardized size to place the peeled cassava and a booklet with a unique ID code to keep production records.

All firms in *Production* and *Goals* were instructed to follow the production measurement protocol during peeling days, for eight weeks. In addition, firms in *Goals* were re-visited in week four and trained to set and record employees' daily production goals for the remaining four weeks, while they continued measuring daily production.

[2]Small firms in developing countries may refrain from using monetary incentives because they face larger resource and borrowing constraints. In addition, weak institutions may hinder the enforcement of work contracts and employers thus rely on informal mechanisms, such as long-term relationships based on trust and reputation, to sustain performance (Macchiavello and Morjaria, 2021).

[3]In Section II and V.C we argue that, in our context, goal attainment is neither bound to financial incentives nor to informal rewards, such as praise and recognition.

[4]We focus on agricultural firms because they are a major source of employment. Since work is tedious and repetitive, motivating workers can be challenging (Fafchamps, 1993; Kaur et al., 2010) and labor productivity is typically low (Gollin et al., 2014).

In addition, we collect survey data before the start of intervention and four months after its end. We mainly use these data for descriptive purposes and to explore mechanisms. Firms in the *No Intervention* group did not receive any training, but only took part in the surveys. This design delivers a unique panel data set spanning over eight weeks, with workers as the unit of observation and days as the time dimension. We focus on the following three main performance indicators, measured at the worker-day level: i) number of bowls peeled, ii) time spent peeling, and iii) productivity defined as the number of bowls filled per hour. As a measure of firm's performance, we use the daily average product of labor. We then estimate the effect of goal-setting on performance with a difference-in-difference approach, where performance in *Goals* is compared to that in *Production* before and after the goal-setting training.

We find that setting goals has large effects on performance: workers trained in this practice peel on average 0.82 extra bowls of cassava per day compared to workers who only measure production, which corresponds to an increase of 16% (0.31 of a standard deviation). Furthermore, workers in *Goals* peel cassava for 40 minutes extra per day, which corresponds to an increase of 8% in working time (0.20 of a standard deviation). Hourly productivity increases by 0.07 bowls, that is around 8% (0.14 of a standard deviation). This translates in large productivity gains for firms: the average productivity of labor increases by 0.66 bowls per worker, that is 13% more than in firms assigned to *Production* (0.26 of a standard deviation).[5] Goal setting behavior is quite heterogeneous: around 50% of workers tend to underachieve their goals, about 20% exactly achieve them and less than one-third tend to surpass them. Interestingly, goals improve performance of all three types. Reassuringly, goal setting does not decrease workers' well-being, and it does not increase inequality in earnings within firms.

[5]These results are in line with results from laboratory experiments which report an increase in production due to goal setting between 14% (Brookins et al., 2017) and 28% (Corgnet et al., 2018).

In terms of mechanisms, we assess whether workers' behavior is consistent with goals being reference points that act as self-regulation devices. This is the main channel proposed by the economics literature (Koch and Nafziger, 2011; Hsiaw, 2013; Kaur et al., 2015), and one that emerged from discussions with cassava processors during pilots. We present several pieces of evidence that, while not conclusive, are in line with workers using goals to mitigate self-control problems. First, we find that goal setting is more effective for workers paid piece-rate as compared to flat-rate. This suggests that before the training, workers paid piece-rate were not achieving their desired level of production and earnings. Setting goals may have released a behavioral friction - plausibly a lack of self-control - that was limiting their performance. Second, we test whether the effects of the intervention are larger for workers who are likely to have self-control problems, where these are proxied by a number of observable characteristics, such as savings, life satisfaction and impatience (Cobb-Clark et al., 2022). We find suggestive evidence that the intervention was more helpful for workers that are more likely to need a commitment device.

We also evaluate alternative mechanisms that could potentially explain the effectiveness of the goal-setting intervention. First, we show that while goals seem to have ignited competition among co-workers, this channel alone cannot explain our results. We then discuss whether goal-setting may have increased monitoring by firm owners and workers' signaling efforts. We argue that these channels are likely to be of limited importance because labor supply in the sector is scarce, workers and employers are often in long-standing relations, and there is no scope for promotion or firing within the firms. Most important, monitoring and signaling should also concern workers paid flat-rate but the intervention is not effective for them.

An important question is whether the effects of goal-setting persist over time. Goal setting was positively perceived by both employers and workers alike, and four months after the end of intervention, they stated that they intend to continue setting

goals. Moreover, the practice seems to have diffused among firms in *Production*, which is an indication of how easily scalable and transferable the practice may be. Finally, in Online Appendix F we present ballpark figures of the costs and benefits associated to goal setting, for firms and workers. Results depend on the payment scheme in place at the firm. Setting goals is highly cost-effective for firms that pay workers piece-rate: we estimate a monthly increase in profits of about \$319 (33%), which more than offsets the necessary investment costs of \$45. Workers paid piece-rate gain approximately \$40 extra per month (30%), and increase leisure time by 21%. In contrast, goal setting does not seem to be beneficial for firms that pay their workers flat-rate, as the investment costs are not matched by a sufficient increase in output. Workers paid flat rate spend 8% more time at work, but the increase is not statistically significant. We do not observe a decrease in well-being among these workers.

Our paper contributes to three strands of literature. First, it adds to a broad literature studying how to improve small firms' productivity in developing countries. More specifically, we add to the literature on training for small businesses in developing countries (see McKenzie et al., 2023, for a review). While this literature primarily concentrates on training entrepreneurs, we also train workers. Second, most interventions in this literature teach a wide range of management practices, while we focus only on setting goals.[6] Third, the mode of knowledge transfer in these studies is often resource-intensive including business consulting, classroom teaching, mentoring, outsourcing, or peer interactions. Our training only lasts 1-hour and is fairly inexpensive. Finally, while this literature mostly focus on survey outcomes measured at

[6]Some interventions include aspects of goal setting. For example, Batista and Seither (2019) find that encouraging firm owners in Mozambique to set realistic goals have positive effects on savings and effort levels, while McKenzie et al. (2022) show that inducing higher financial aspirations among poor entrepreneurs in the Philippines does not have positive effects on savings and investments. We deviate from these studies substantially as our focus is to improve workers' performance, rather than overall firms' performance.

the firm-level, we focus on worker-level outcomes measured several times during the intervention.

This paper also contributes to the literature on goal setting.[7] We show that goals can be a cost-effective tool to increase workers' performance in a non-western work setting. This is relevant not only for research, but also for policy, as it offers a simple and scalable solution to enhance productivity in sectors where it is traditionally low. To the best of our knowledge, the only other paper reporting on a field experiment with production goals in a developing country is Kaur et al. (2015). They find that workers choose contracts where missing a goal is associated with a strong monetary penalty, and interpret this as evidence that goals are used as self-regulation devices. We show that goal setting is very effective also when it is not associated with monetary rewards for achieving a goal or monetary penalties for failing to reach a goal, which can be costly for both employers and employees alike.[8]

Finally, our paper adds to a literature that tests non-monetary incentives, such as recognition, oral praise and feedback to increase workers' performance. Most of these studies are conducted in western countries (see List and Rasul, 2011, for an overview). Evidence from the developing world comes from studies with agents in the public health sector (Ashraf et al., 2014), and from laboratory settings (Davies and Fafchamps, 2017). In the context of firms, Adhvaryu et al. (2021) explore the effect of a communication platform for workers to anonymously communicate grievances to human resource officers in a large manufacturing firm in India. They find effects of this tool on job attrition and absenteeism, but no effects on productivity. Our study demonstrates that a simple non-monetary tool like goal-setting can foster labor performance in small, informal firms.

[7] We summarize the goal-setting literature in Table D.28 in the Online Appendix.

[8] Another difference is that their experiment is conducted in a data-entry firm in India, which represent an arguably more amenable setting to introduce work practices compared to rural, small firms, in Ghana.

The rest of the paper is structured as follows. In Section II we review the goal setting literature and explain why goals can improve workers' performance. In Section III we outline the research design, in Section IV we present the data and empirical approach, in Section V we describe the results. Conclusions are drawn in Section VI.

II Conceptual Framework

Goal setting is a commonly used practice to promote personal growth and improve performance on the job. The importance of goals was first acknowledged by psychologists, who recognized that the process of setting goals forces individuals to devote more attention to a certain task, bringing that task to the front of mind and inducing the individual to make plans that would not be made otherwise. Goals thus provide structure, organization, and focus in a task (Locke and Latham, 2002).

Economists and management scholars have leveraged these insights from psychology, proposing decision making models to understand goal setting behavior and its effectiveness. We draw inspiration from the seminal models by Koch and Nafziger (2011) and Hsiaw (2013), who show that goals are reference points that act as self-control devices for time inconsistent decision makers. Both papers propose a dual self model where agents are present biased and have reference-dependent preferences. Agents' utility depends on a material outcome and on a psychological payoff, derived from the comparison of this outcome to a non-binding, self-chosen goal. Since goals act as reference points, setting goals is a powerful tool of self-regulation because agents work hard to avoid the psychological cost of falling short.

The notion that goals are commitment devices is supported by empirical studies. For instance, Kaur et al. (2015) investigate the demand for contracts that include a monetary penalty for failing to meet a goal. In their study, achieving the goal resulted in a standard piece rate, whereas not meeting it led to a halved rate. Their findings

revealed that workers frequently opted for contracts with ambitious goals, motivating themselves and increasing their output. The laboratory experiment by Corgnet et al. (2015) provides direct evidence that goals help subjects to avoid distractions. The authors found that non-binding goals not only increase production, but also reduce the time spent on leisure activities during working hours.

Notably, most of the existing evidence on goal setting originates from Western countries and to the best of our knowledge, this study is the first to test whether goals are effective for small firms, in a developing context.[9] There are several reasons why the effectiveness of goals may be different for a low-income population as compared to a high-income or Western one. First, low-income populations may have different cultural norms and values that influence their approach to goal setting (Hofstede, 2001). In many cases, immediate survival needs may take precedence over long-term planning, making goal setting less important or less prioritized. Second, as indicated in Section IV.A, goal setting was not a common practice prior to our intervention. Without prior experience or success in goal setting, individuals might be less motivated and confident in their ability to set and achieve goals, leading to different outcomes compared to populations where goal setting is a more familiar concept (Locke and Latham, 2002). Finally, low-income individuals often experience higher levels of stress and uncertainty, which can impact their cognitive load and decision-making processes (Mani et al., 2013). This could affect their ability to engage with their goals, as they might be more focused on addressing immediate concerns rather than long-term objectives.

[9]The papers by Kaur et al. (2015), Batista and Seither (2019) and McKenzie et al. (2022) constitute an exception (c.f. the Introduction section). However, their focus is not on testing whether goals increase workers' performance.

III Research Design

III.A Study Setting

The study was conducted in the south east of Ghana, where the bulk of the nation's cassava is produced.[10] Our sample consists of traditional micro and small cassava processors situated in rural areas. We describe the firms' characteristics at the beginning of Section IV.

Cassava processing has several features that make it an ideal sector for the purposes of this study. First, the sector has economic relevance in African economies. Cassava is an important staple for both the diets and incomes of rural farmers in West Africa, and in Ghana in particular. Cassava forms approximately 26% of the per capita daily consumption in Ghana, and 22% of the agricultural gross domestic product (Fao, 2005). The Government of Ghana has targeted cassava cultivation and processing as a way to support food security and incomes among the poor (Angelucci, 2013). Given cassava's economic importance, improving labor management in this sector can have important implications for the livelihoods of many people.

We focus on the first stage of cassava processing, which involves peeling the tubers.[11] Cassava is a highly perishable crop which deteriorates 2-3 days after harvest, and it is thus crucial to peel the tubers as quickly as possible. Although other phases of the processing have been relatively mechanized, the peeling stage presents technological challenges and is still largely done by hand (Seth, 2020). It is a labor-intensive

[10] For budgetary reasons, we limited our study to four districts encompassing 36 communities in total. The four districts are: Nsawam-Adoagyiri (15 communities), Ayensuano (5 communities), Akuapem North (15 communities) and Upper West Akyem (1 community). The districts were selected on the basis of their vicinity to Accra, where IPA's central office is located.

[11] Cassava is later processed into gari through a process that involves cutting the raw tubers, grinding these tubers into a mash, and fermenting and pushing this mash through a sieve. The ensuing pieces of cassava are fried, resulting in a crispy, granulated product similar to couscous.

task that demands specific manual skills, making it unsuitable for everyone. This work is typically performed by younger workers, who possess the dexterity required for the job. The peeling stage is ideal for product measurement and goal setting, as it is simple, measurable, and comparable across all cassava processors. Furthermore, it does not rely upon electricity, which is unpredictable in Ghana.

Lastly, cassava firms share features with other agro-processing industries in developing countries, which increases the external validity of our study. For example, the production of cereals, palm oil, honey, and other goods operates on a similar scale and is often characterized by informal labor relations. The lessons learned by studying cassava processing should thus be transferable to other sectors. To implement the study, we partnered with Innovation for Poverty Action (IPA) Ghana and the National Board for Small Scale Industries (NBSSI), a public sector organization under the Ministry of Trade and Industry. Among other responsibilities, NBSSI serves as the principal government agency for developing, implementing, and monitoring programs that enable private sector businesses to grow. This partnership allowed us to harness NBSSI's extensive network of firms. Furthermore, we trained NBSSI employees to conduct the training sessions with firms, which were subsequently implemented by IPA and NBSSI employees in tandem.

III.B Sampling

Due to the absence of a representative list of cassava processors in the study area, we created a list of 1052 cassava processing firms identified with the support of NBSSI. Out of these 1052 firms, 859 satisfied the conditions to participate in our study. The conditions were: a) to be a gari producing firm that has cut and peeled cassava daily over the past six months, and plans to continue operations over the next six months; b) to have 3 to 20 employees who peel cassava regularly and c) to be interested in participating in the research project. Out of these 859 firms, the study sample was

generated on the basis of additional criteria, as collected during the listing. These criteria were (a) to have processed cassava over the last six months, and to intend to continue processing cassava over the next six months, (b) to have employees that peel cassava during both high and low seasons, (c) to employ between 2 and 20 employees during low season, (d) to peel cassava at least once a week, (e) the firm is not formally registered as a business, and (f) the firm has not received assistance from NBSSI in the prior 6 months. This sampling procedure resulted in 595 eligible firms.

III.C Experimental Design and Timeline

We randomly selected 425 firms out of the 595 eligible ones. Each firm was visited by an enumerator who administered a pre-intervention survey to the firm owner and afterward, to the two employees that peeled more often at the firm.[12] Further we required that workers were at least 18 years old, had peeled cassava at least once at the firm, and were planning to continue peeling for the following six months.[13] The stated aim of the survey was to learn more about the firm and the employees, nothing was mentioned about the intervention. It is important to note that, unlike in most RCTs, the pre-intervention survey was not implemented to measure the main outcome of interest, i.e. peeled cassava, because firms did not have a systematic way to do so prior to our intervention. We implemented a pre-intervention survey to collect information on firms and workers that would allow to test statistical balance on observable characteristics after randomization, to study socio-demographics determinants of goal-setting behavior, and to perform treatment heterogeneity analysis.

After completion of the pre-intervention survey, the firms were randomly assigned

[12]Firms are usually run by one person, so we use the terms firm owner and employer interchangeably.

[13]If one employee was unavailable on that day, a third employee that works frequently at the firm was interviewed. We focused on employees who work frequently to maximize the chance that they could be observed during the entire duration of the study.

to a *No Intervention* group ($N = 110$), a *Production* measurement group ($N = 105$), and a production measurement plus *Goals* setting group ($N = 210$).[14] The random assignment was stratified on number of employees, profits (positive or negative), employer's life satisfaction, and age (median split). In addition, firms were randomly assigned to be trained either by a pair of representatives from both NBSSI and IPA, or exclusively by an IPA representative.[15]

Firms in the *No Intervention* group did not receive any training, while all firms assigned to either *Production* or *Goals* were invited to participate in a training on production measurement. We included a group of firms that is only surveyed, and not trained, to shed light on potential effects of production measurement on its own, and to study mechanisms and spillovers. During the training, firms were instructed to follow a protocol to measure and record the amount of cassava peeled per employee, per day. Since our aim was to minimize interferences with existing processes, during the pilot phase we studied these processes and later co-designed the training with a group of cassava processors and peelers who are excluded from the actual intervention.

The training was offered to both employers and employees, and was very short: it lasted about one hour and was held within the premises of the firms to minimize participation costs. While the firms who participated in our project had not received training from NBSSI before, these are not unusual in this sector, as the boards' role is to build the capacities of small and medium firms in Ghana. Due to budgetary limitations of the study, a maximum of four employees per firm were allowed to participate in the training. Workers who answered the pre-intervention survey were

[14] Twice as many firms were assigned to *Goals* as to *Production* because we initially planned to implement both self-chosen and exogenously given goals. We later opted only for the first treatment because it was a more natural intervention for the context. Additionally, oversampling in *Goals* is useful for the analysis of goal setting behavior.

[15] In total the field team consisted of an IPA Research Associate, an IPA Field Manager, two IPA Team Leaders, two IPA Auditors, 14 BAs and 21 MOs. The training sessions were conducted either by a trained NBSSI Business Advisor (BA) and an IPA Monitor Officer (MO), or only by an IPA MO.

approached again and firm owners were allowed to add a maximum of two workers to the training. Considering that the median number of workers per firm is 4, firm owners had very little scope for selecting workers; we address selection issues in Section

Four months after the end of the intervention, we contacted all the firm owners and employees who took part in it and who had answered the pre-intervention survey, to answer a post-intervention survey. The purpose of this survey was to collect data on individual outcomes that may have been affected by the intervention, such as subjective well-being or preferences for competition, and which help to shed light on potential mechanisms through which goals operate. Furthermore, we collected data to study persistence of the goal setting practice after the intervention.

III.C.1 Production Measurement and Goal Setting Training

At the beginning of the production measurement training, trainers introduced a set of tools: a booklet for each employee, one aluminum bowl of a standardized size per employee, a mobile-phone with a camera, a video outlining the protocol, and miscellaneous utensils (e.g. pencils, sheets, stickers, markers). During the pilot, we observed that peeled cassava was placed in containers of different sizes and shapes, or on piles on the floor. We thus provided firms with metal bowls to homogenize production measurement within and across firms (see Figure C.3 in Online Appendix).[16] Each employee was also given his/her own production booklet with a unique ID code and the names of both employee and employer on the front cover. On each page, the booklet had an illustration of twelve numbered cassava bowls and at the top of the page, the following was written: 'Today, I peeled this many bowls of cassava'. A picture of the production booklet can be found in Online Appendix (see Figure C.4). The design of the booklets and protocol is the result of careful piloting and consultations with employers and workers.

[16]We did not provide scales to weight the cassava bowls because this option was both very expensive and perceived as too time consuming by the employers.

Once the tools were presented, the following protocol was outlined to employers and employees. At the beginning of each working day, the employer would place a pre-printed sticker on the bowl with the employer's and employee's ID and name, and the date of peeling. The date and the starting time of peeling was recorded in the booklet. The employee started peeling cassava, placing the peeled cassava into her uniquely identified bowl. Once a bowl was filled, the employer took a time-stamped photograph of the bowl and marked one bowl on the booklet. At the end of the working shift, the employer wrote down the end time, and placed a thumb print or signature.[17] We collected the photographs of bowls and booklets on a weekly basis to ensure that we could intervene if any firm was failing to record their production accurately.

Firms in *Goals* and *Production* were instructed to follow the production measurement protocol for eight weeks. Firms in *Goals* did not know that they were going to be trained in goal setting; they were re-visited in week four and trained to set production goals for the remaining four weeks. The protocol for setting goals was as follows. At the beginning of each working day, the worker chose how many bowls of cassava he/she wanted to peel. We chose daily goals, as opposed to goals that span a longer time horizon, as they may better facilitate self-control (Koch and Nafziger, 2016). Employers and employees were allowed to discuss the daily goal. To avoid production goals being altered after the work was completed, we instructed employers to take a picture of the booklet right after the goal was agreed upon (see Figure C.5 in Online Appendix).[18] Thereafter, they had to follow the same production measurement

[17]Bowls not filled to the brim were only considered if they were the last bowl of the employee for that peeling day. Any bowl that was not filled to the brim with peeled cassava was considered a half bowl. In this case, the employer was to indicate a half bowl in the booklet.

[18]The production and goals booklets were identical, with the exception of an illustration of 12 numbered bowls at the top of each page with the sentence 'Today, my goal is to peel this many bowls of cassava'. At the bottom of each page, there was an illustration of 12 numbered bowls representing the actual number of bowls filled on

protocol described above.

One may worry that employers or workers could take many photographs of the same bowl, take pictures of someone else's work, or put a filler in the bottom of the bowls to make it look like they peeled more. Cheating would not bring any material benefit, but workers in *Goals* may cheat to convince themselves they can reach their goals, or to avoid feeling like they have failed. Thanks to the protocol, cheating was quite complicated, as it would require a worker to take multiple pictures of the same bowl at different times during the work shift. This is difficult to do without the complicity of the firm owner and of other workers. Even though we deemed data falsification to be very unlikely, we introduced spot checks by IPA monitors. A monitor visited each firm at least once to assess the firm's progress, collect data on production, and retrain on protocols if necessary.

While there were no monetary incentives to comply with the protocols, at the end of the project employers and workers received a certificate of participation in the training upon following the protocol. This was an informal recognition, with no instrumental value.[19] We made it explicit that the phone and bowls were tools to be used only for the duration of this exercise, that they would be recollected at the end of the training, and that firms would not receive any reward based on how much cassava was peeled.

We took measures to mitigate the possibility of treatment contamination. Animosity and envy can breed among community members when an intervention carries material gains, or is a funding source. Since our intervention was not material in nature, the possibility of creating frictions between two treated firms in the same community was low. Furthermore, training sessions were conducted in private, firms

that day.

[19]We have chosen this type of recognition because in the pilot we learned that a certificate would be appreciated and because we did not want to tie their participation to material incentives.

were asked to keep their materials private, and trainers emphasized that the data generated from the intervention was strictly confidential.

The timeline of the project was as follows. In October and November 2016 we listed cassava processors. From May to June 2017 we piloted both the pre-intervention survey and the trainings. In August and September 2017 we administered the pre-intervention survey to all firms. Firms in *Goals* and *Production* were trained in October and November, the data collection of production measurement and goal-setting took place from October to December 2017. In April and May 2018 we administered a post-intervention survey to all firms, including those assigned to *No Intervention*. A detailed timeline can be found in Online Appendix B.

IV Data and Empirical Approach

IV.A Data Sources and Descriptive Statistics

All our main outcome variables are measured daily at the worker-level, during the eight weeks of the intervention period. The variables are: i) production, defined as the number of cassava bowls filled during a day, ii) time spent peeling cassava during a work shift, and iii) in the last four weeks, the chosen production goals of workers in *Goals*. We obtain these variables from the photos of filled bowls and booklets. The resulting data set has a panel structure with workers as the unit of observation and days as the time dimension.

Before the intervention starts, firm owners and workers answered the pre-intervention survey in private. We contacted 425 owners of cassava processing firms and surveyed 422, as three owners could not be found. Descriptive statistics and balance checks can be found in Table A.1. More than 90% of firms are owned by women, with an average age of about 43 years. Employers attain on average 4.4 years of schooling and about a third have no education at all. The average firm has been producing cassava for about

13.5 years and employs 4.5 employees, of which about half are family members. Based on their last peeling cycle (which lasts approx. one week), firms generate about $550 PPP in sales and $160 PPP in profits per month.[20] Only 19% of the firms separate their business and family accounts, and fewer than 5% keep written business records or systematically measure production. Only half of the owners responded 'yes' when asked if they have ever set a goal. Employers report a high level of life satisfaction. The randomization was successful, with none of the variables differing significantly between the treatments.

Table A.2 presents summary statistics and balance checks for employees. In total, we interviewed 844 employees, two per firm. The majority of workers (79%) are women, their average age is 36 years and their average educational attainment is 5.6 years. The average employee has 4.6 years of experience; employees work approximately two weeks per month, and on a peeling week, they work on average three days a week. They are very poor, with a reported weekly income of about $24 PPP. We observe some heterogeneity in how employees are paid for peeling cassava. Almost half of the employees state that they are paid a flat-rate, about one third are paid piece-rate, and the rest are paid by other methods.[21] Slightly more than half of the workers state that peeling cassava is their only source of income. Career opportunities within firms are absent; around 80% of workers state that they aspire to do something different than working in the cassava processing sector. About half of the employees responded that they never experienced goal setting in their job.[22] Com-

[20]The 80% of firms in our sample either grow their own cassava or buy ropes to harvest it. A minority of firms buys cassava from the local market. Firms do not differ in terms of where they procure the cassava to peel (Chi-square test $p = 0.75$). Differential demand shocks are also unlikely as the study occurs in same season and region for all firms, and in a relatively short period of time.

[21]The large majority of employees are paid in cash (75%) and the rest are paid in-kind (about 8%) or in other ways (e.g. gift exchange, favors, etc.). Most firms, 74%, use the same payment scheme for all their employees.

[22]To both employees and employers we asked 'What is your definition of the word goal or target'. About 50% of respondents answered 'I do not know what a goal

pared to workers in *Goals*, workers in *Production* are somewhat younger and with less experience. We control for these imbalances by using individual fixed effects in the regression analysis.

The fact that workers and employers are not quite familiar with the concept of goal-setting may be surprising, but it is less so when considering that both have very little formal schooling, many are illiterate and none had received a business training before our intervention.[23] Cultural aspects may also be relevant; for example, McKenzie and Woodruff (2017) find that only 40% of a sample of small firm owners in Accra, Ghana, set sales targets. This all the more remarkable since the firm owners in that study have on average 14 years of education and are applicants in a business plan competition.

IV.B Attrition

We first discuss attrition at the firm level across the different stages of the experiment. Out of the 315 firms that were contacted at the beginning of the study, 3 were not available at the time when the pre-intervention survey was conducted. Among the 312 firms that were interviewed, 296 completed the training session; 6 firms in *Production* and 10 in *Goals* could not be trained because they were unreachable at the time of the training. The first two specifications in Table 1 show that there is no differential attrition by treatment for these firms. Of the 296 firms that were trained, 272 peeled at least once during the intervention period (12 firms in *Production* and 12

or target is', while the remaining half gave his/her own definition. Regardless the answer given, the enumerator read out loud: 'A goal is a desired outcome that a person envisions, plans and commits to achieve.' In this way, all respondents could continue answering the survey with the same definition in mind.

[23]We explore whether familiarity with goals reported in the pre-intervention survey is associated to workers' and firm owners' observable characteristics. The regression results are reported in Table A.3. Familiarity with goals is positively and significantly correlated with workers' years of education and with being male, which is a common finding (Dalton et al., 2015). For firm owners, we only find that those employing more people are more likely to be familiar with goal-setting.

in *Goals* did not peel or did not follow the protocol during the intervention period). A firm's decision to be inactive during the peeling phase is taken after the production measurement training, which is common to both treatments and is implemented simultaneously in both treatment groups. Thus, even if firms' proportional attrition is relatively larger in *Production* than in *Goals*, it should not be attributed to the goal setting training, which was only introduced to firms after they started peeling. Columns (3) and (4) further confirm that the probability of peeling after being trained is independent of treatment assignment. Lastly, we test whether firms in *Production* and *Goals* differ in the rate at which they are observed peeling. The dependent variable in columns (5) and (6) is the mean number of days per week in which workers are observed peeling, in a given firm; results show that there is not a statistically significant difference in the rate at which workers are observed in *Production* and *Goals*. All the 272 firms that answered the pre-intervention survey and took part in the intervention, answered the post-intervention survey. We also re-interviewed all the firms in *No Intervention* who had answered the pre-intervention survey. Table A.4 in Online Appendix provides an overview of the number of observations in each stage of the study.

We now analyse workers' attrition. Our main analysis is conducted with 671 workers that were trained and peeled cassava during the intervention period, while the number of workers who participated in all parts of the study, i.e. including the surveys, is 469.[24] This difference is mainly due to the fact that we trained more workers than we interviewed, and not to attrition. To be precise, of the 623 workers interviewed at baseline 590 were also trained (c.f. then number of observation for *Production* and *Goals* column 1 and 3 of Table A.5); attrition thus affected 33 workers between the pre-intervention survey and the training. In columns (1) and (2) of Table 2 we show that there is no differential attrition by treatment, and that individual characteristics

[24]We have excluded from the analysis one worker that peeled cassava for two firms assigned to different interventions.

are unrelated to the likelihood of being trained after answering the survey. The second piece of attrition concerns 119 workers that answered the pre-intervention survey, were trained but subsequently did not peel cassava (c.f the difference between column 3 and 5 in Table A.5).[25] In column (3) of Table 2 shows that there is no differential attrition by treatment; the addition of a set of individual control variables in column (4) does not alter the results.

Attrition in the peeling phase could also potentially affect workers that were not interviewed in the pre-intervention survey and that were added to the training by firm owners (that is, the third and fourth workers that were trained). However, we observe that all workers that were added to the training after the pre-intervention survey were also observed peeling. Lastly, there is minimal attrition in the post-experiment survey: only 3 workers who were interviewed in the pre-experiment survey, were trained, and peeled cassava did not answer the post-experiment survey. An overview of workers' observations can be found in Table A.5 in Online Appendix.

IV.C Empirical Approach

We use the following difference-in-difference (DiD) specification to identify the effect of goal setting on workers' performance:

$$y_{it} = \alpha_i + \omega_t + \beta \text{Goals}_f \times \text{Post}_t + \epsilon_{it} \tag{1}$$

and conduct three specifications where y_{it} is respectively 1) the number of cassava bowls peeled by worker i on day t, 2) the number of hours worker i spends peeling on day t, 3) the daily productivity of worker i, defined as the number of bowls peeled divided by the hours worked on a day t. Workers fixed effects are captured by α_i and ω_t represents week fixed effects. By including individual and time fixed effects we control

[25] Several trained workers are not observed peeling because 24 firms that were trained did not peel cassava during the intervention period.

for stable unobservable differences among workers and working weeks, respectively. The interaction term $\text{Goals}_f \times \text{Post}_t$ is equal to one if an individual works in a firm that is assigned to *Goals* and if the training has started. Our coefficient of interest is β, which represents the differential effect of the *Goals* training on workers' performance. We cluster standard errors at the firm level as that is the level of treatment assignment (Abadie et al., 2023).

From the perspective of firms, a relevant question is whether the practice of setting goals can increase the average product of labor. To answer this question we conduct the following regression:

$$y_{ft} = \alpha_f + \omega_t + \beta \text{Goals}_f \times \text{Post}_t + \epsilon_{ft} \tag{2}$$

where the dependent variable is defined as the total number of bowls peeled during a peeling day at a given firm, divided by the number of workers who have been peeling. Firms fixed effects are captured by α_f and week fixed effects by ω_t. In all specifications based on eq.1 and eq.2 the dependent variable is winsorized at 5% and 95% levels to deal with outliers.[26]

V Results

We start by describing goal setting behavior, and then analyze the effects of setting goals on workers' performance and on outcomes related to workers' wellbeing. We then explore possible channels through which goals may work. We comment on

[26]When winsorizing production data at the 5th and 95th percentiles, we correct for data reporting less than 2 bowls of peeled cassava per day and more than 11 bowls per day. When winsorizing the variable that measures time spent peeling, we correct for outliers that have spent less than 2.4 hours and more than 11 hours peeling on a day. In Table A.6 in Online Appendix we show that the main results are qualitatively unchanged when the data are winsorized at the 1st and 99th percentiles, and when they are not winsorized, but the effect of goal-setting on productivity loses significance at the conventional levels in the latter case.

goals' persistence and diffusion in Online Appendix E. A cost-benefit analysis of the intervention is presented in Online Appendix F.

V.A Goal Setting Behavior

On average, workers peel just a bit less than 6 bowls of cassava per day and set a slightly higher goal, the gap between a goal and actual production being equivalent to 0.36 bowls of cassava. Both chosen goals and number of bowls peeled display high variation. Table A.7 provides summary statistics on chosen goals, production, and on the gap between goals and production during the four weeks of the *Goals* intervention.

To further understand goal setting, we conduct a regression analysis. The results reported in column (1) of Table A.8 show that goals are positively related both to the goals and to the number of bowls peeled during the preceding work shift, and that goals follow a positive, yet insignificant, time trend. The estimation results in column (2) show that chosen goals are unrelated to a number of workers' characteristics, such as gender, age, years of education, tenure at the firm and payment scheme. We add firms' and their owners' characteristics in column (3): goals are higher in firms that employ more workers (p-value < 0.05), but all other observable characteristics are not significantly related to chosen goals. The dependent variable in column (4) is the gap between chosen goals and actual production. The gap is larger the higher the goals in the previous shift, and smaller the higher the production in the previous shift (p-value < 0.05). A significant time trend cannot be detected. We add workers' characteristics in column (5) and employers'/firms' characteristics in (6): workers', employers' and firms' characteristics are unrelated to gaps.

Since we observe workers for several peeling shifts, we can categorize them into types based on their tendency to over, under or exactly achieve their goals. We follow a simple approach and assign types based on the sign of the most frequent gaps: 51% of workers are mostly under-achieving their goals, 19% tend to meet their goals and

30% to surpass their goals.[27] We then test whether the types systematically choose different goals: in all weeks of the intervention, *Over-achievers* and *Achievers* choose lower goals than *Under-achievers*, but the difference is statistically significant only for the former group (c.f. results in Table A.9).

V.B Impact of Goal Setting

V.B.1 Performance

To study the impact of setting goals on workers' performance we estimate the model described in eq.1. Results are reported in Table 3. The coefficient of *Goals* $\times$ *Post* in column (1) indicates that setting goals effectively increases the number of cassava bowls peeled by 0.82 per day (p-value < 0.01), relative to only measuring production. Considering that the average number of bowls peeled in the period preceding the goal setting training was about 5 per peeling shift, the increase in output due to goal setting amounts to 16% (0.31 of a standard deviation). This result is consistent with findings from controlled experiments on non-binding goals. For example, in the experiment by Brookins et al. (2017) workers were hired for a day to restructure a library and were randomly assigned to one of three incentive treatments: a standard piece-rate, a piece-rate combined with non-binding, self-chosen goals, and a treatment only with non-binding self-chosen goals. They observed a 14% to 16% increase in production in the goal-setting treatments, which aligns closely with our findings. In a laboratory experiment Corgnet et al. (2018) implemented a virtual workplace with real-world characteristics, including real-effort tasks and options for on-the-job leisure. They found that non-binding goals increased effort by 28%. Lastly, Gonzalez et al. (2020) shows that a piece-rate contract complemented by self-set, non-binding goals leads to

[27] In Table A.10 we show that the longer employees work for the firm the more likely it is that they meet or surpass their goals. A number of other observable characteristics are uncorrelated with the types.

an 11% increase in output compared to a contract with monetarily incentivized goals.

We test whether setting goals affects the time workers spend peeling cassava in column (2) of Table 3. The maximum amount of time people can work depends on the daylight, which is on average 11 hours during the intervention period. Setting goals increases time spent peeling by 30 minutes per peeling shift (p-value < 0.1); shifts lasted on average 6.5 hours before our interventions took place, which implies that setting goals increases time spent at work by 8% (0.2 of a standard deviation). Last, column (3) shows the effects of setting goals on productivity, defined as number of bowls peeled per hour. Productivity increases by 0.07 bowls per hour, which amounts to a gain of around 8% (0.14 of a standard deviation).[28]

We now turn to the question of whether setting goals has an effect on firms' average product of labor, defined as the average amount of cassava bowls peeled by workers in a firm, during a shift. Column (4) of Table 3 displays the results of regression eq. 2. Among treated firms, the average product of labor increases by 0.66 bowls per worker (p-value < 0.05) that is by 13% (0.26 of a standard deviation). Setting goals is thus effective for firms, as it allows increasing their per-worker output.[29][30]

The results of our study may be biased if firm owners selected a particular type of workers to take part in the trainings, but this concern is partly limited by design. Before the production training started, the two workers who had answered the pre-intervention survey were approached again, and firm owners could invite up to two extra workers. At that time, however, employers did not know that a goal-setting training would take place later. Furthermore, given that about 60% of the firms em-

[28]For completeness, in Table A.12 we report the results of a regression specification similar to ANCOVA. Results are qualitatively similar but weaker, possibly because ANCOVA does not take advantage of the full panel structure of the data.

[29]We also test weather goals affect the average amount of cassava bowls peeled in a firm in an hour. Table A.13 in the Online Appendix presents the results.

[30]Output gains do not decrease work quality, as suggested by the photographs of peeled cassava bowls and by employers' high satisfaction with the intervention (c.f. Online Appendix E).

ploy at most four workers, most firm owners' did not have the possibility to choose workers for the training. Nevertheless, to address potential selection issues, we divide firms in two groups: those that have more than four employees and those that have less than four employees, and conduct our main regression analysis on these two sub-samples. The results in Table A.14 show that setting goals increased the number of bowls peeled in both types of firms, but the effect is stronger when there are fewer employees. Time spent peeling increased in both samples, but not in a statistically significant way. Productivity increased significantly among workers with few colleagues, whereas productivity gains were comparatively modest in larger firms. These findings thus confirm that the effectiveness of goal setting is likely not biased upwards.[31]

V.B.2 Heterogenous Effects and Wellbeing

Having established that goals increase workers' effort, we test whether the practice was effective for all types of goal-setting behaviors. Figure A.1 shows the average number of bowls peeled (panel a), the average time spent peeling (panel b), and the productivity (panel c) of the three types of workers, before and after the goal setting training. Relative to the pre-training period, goal setting increases both production and time spent peeling for all types of workers (p-value < 0.05). Productivity also increases among all types of workers, but significantly so only for workers who tend to achieve their goals (p-value < 0.05). Although these results should not be given a causal interpretation, they suggest that the practice is effective irrespective of how workers set goals.

An unintended effect of the practice could be that workers feel stressed about

[31] We also estimate eq. 1 on the sub-sample of workers observed during the entire period of the study, i.e. both before and after the goal setting training. The estimated treatment effects are largely in line with those found for the full sample, see Table A.11.

meeting their targets and are thus less happy than usual. To test the effect of goal setting on workers' wellbeing we employ two indicators. First, we consider whether in the post-intervention survey workers agreed with the statement '[the intervention] created stress and worries for me', where the intervention would be either setting goals or measuring production. Only 14% of the workers in *Production* and 10% of the workers in *Goals* agreed with the statement. Second, we use data on self-reported life satisfaction collected during the pre-intervention and the post-intervention surveys, where workers were asked how satisfied they were with their life on a scale from 1 to 5 (higher numbers correspond to higher satisfaction levels). We then regress workers' life satisfaction elicited in the post-intervention survey on life satisfaction at pre-intervention and dummies for *Production* and *Goals*. The responses of workers in the *No Intervention* group, who did not receive any training, constitute the omitted category. The results in column (1) of Table A.15 show that workers' life satisfaction four months after the intervention is strongly associated with life satisfaction measured before the intervention, and is not significantly influenced by either training. We then conduct the same regression specification as in (1) but only using the sub-sample of workers paid piece-rate; for these workers, the interventions may increase the salience of financial incentives, thereby decreasing well-being. Results in column (2) show again no significant effect of the treatments on well-being post-intervention.[32] Lastly, in column (3) of Table A.15 we focus only on workers in *Goals* and compare the wellbeing of the three types of goal setters before and after being trained. Relative to *Achievers*, *Over-achievers* report the highest increase in life satisfaction at the end of the intervention. We do not observe a relation between being an *Under-achiever* and wellbeing.[33]

[32]We have conducted the same regression on the sub-sample of workers paid flat-rate, and again find no significant effect of either treatment on life satisfaction. Results are available upon request.

[33]The fact that life satisfaction of *Under-achievers* increases relative to that of *Achievers* suggests that for these peelers, there seems to be an instrumental value of

As another proxy of workers' well being we consider earnings' inequality within firms. Inequality may increase if some workers are motivated to exert extra effort when setting goals, while at the same time, others are disinclined to do so. Especially in collective societies like the Ghanian one, inequality may generate hostility among co-workers and thus reduce their well-being (Breza et al., 2018). Since we do not have information on individual payments to workers, for each firm we calculate the standard deviation of the number of cassava bowls peeled during each peeling day and use it as a proxy for earnings' dispersion. The regression results reported in column (4) of Table A.15 show that cassava production has a higher standard deviation within firms in *Goals* relative to those in *Production*, but this increase is statistically insignificant.[34]

Although the evidence suggest that workers' well-being was not affected by the intervention, setting goals may have had immediate (but transient) effects on workers' satisfaction during the weeks of the intervention. Such effects could translate in absenteeism if, for example, workers that do not achieve their goals loose the motivation to work. We thus compare the three types of goal setters in terms of the number of days per week in which they peel cassava, running separate regressions for each of the four weeks of the intervention. The results are displayed in Table A.16 in the Online Appendix. Differences in the average number of working days are mostly not statistically significant at conventional levels, but an interesting pattern emerges. In the first two weeks of the intervention, under-achievers work on average more days than the other types but as of the third week the trend reverts, and achievers and over achievers work on average more days. In the last week of the intervention over achievers work for significantly more days than the other two types of workers (p-

being unrealistically optimistic, maybe because high goals are a stimulus for them to become more productive (Brunnermeier and Parker, 2005; Dunning et al., 2004).

[34]We obtain similar results when focusing exclusively on workers paid piece-rate. Results are available upon request.

value<0.1). This pattern thus suggests that workers who tend to set too ambitious goals may indeed feel somewhat discouraged after missing their targets; nevertheless, this does not have a substantial impact on their labor supply.

V.C Mechanisms: Why Do Goals Increase Performance?

Having established that setting goals improves worker's performance, we explore several possible channels that could explain the effectiveness of goals.

V.C.1 Goals as Reference Points for Self-regulation

As discussed in Section II, economic models predict that goals increase motivation and effort because they act as reference points, which can be used as commitment devices by individuals with low self-control. Below we present several pieces of evidence that, although not conclusive, point at the relevance of this channel.

An initial indication that some workers had difficulties focusing on their tasks was provided by focus groups conducted prior to the intervention. A common complaint of firm owners was the lack of time structure of their workers; in the words of an owner '..they do not arrive or leave at regular times, and do not seem to be time-conscious.' On the other hand, several firm owners admitted that they do not give specific time schedules to the workers. To study whether workers' behavior is consistent with goals acting as self-regulation devices, we exploit the fact that firms tend to pay all their workers either piece-rate or flat-rate.[35] Compared to workers paid flat-rate, workers paid piece-rate can reap monetary benefits from overcoming their self-control issues, so we expect that setting goals is more effective for them. Importantly, goal setting does not modify existing incentives, as there are not rewards (punishments)

[35]Payment schemes are balanced between treatments (c.f Table A.2). Table A.17 further shows that the likelihood of being paid with a certain scheme four months after the training is strongly correlated with the scheme applied before the intervention, but unrelated to the goal-setting training. Table A.18 shows that the use of either scheme is unrelated to firms' characteristics.

for achieving (missing) a goal. We conduct regressions as in eq.1 for both samples separately and report the results in Table 4. Column (1) shows that workers paid piece rate peel significantly more cassava after the goal-setting training (p-value < 0.01), while the estimated effect of the training for workers paid flat-rate, shown in column (2), is modest and insignificant. Results in columns (3) and (4) show that setting goals increases time spent peeling for both groups of workers by about 40 minutes, but these effects are not statistically significant. Lastly, results in column (5) and (6) show that setting goals significantly increases the productivity of workers paid piece-rate by 0.2 extra bowls of cassava per hour (p-value < 0.05), while the productivity of those paid flat-rate remains unchanged.[36] In summary, the fact that the effects are driven by piece-rate workers suggests the existence of a behavioral constraint that hinders them before the goal-setting intervention.[37]

We also conduct a heterogeneity analysis using known correlates of self-control.[38] The correlates we use are chosen based on the work of Cobb-Clark et al. (2022). In their study, self-control is measured with an established self-reported scale and then correlated to a number of life outcomes, controlling for a set of individual characteristics. The authors find that individuals with higher self-control display healthier behaviors, greater financial well-being and higher life satisfaction. These relationships hold when controlling for a large set of potential confounders and applying variable selection models. Our analysis is based on the assumption that the relationships documented in Cobb-Clark et al. (2022) also hold, at least to some extent, in our

[36] These results are consistent with those in Corgnet et al. (2015), who show both theoretically and with a laboratory experiment that wage irrelevant goals are most effective at increasing workers' effort when monetary incentives are strong.

[37] To test the robustness of our results, we conduct a randomization inference exercise reported in Table A.22.

[38] A more direct way to test whether goals are self-regulation devices would have been to gather measures of workers' self-control. We piloted different experimental and survey measures but decided not to include them because data did not seem reliable, as there was very little variation in the answers.

sample.

First, we consider workers' self-reported savings, which are a measure of financial well-being. We conduct the regression specification in (1) where the continuous measure of (self-reported) savings is interacted with *Goals**Post. The Online Appendix Table A.19 shows that savings interact with the goals treatment when we restrict the sample to piece-rate workers only: the higher the savings before the intervention, the less effective is goal setting in increasing the number of bowls peeled and the time spent peeling. Second, we consider life satisfaction as self-reported in the pre-intervention survey. Results in Onlnine Appendix Table A.20 show that the more satisfied the worker, the lower the effectiveness of setting goals. The interaction effect of goals and life satisfaction is statistically significant when the outcome variable is the amount of bowls peeled, while for peeling time and productivity the effect goes in the same direction but is not statistically significant. Third, we consider impatience. Individuals with self-control issues are often impatient, in the sense that they are characterized by a low discount factor (Frederick et al., 2002). In the pre-intervention survey, we measured impatience using hypothetical choices between smaller, immediate payment and larger, delayed ones. About one-third of workers display high impatience, in the sense that they prefer the immediate payment in all decision situations. We then test whether goal-setting is more effective for this type of workers, and find that this is the case. The effect is statistically significant when the outcome variable is productivity; when considering the number of bowls peeled and peeling time, effects go in the predicted direction but are not statistically significant at conventional levels (c.f Online Appendix Table A.21).

While not conclusive, this set of results is consistent with goal setting being used by piece-rate workers to overcome self-control problems that may be preventing them from producing and earning more. Had there been no such problems, workers would

have likely supplied the same effort with and without setting goals.[39] In what follows we discuss other alternative potential mechanisms and their plausibility.

V.C.2 Peer Effects and Competition

Even though goals are set individually in our experiment, interaction among coworkers in cassava processing firms is common. Peelers typically work outdoors, sitting together in a shared space (see Figure C.2 in Online Appendix); they can observe each other, and often chat while peeling. It is possible that goal-setting stimulated workers to compare each other, and that such comparisons increased performance.[40]

To assess this channel, we use data from the post-intervention survey where workers are asked whether they prefer to peel more cassava than their colleagues and regress the answers on treatment dummies. The *No Intervention* group is included to test whether the production training on its own had an effect on competition. Column (1) in Table A.23 displays the results: four months after the intervention, workers in *Goals* and *Production* are significantly more competitive compared to workers in *No Intervention* (8% and 10% percent respectively, p-value ≤ 0.05). The Wald test results show that this increase in self-reported competitiveness is not statistically significantly different between the two groups. In the post experiment survey, workers in *Production* (*Goals*) were also asked whether tracking production (setting goals) made their job into more of a competition. Column (2) of Table A.23 shows that workers in *Goals* are 13% more likely to answer affirmatively to the question (p-value < 0.05).[41]

[39]The goal-setting intervention itself may have been perceived by workers as a message from the employer that higher output was expected, akin to a 'norm change'. Making higher expected output more salient could, in principle, increase workers' effort. However, we believe that the potential to change or emphasize expected output is an inextricable feature of any training aimed at improving firm performance, and it is challenging to separate this effect from others.

[40]See Ashraf and Bandiera (2018) for a comprehensive review of the empirical evidence on social incentives in organizations and their interaction with monetary incentives.

[41]To better understand competitive attitudes, we study whether self-reported com-

How important is competition to explain the effectiveness of goal-setting? To answer this question, we run our main regression specifications (c.f eq. 1) on the sample of workers that, in the post-intervention survey, affirm being competitive and on the non-competitive ones. Results reported in Table A.24 show that the effects of the training are more pronounced among workers that reported increased competition, but a positive and marginally significant effect on bowls peeled is also observed among non-competitive workers. We then exclusively focus on workers in *Goals* in the period following the goals training, and test whether performance is positively related to competitiveness: the results in Table A.26 show no evidence of such relation. Lastly, if competition would be the main driver behind the success of goal-setting, we should observe performance improvements also among workers paid flat-rate, but this is not the case[42] (c.f Table 4).

V.C.3 Monitoring, Signaling, Informal Rewards and Cheating

The booklets with production records may be a tool for firm owners to monitor workers' performance. Monitoring could potentially explain our results if the goal-setting protocol offered better monitoring possibilities than the production measurement protocol, but it seems unlikely that this would be the case. Furthermore, during the pilot phase we observed that employers did not exert strong authority and that superior-subordinate dynamics were absent, which suggests that employers were not inclined to exercise strict control over their workers.

On the supply side, it could be argued that workers in the *Goals* group can more effectively signal their type by setting and achieving their chosen production goals

petitiveness in the post-experiment survey is related to the characteristics of the firm and to whether peers are stable or change frequently. Table A.25 shows that in firms where working groups are constant over time, there is no significant effect of setting-goals on workers competitive attitudes. Instead, in firms where peers tend to be more variable, setting goals is associated to an increase in workers competitive spirit.

[42]Peer effects are ruled out by design in all laboratory experiments on goals (see, for instance, Goerg and Kube (2012); Clark et al. (2020); Gonzalez et al. (2020).

compared to workers in the *Production* group. However, there are several reasons why signaling is unlikely to be a relevant mechanism in our context. Workers typically signal their type when there is asymmetric information or a motivation to reveal their type, but neither condition is likely to apply here.

Asymmetric information is improbable because the firms are small, and workers and employers are long-standing acquaintances who live in the same area, often belonging to the same family. Furthermore, if signaling due to asymmetric information was a factor, we would expect goal setting to be more effective in firms with fewer family members, where information asymmetries might be more significant. The results in Table A.27 show that this is by and large not the case.

Additionally, there are at least two reasons why workers may not be concerned about revealing their type: firing is not a credible threat in these firms, and career opportunities are absent. Firing is not a concern because, as mentioned in Section III.A, labor supply is scarce in West African agricultural firms (Fafchamps, 1993) and specifically in the cassava processing sector in Ghana (Coulibaly et al., 2014). High levels of rural-urban migration, particularly among young people, and the relatively low wages in this sector further discourage potential workers (Abiodun et al., 2023). In line with this, nearly all workers remained with their respective firms four months after the intervention when we conducted the post-intervention survey.[43] There are no career opportunities within these informal small firms either. In fact, the great majority of workers do not aspire to remain working in the sector. Last and most important, if signaling was a relevant mechanism explaining our results, we would have seen effects also for workers who are paid flat-rate.

Another potential mechanism is that goals are effective because they are associated with informal rewards, such as praise or recognition. While we are certain that firms

[43]Labor scarcity was also mentioned by firm owners during pilot interviews and in the pre-intervention survey, where 40% of processors identified it as a major hurdle to increasing production.

did not provide formal rewards to those who achieved their goals, we cannot rule out that highly productive workers were praised by firm owners. However, if this were the case, we would expect it to occur in firms within the *Production* group as well. Furthermore, even if we assume, for the sake of argument, that informal or formal rewards differed in the *Goals* group, the fact that goal setting was not effective in firms that pay a flat rate suggests that this cannot be the primary explanation for our results.

Finally, one may be concerned that the main effect of goal setting is explained by workers in goals who want to cheat on their production levels. This can happen if workers want to convince themselves that they can reach their goals, or they do not want to feel like they have failed. As we mentioned in Section III.C.1, cheating is very unlikely by design. Even if we assume that cheating has happened, this should only be the case among workers categorized as goal *Achievers* and *Over-achievers*. However, as Figure A.1 shows, goal setting is effective also for *Underachievers*, which are 51% of the workers. Finally, data on peeling time further suggests that cheating is unlikely. We find that peeling time increases significantly for all types of workers after the goal setting training (p-value$<$0.04). Faking both working times and production records would require that workers are able to manipulate the booklets data to a large extent, which seems quite implausible.

VI Conclusions

In spite of clear labor management problems, small firms in developing countries often do not use proven human-resources practices (Bloom and Van Reenen, 2011; McKenzie and Woodruff, 2017). On the one hand, this can be attributed to lack of resources, the informality of labor markets and lack of awareness of the practices. On the other hand, practices that work well in high income countries may not deliver the

same results in the developing world. In this paper we study whether setting non-binding production goals on a daily basis can increase the performance of cassava peelers in Ghana.

We find that workers who set goals perform better than those who only measure production: workers peel more cassava and their hourly productivity increases as well. Firms benefit from the intervention, as the average amount of cassava peeled by each worker in the firm increases substantially. The estimated effects are sizable, and range from a 14% standard deviation increase in productivity to a 30% standard deviation increase for production. This is remarkable also because men tend to benefit more from goal setting interventions than women (Dalton et al., 2015), while workers and employers in our sample are predominantly female.

We also find that while goal setting behavior is quite heterogeneous, all types of goal setters improve their performance relative to the pre-intervention period. This indicates that the practice of setting goals, and not necessarily their achievement, is sufficient to increase work effort in this context. In line with the fact that most workers set goals by themselves, we find that employers' and firms' characteristics are by and large uncorrelated with chosen goals and with goal achievement. An analysis of potential mechanisms suggests that goal setting may increase performance because it helps workers to overcome self-control issues.

The fact that performance improvements are very large among workers paid piece-rate, but not among those paid a fixed-fee, indicates a complementarity between goals and monetary incentives. This result is especially interesting in light of previous findings on the ineffectiveness of incentives in developing countries. A key difference with the existing studies is that our intervention did not alter the payment schemes at the cassava firms, it only provided a simple, non-monetary, tool to structure work.

To conclude, our paper offers a proof of concept that setting non-binding goals is a cost-effective practice to improve workers' performance in small, informal firms.

Low working hours and low productivity of labor are common problems in agriculture (Kaur et al., 2010), so we hope that the intervention will be replicated in sectors facing similar constraints. We believe that the practice is scalable for several reasons. It relies on simple protocols, it does not have negative spillover effects on workers' well-being, it is effective for all types of goal-setters, and was endorsed and implemented by the Ghanian government.

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Main Tables

Table 1: **Firms' Attrition**

Dep.var:	Trained		Peeled		N. of peeling days	
	(1)	(2)	(3)	(4)	(5)	(6)
Goals	0.009	0.011	0.062	0.059	-0.037	-0.003
	(0.027)	(0.028)	(0.037)	(0.037)	(0.059)	(0.057)
Age		-0.001		-0.001		-0.007*
		(0.002)		(0.002)		(0.004)
N. of workers		-0.005		0.006		0.051***
		(0.004)		(0.005)		(0.012)
Years in business		0.002		0.003*		0.002
		(0.002)		(0.002)		(0.004)
Constant	0.942***	0.965***	0.878***	0.837***	1.223***	1.225***
	(0.023)	(0.049)	(0.033)	(0.081)	(0.072)	(0.164)
Observations	312	309	295	292	960	950

*Notes: Columns 1-4 presents LPM regressions: 'Trained' equals one if a firm that took part in the pre-intervention survey also took part in the production measurement training, and zero otherwise. 'Peeled' equals one if the trained firm peeled at least once during the intervention period, and zero otherwise. Columns 5 and 6 show linear regression results; 'N. of peeling days' is the mean number of days per week in which workers are active peeling at a firm, week fixed effects are included. In all regressions robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

Table 2: **Workers' Attrition**

Dep.var:	Pre-survey & Trained		Pre-survey & Trained & Peeled	
	(1)	(2)	(3)	(4)
Goals	0.007	0.012	0.060	0.070
	(0.027)	(0.028)	(0.044)	(0.044)
Age		-0.000		-0.000
		(0.001)		(0.001)
Peeling experience		0.002		0.008**
		(0.002)		(0.003)
Piece-rate		-0.013		0.043
		(0.036)		(0.051)
Flat-rate		0.043		-0.000
		(0.031)		(0.049)
Constant	0.942***	0.916***	0.760***	0.715***
	(0.023)	(0.044)	(0.038)	(0.066)
Observations	623	620	590	587

*Notes: LPM regression results, standard errors in parentheses are clustered at the firm level. 'Pre-survey & Trained' equals one if a worker took part in pre-survey and the production measurement training, and zero if the worker only answered the survey. 'Pre-survey & Trained & Peeled' equals one if a worker answered the pre-survey, was trained in production measurement and peeled at least once during the intervention period; the variable is zero if a worker answered the survey, was trained, but subsequently did not peel cassava. *** p<0.01, ** p<0.05, * p<0.1.*

Table 3: **Effect of Goal Setting on Worker's Performance**

Dep.var:	Bowls peeled (1)	Peeling time (2)	Productivity (3)	Product of Labor (4)
*Goals**Post	0.819***	0.505*	0.073*	0.656***
	(0.268)	(0.281)	(0.041)	(0.251)
Constant	5.188***	6.601***	0.810***	4.923***
	(0.259)	(0.283)	(0.044)	(0.208)
Observations	3,126	3,089	3,089	1,527
N. of workers	671	666	666	
N. of firms				272

*Notes: Regressions include individual and week fixed effects. Dependent variables are winsorized on both tails at the 5th and 95th percentiles. Standard errors in brackets are adjusted for clustering at the firm level. *** p<0.01, ** p<0.05, * p<0.1.*

Table 4: **Effect of Goal Setting by Payment Scheme**

Dep.var:	Bowls peeled		Peeling time		Productivity	
	Piece rate	Flat rate	Piece rate	Flat rate	Piece rate	Flat rate
	(1)	(2)	(3)	(4)	(5)	(6)
*Goals**Post	1.669***	0.115	0.671	0.546	0.174**	-0.0453
	(0.357)	(0.364)	(0.540)	(0.411)	(0.0680)	(0.0489)
Constant	5.225***	5.344***	6.414***	7.589***	0.815***	0.777***
	(0.431)	(0.280)	(0.364)	(0.427)	(0.0673)	(0.0427)
Observations	779	963	768	949	768	949
N. of workers	173	217	169	216	169	216
T-test p-value:	0.002		0.949		0.020	

*Notes: Columns 1, 3 and 5 report results for workers paid piece-rate, column 2,4 and 6 for workers paid flat-rate. Regressions include individual and week fixed effects. Dependent variables are winsorized on both tails at the 5th and 95th percentiles. The last line reports p-values of the comparison of Goals*Post between the piece-rate and flat-rate sub-samples. Standard errors in brackets are adjusted for clustering at the firm level.*** p<0.01, ** p<0.05, * p<0.1.*

Online Appendix

A Tables

Table A.1: **Employers Balance Tests**

	(1) Production	(2) Goals	(3) No-Intervention	(1) vs. (2)	(1) vs. (3)	(2) vs. (3)	N
Male	0.087	0.072	0.100	0.653	0.737	0.390	422
Age	42.837	42.599	42.500	0.863	0.815	0.938	422
	(1.136)	(0.791)	(0.893)				
Education	4.519	4.470	4.155	0.920	0.496	0.497	422
	(0.397)	(0.279)	(0.360)				
Years in firm	14.146	13.216	13.473	0.419	0.631	0.811	421
	(1.068)	(0.612)	(0.912)				
Peeling days	3.048	2.851	2.891	0.276	0.473	0.824	422
	(0.156)	(0.101)	(0.153)				
N. of workers	4.942	4.729	4.330	0.535	0.089*	0.195	419
	(0.290)	(0.193)	(0.213)				
Family members	2.359	2.295	1.982	0.765	0.094*	0.111	419
	(0.179)	(0.122)	(0.139)				
Sales $PPP	659	532	483	0.175	0.106	0.524	421
	(93.899)	(46.621)	(57.572)				
Profits $PPP	191	158	134	0.662	0.515	0.714	421
	(74.120)	(39.172)	(47.859)				
Life satisfaction	3.538	3.769	3.734	0.114	0.223	0.803	421
	(0.117)	(0.085)	(0.110)				
Separate accounts	0.202	0.168	0.218	0.467	0.772	0.278	422
Written records	0.067	0.048	0.027	0.482	0.167	0.374	422
Track production	0.058	0.043	0.036	0.576	0.462	0.768	422
Has set goal	0.553	0.570	0.555	0.776	0.987	0.786	420

*Notes: Peeling days is the average number of days per week in which the firm peels cassava. Sales and Profits are calculated over the last peeling cycle. Separate accounts is 1 if the firm keeps separate account for personal and business finances; Written records is 1 if the firm keeps written business records; Track production is 1 if the business keeps production records; Has set a goal is 1 if the business has ever set a target; Life satisfaction is on a 1 to 5 scale. If relevant, standard deviations are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

Table A.2: **Employees Balance Tests**

	(1) Production	(2) Goals	(3) No-Intervention	(1) vs. (2)	(1) vs. (3)	(2) vs. (3)	N
Male	0.178	0.234	0.195	0.110	0.642	0.269	843
Age	38.231	35.200	35.277	0.027**	0.066*	0.955	843
	(1.128)	(0.782)	(1.137)				
Education	5.346	5.764	5.616	0.202	0.473	0.651	842
	(0.264)	(0.190)	(0.268)				
Experience	5.364	4.567	4.144	0.059*	0.009***	0.274	834
	(0.366)	(0.235)	(0.285)				
Income $PPP	28.435	26.672	20.741	0.563	0.005***	0.020**	737
	(2.551)	(1.735)	(1.087)				
Piece-rate	0.327	0.378	0.332	0.209	0.914	0.247	843
Flat-rate	0.495	0.451	0.505	0.293	0.847	0.196	843
Only income	0.534	0.552	0.527	0.668	0.895	0.556	843
Had a goal	0.543	0.571	0.490	0.663	0.461	0.185	397

Notes: Experience *is the number of years working at the firm;* Income *indicates weekly income;* Had a goal *is equal to 1 if the worker had a goal in his/her job at least once.* Only income *is equal to 1 if cassava peeling is the only income generating activity for the worker. When relevant, standard deviations are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

Table A.3: **Goal Setting Before the Intervention and Individual Characteristics**

Dep.var:	Had a goal at work	
	(1)	(2)
Goals	0.036	0.033
	(0.051)	(0.064)
Age	0.0001	-0.004
	(0.002)	(0.003)
Male	0.205***	-0.173
	(0.062)	(0.125)
Years of education	0.014**	0.009
	(0.007)	(0.008)
Years working for the firm	0.007	
	(0.005)	
Piece rate	0.060	
	(0.047)	
N. of workers		0.035***
		(0.012)
N. of family members in the firm		-0.008
		(0.020)
Constant	0.043	0.566***
	(0.090)	(0.152)
Observations	346	265

*Notes: LPM regression results. In column (1) the dependent variable is workers' answer to the question 'Have you ever had a goal in your job?', independent variables are worker's characteristics. In column (2) the dependent variable is firm owners' answer to the question 'Have you ever set a goal in your business', independent variables are firm owner and firm characteristics. *** p<0.01, ** p<0.05, * p<0.1.*

Table A.4: **Number of Observations – Firms**

	Contacted	Pre-survey	Trained	Trained & Peeled	Post-survey
	(1)	(2)	(3)	(4)	(5)
No Interv.	110	110	0	0	110
Production	105	104	98	86	86
Goals	210	208	198	186	186
Total	425	422	296	272	382

Table A.5: **Number of Observations – Workers**

	Pre-survey	Trained	Pre-survey & Trained	Trained & Peeled	Pre-survey & Trained & Peeled	Post-survey	All
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
No Interv.	220	0	0	0	0	219	0
Production	208	267	196	221	149	206	147
Goals	415	521	394	450	323	408	322
Total	844	788	590	671	472	833	469

Table A.6: **Effect of Goal Setting: Less and None Winsorization**

	Winsorization at 1%			Non-Winsorized data		
Dep.var:	Bowls Peeled	Peeling Time	Productivity	Bowls Peeled	Peeling Time	Productivity
	(1)	(2)	(3)	(4)	(5)	(6)
*Goals**Post	0.840***	0.640**	0.0814*	0.822***	0.658**	0.0845
	(0.289)	(0.315)	(0.0493)	(0.288)	(0.324)	(0.0553)
Constant	5.180***	6.756***	0.849***	5.185***	6.743***	0.882***
	(0.274)	(0.348)	(0.0652)	(0.274)	(0.349)	(0.0930)
Observations	3,126	3,089	3,089	3,126	3,089	3,089
N. of workers	671	666	666	671	666	666

*Notes: Regressions include individual and week fixed effects. In columns 1-3 the dependent variables are winsorized on both tails at the 1st and 99th percentiles. In columns 3-6 the dependent variables are not winsorized. Standard errors in brackets are adjusted for clustering at the firm level. *** p<0.01, ** p<0.05, * p<0.1.*

Table A.7: **Summary Statistics of Chosen Goals**

	Mean	Std. Dev.	Min	Max	Median	Obs
Goal	6.24	2.49	0	12	6	1228
Bowls peeled	5.88	2.57	1	12	6	1230
Gap (goal-bowls peeled)	0.36	1.96	-7	10	0	1228

Notes: All variables are expressed in terms of number of peeled cassava bowls.

Table A.8: **Correlates of Goal-Setting Behavior**

Dep.var:	Goal			Gap		
	(1)	(2)	(3)	(4)	(5)	(6)
Bowls_{t-1}	0.084*	0.097**	0.093**	-0.339***	-0.287***	-0.286***
	(0.050)	(0.044)	(0.043)	(0.079)	(0.066)	(0.067)
Goals_{t-1}	0.290***	0.195***	0.178***	0.355***	0.284***	0.282***
	(0.065)	(0.055)	(0.055)	(0.088)	(0.062)	(0.063)
Week	0.058	0.075	0.086	-0.075	-0.034	-0.039
	(0.072)	(0.075)	(0.075)	(0.059)	(0.057)	(0.056)
Worker age		-0.007	-0.007		-0.001	-0.003
		(0.008)	(0.007)		(0.005)	(0.005)
Worker male		-0.274	-0.222		0.220	0.256
		(0.328)	(0.312)		(0.199)	(0.196)
Worker years of education		0.024	0.024		-0.018	-0.025
		(0.033)	(0.034)		(0.019)	(0.021)
Years in the firm		-0.029	-0.028		-0.021	-0.015
		(0.022)	(0.020)		(0.017)	(0.018)
Piece rate		0.003	-0.025		-0.196	-0.167
		(0.372)	(0.364)		(0.238)	(0.246)
Flat rate		-0.342	-0.345		-0.078	-0.095
		(0.390)	(0.376)		(0.205)	(0.200)
Employer age			-0.009			-0.000
			(0.012)			(0.008)
Employer male			0.493			-0.070
			(0.621)			(0.215)
Employer years of Education			-0.004			0.016
			(0.033)			(0.022)
N. of workers			0.129**			0.011
			(0.058)			(0.041)
N. of family members in firm			-0.052			-0.065
			(0.097)			(0.066)
Constant	3.542***	4.294***	4.226***	0.562	0.742*	0.872
	(0.453)	(0.707)	(0.978)	(0.408)	(0.448)	(0.613)
Observations	1,210	828	821	1,210	828	821

Notes: Panel regression results, in columns 1-3 the dependent variable Goal *is the goal set by worker i on a peeling day, in specifications 4-6 the dependent variable* Gap *is the difference between the chosen goal and the actual number of bowls peeled on a given day.* Week *is a linear time trend. Standard errors in brackets are adjusted for clustering at the firm level. *** p<0.01, ** p<0.05 * p<0.1.*

Table A.9: **Goals by Goal-Setting Type**

Dep.var:	Chosen goal			
	week 1	week 2	week 3	week 4
Achiever	-0.451	-0.651	-0.271	0.229
	(0.593)	(0.774)	(0.462)	(0.453)
Over achiever	-0.913*	-0.790**	-1.374***	-1.548***
	(0.501)	(0.368)	(0.383)	(0.331)
Constant	6.405***	6.437***	6.510***	7.064***
	(0.257)	(0.246)	(0.285)	(0.265)
Observations	274	206	331	370

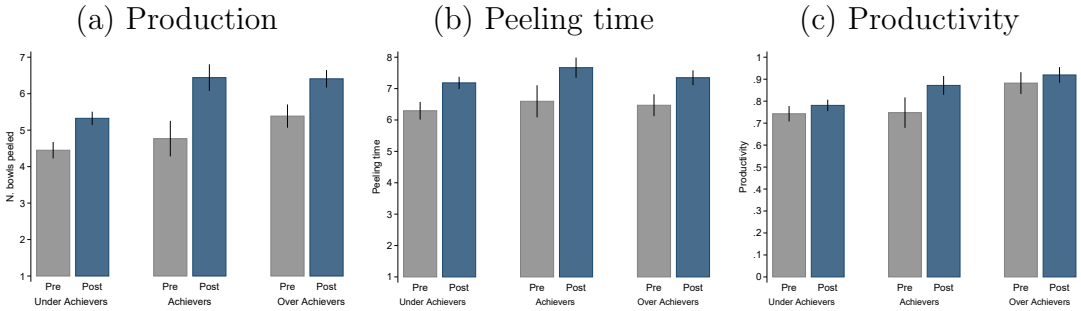
*Notes: The dependent variable is the average chosen goal, by week, after the goal setting intervention. Standard errors in brackets are adjusted for clustering at the firm level. *** p<0.01, ** p<0.05, * p<0.1.*

Table A.10: **Correlates of Goal Types**

Dep.var:	Goal Type
Worker age	0.006
	(0.008)
Worker male	-0.479
	(0.300)
Worker years of education	0.031
	(0.035)
Years working for the firm	0.061***
	(0.023)
Constant cut 1	0.659
	(0.424)
Constant cut 2	1.467***
	(0.432)
Observations	277

Notes: Ordered Logit regression results. The categories of the dependent variable Goal Type *are* Under achiever, Achiever *and* Over achiever. **** p<0.01, ** p<0.05, * p<0.1.*

Figure A.1: **Performance by Worker Type**



Notes: 'Under Achievers' are defined as workers who mostly produce less than their goals, 'Achievers' are workers who tend to meet their goals, and 'Over Achievers' are workers who tend to surpass their goals. Bars include 95% confidence intervals.

Table A.11: **Effect of Goal Setting, Sub-sample of all Time Workers**

Dep.var:	Bowls Peeled (1)	Peeling Time (2)	Productivity (3)	Product of Labor (4)
*Goals**Post	0.813***	0.493*	0.073*	0.813***
	(0.270)	(0.282)	(0.041)	(0.264)
Constant	5.270***	6.736***	0.817***	5.187***
	(0.269)	(0.288)	(0.045)	(0.269)
Observations	2,509	2,482	2,482	2,509
N. of Workers	402	402	402	402
N. of Firms				182

*Notes: This analysis uses the sub-sample of workers which were observed peeling both before and after the goal-setting training. Columns (1) to (3) include workers and week fixed effects, column (4) includes firm and week fixed effects. Dependent variables are winsorized on both tails at the 5th and 95th percentiles. Standard errors in brackets are adjusted for clustering at the firm level. *** p<0.01, ** p<0.05, * p<0.1.*

Table A.12: **Effect of Goal Setting, ANCOVA Approach**

Dep.var:	Bowls Peeled (1)	Peeling Time (2)	Productivity (3)	Product of Labor (4)
Goals	0.672**	0.375	0.0258	0.714**
	(0.268)	(0.265)	(0.0393)	(0.276)
Bowls Pre	0.732***			
	(0.0480)			
Time Pre		0.488***		
		(0.0626)		
Productivity Pre			0.525***	
			(0.0554)	
Product of Labor Pre				0.783***
				(0.0569)
Constant	1.238***	3.495***	0.369***	0.992**
	(0.359)	(0.494)	(0.0534)	(0.391)
Observations	1,420	1,402	1,402	1,532

Notes: All the Pre *explanatory variables are based on averages calculated in the period preceding the goal setting intervention. Regressions include week fixed effects, standard errors in brackets are adjusted for clustering at the firm level. *** p<0.01, ** p<0.05, * p<0.1.*

Table A.13: **Effect of Goal Setting on Firms' Hourly Productivity**

	All firms	Piece-rate firms
Dep.var:	Productivity	
	(1)	(2)
*Goals**Post	0.047	0.144**
	(0.039)	(0.071)
Constant	0.792***	0.817***
	(0.036)	(0.072)
Observations	1,517	473
N. of firms	271	98

*Notes: The dependent variable is the daily productivity of a firm, defined as the number of cassava bowls peeled divided by the total amount of work hours. Regressions include firm and week fixed effects. Dependent variables are winsorized on both tails at the 5th and 95th percentiles. Standard errors in brackets are adjusted for clustering at the firm level. *** p<0.01, ** p<0.05, * p<0.1.*

Table A.14: **Effect of Goal Setting by Number of Workers**

N. of workers:	≤ 4	> 4	≤ 4	> 4	≤ 4	> 4
Dep.var:	Bowls Peeled		Peeling Time		Productivity	
	(1)	(2)	(3)	(4)	(5)	(6)
*Goals**Post	1.040***	0.707**	0.376	0.620	0.132**	0.034
	(0.369)	(0.344)	(0.383)	(0.409)	(0.062)	(0.044)
Constant	4.624***	5.687***	6.299***	6.884***	0.761***	0.848***
	(0.247)	(0.435)	(0.431)	(0.378)	(0.051)	(0.068)
Observations	1,489	1,637	1,474	1,615	1,474	1,615
N. of workers	350	321	346	320	346	320
T-test p-value:	0.509		0.663		0.190	

*Notes: Columns (1) to (3) include workers and week fixed effects, specification (4) includes firm and week fixed effects. Dependent variables are winsorized on both tails at the 5th and 95th percentiles. The last line reports p-values of the comparison of Goals*Post between the sub-samples of firms with at most 4 and more than 4 workers. Standard errors in brackets are adjusted for clustering at the firm level. *** p<0.01, ** p<0.05, * p<0.1.*

Table A.15: **Effect of Goal Setting on Proxies of Well-being**

Dep.var:	Life Satisf. Post Intervention			Inequality at firm
	All	Piece rate	By type	
	(1)	(2)	(3)	(4)
Life Satisf. Pre-intervention	0.199***	0.209***	0.319***	
	(0.039)	(0.063)	(0.062)	
Goals	-0.114	-0.162		
	(0.112)	(0.181)		
Production	-0.146	-0.003		
	(0.136)	(0.218)		
Under Achiever			0.397**	
			(0.200)	
Over Achiever			0.733***	
			(0.212)	
*Goals**Post				0.174
				(0.118)
Constant	2.661***	2.518***	1.704***	0.826***
	(0.171)	(0.287)	(0.292)	(0.169)
Observations	831	294	276	1,041
Wald test:				
Goals=Production	0.80	0.41		
Under achiever=Over achiever			0.059	

*Notes: Columns (1) to (3) report OLS regression results.'Life Satisfaction' is self-reported on a 1 to 5 scale, workers in 'No Intervention' constitute the omitted category in columns (1) and (2). In specification (3) the omitted category is 'Achiever', i.e. workers that exactly achieve their goal. 'Under (Over) Achiever' is a dummy for workers that mostly fall short (surpass) their goals (see section V.A). In specification (4) 'Inequality at firm' is the standard deviation of the amount of bowls peeled in a firm, on a given day. Panel regression results with firm and week fixed effects are reported. In all specifications standard errors in brackets are adjusted for clustering at the firm level.*** p<0.01, ** p<0.05, * p<0.1.*

Table A.16: **Number of Working Days by Goal-Setting Type**

Dep.var:	N. of working days			
	week 4	week 5	week 6	week 7
Achiever	-0.062	-0.264	0.264	0.160
	(0.161)	(0.164)	(0.164)	(0.145)
Over achiever	-0.127	0.000	0.183	0.328***
	(0.137)	(0.117)	(0.137)	(0.111)
Constant	1.945***	1.621***	2.080***	1.963***
	(0.073)	(0.076)	(0.090)	(0.070)
Observations	274	205	328	368

*Notes: The dependent variable is the number of days in which a worker peeled cassava, by week, after the goal setting intervention. Under achiever is the omitted category. Standard errors in brackets are adjusted for clustering at the firm level. *** p<0.01, ** p<0.05, * p<0.1.*

Table A.17: **Effect of Goal Setting on Paying Schemes**

Dep.var:	Piece-rate Post	Flat-rate Post
Piece-rate Pre	0.451***	
	(0.147)	
Flat-rate Pre		0.406***
		(0.050)
Goals	-0.013	-0.050
	(0.053)	(0.057)
Constant	0.333***	0.295***
	(0.048)	(0.053)
Observations	469	469

*Notes: Linear probability regressions, 'Piece-rate Post (Pre)' is 1 if the worker was paid piece-rate after (before) the goal setting intervention. Similarly, 'Flat-rate Post (Pre)' indicates whether the worker was paid flat-rate before and after the intervention. Standard errors in brackets are adjusted for clustering at the firm level. *** p<0.01, ** p<0.05, * p<0.1.*

Table A.18: **Determinants of Adoption of a Payment Scheme**

Dep.var:	Piece-rate (1)	Flat-rate (2)
Goals	0.011	-0.046
	(0.078)	(0.080)
Employer's age	-0.001	0.004
	(0.004)	(0.004)
Total n. of employees	-0.006	0.005
	(0.016)	(0.016)
N. of family members	0.023	-0.040
	(0.024)	(0.025)
Years in business	0.006	-0.008
	(0.005)	(0.005)
Constant	0.262	0.475***
	(0.167)	(0.170)
Observations	191	191

Notes: Column (1) presents linear probability regression results where Piece rate *is one if the firm pays workers with a piece rate scheme and is zero if the firm uses any other scheme. In specification (2)* Flat rate *is one if the firm pays workers with a piece rate scheme, and is zero if the firm uses any other scheme.*

Table A.19: **Effect of Goal Setting by Savings**

Dep.var:	Bowls Peeled		Peeling Time		Productivity	
	All	Piece-rate	All	Piece-rate	All s	Piece-rate
	(1)	(2)	(3)	(4)	(5)	(6)
*Goals**Post	0.708**	1.765***	0.539*	0.776	0.054	0.168**
	(0.293)	(0.378)	(0.303)	(0.553)	(0.044)	(0.072)
*Goals**Post**Savings*	-0.000	-0.001**	-0.000	-0.001**	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	5.139***	4.952***	7.014***	6.491***	0.775***	0.783***
	(0.231)	(0.352)	(0.298)	(0.350)	(0.037)	(0.058)
Observations	2,123	765	2,096	754	2,096	754
N. of workers	472	173	467	169	467	169

*Notes: Savings are self-reported by workers in the Pre-Intervention survey. Columns 1, 3 and 5 report results for all workers, column 2,4 and 6 restrict the sample to workers paid piece-rate. Regressions include individual and week fixed effects. Dependent variables are winsorized on both tails at the 5th and 95th percentiles. Standard errors in brackets are adjusted for clustering at the firm level.*** p<0.01, ** p<0.05, * p<0.1.*

Table A.20: **Effect of Goal Setting by Life Satisfaction**

Dep.var:	Bowls Peeled		Peeling Time		Productivity	
	All	Piece-rate	All	Piece-rate	All	Piece-rate
	(1)	(2)	(3)	(4)	(5)	(6)
*Goals**Post	1.462***	3.480***	0.914	1.153	0.077	0.341**
	(0.495)	(0.822)	(0.620)	(0.973)	(0.079)	(0.143)
*Goals**Post**Life Satisfaction*	-0.200*	-0.462**	-0.108	-0.124	-0.006	-0.043
	(0.104)	(0.179)	(0.143)	(0.220)	(0.018)	(0.035)
Constant	5.188***	5.148***	7.016***	6.394***	0.782***	0.807***
	(0.249)	(0.415)	(0.296)	(0.369)	(0.040)	(0.066)
Observations	2,153	779	2,126	768	2,126	768
N. of workers	472	173	467	169	467	169

*Notes: Life Satisfaction is self-reported by workers in the Pre-Intervention survey on a 1 to 5 scale. Columns 1, 3 and 5 report results for all workers, column 2,4 and 6 restrict the sample to workers paid piece-rate. Regressions include individual and week fixed effects. Dependent variables are winsorized on both tails at the 5th and 95th percentiles. Standard errors in brackets are adjusted for clustering at the firm level.*** p<0.01, ** p<0.05, * p<0.1.*

Table A.21: **Effect of Goal Setting by Impatience**

Dep.var:	Bowls Peeled		Peeling Time		Productivity	
	All	Piece-rate	All	Piece-rate	All	Piece-rate
	(1)	(2)	(3)	(4)	(5)	(6)
*Goals**Post	0.562*	1.378***	0.713**	1.124	-0.000	0.070
	(0.318)	(0.389)	(0.362)	(0.682)	(0.047)	(0.083)
*Goals**Post**Impatient*	0.399	0.771	0.072	0.106	0.098**	0.117
	(0.376)	(0.475)	(0.423)	(0.546)	(0.047)	(0.089)
Constant	5.138***	4.937***	6.883***	6.131***	0.784***	0.802***
	(0.272)	(0.432)	(0.347)	(0.450)	(0.040)	(0.071)
Observations	1,616	590	1,595	579	1,595	579
N. of workers	364	135	359	131	359	131

*Notes: Impatient is a dummy equal to 1 if workers stated that they always prefer a smaller, sooner payment to a larger, later payment in the Pre-Intervention survey. Columns 1, 3 and 5 report results for all workers, column 2,4 and 6 restrict the sample to workers paid piece-rate. Regressions include individual and week fixed effects. Dependent variables are winsorized on both tails at the 5th and 95th percentiles. Standard errors in brackets are adjusted for clustering at the firm level.*** p<0.01, ** p<0.05, * p<0.1.*

Table A.22: **Randomization Inference Results**

T	T(obs)	c	n	p=c/n	SE(p)	[95% Conf. Interval]
Bowls peeled	0.819	49	2000	0.025	0.004	0.018 – 0.032
Time peeling	0.505	405	2000	0.203	0.009	0.185 – 0.221
Productivity	0.073	344	2000	0.172	0.008	0.156 – 0.189
Workers paid piece-rate:						
Bowls peeled	1.669	33	2000	0.016	0.003	0.011 – 0.023
Time peeling	0.671	750	2000	0.375	0.011	0.354 – 0.397
Productivity	0.174	215	2000	0.107	0.007	0.094 – 0.122

Notes: Confidence interval is with respect to $p = \frac{c}{n}$. ($c = \#\{|T| \geq |T(obs)|\}$).

Table A.23: **Peer Effects**

	Peel More (1)	Compete (2)
Production	0.078**	
	(0.039)	
Goals	0.099***	0.129**
	(0.034)	(0.050)
Constant	0.772***	0.667***
	(0.029)	(0.043)
Observations	834	470
Wald test: *Goals=Production*	0.51	

*Notes: Columns (1) and (2) report linear probability model regressions. Peel More is 1 if a worker stated that he/she prefers to peel more cassava than his/her colleagues. Compete is 1 if a worker agrees with the statement that the intervention made his/her job into more of a competition. Standard errors in brackets are adjusted for clustering at the firm level. *** p<0.01, ** p<0.05, * p<0.1.*

Table A.24: **Effect of Goal Setting by Competitive Attitude**

	Not Competitive			Competitive		
Dep.var:	Bowls Peeled	Peeling Time	Productivity	Bowls Peeled	Peeling Time	Productivity
	(1)	(2)	(3)	(4)	(5)	(6)
*Goals**Post	1.037*	1.998***	-0.0713	0.686**	0.285	0.0747*
	(0.547)	(0.585)	(0.0978)	(0.304)	(0.312)	(0.0447)
Constant	3.765***	7.703***	0.652***	5.400***	6.881***	0.803***
	(0.218)	(1.324)	(0.111)	(0.282)	(0.264)	(0.0433)
Observations	268	264	264	1,877	1,855	1,855
N. of workers	59	57	57	410	407	407

Notes: Competitive *is a dummy equal to 1 if a worker states that he/she prefers to peel more than the other workers. Workers who do not want to peel more than their colleagues are classified as* Not Competitive. *Regressions include individual and week fixed effects. Standard errors are adjusted for clustering at the firm level. *** p<0.01, ** p<0.05, * p<0.1.*

Table A.25: **Effect of Goal-Setting on Competitive Attitudes**

Dep.var:	Competitiveness			
	Stable peers		Unstable peers	
	(1)	(2)	(3)	(4)
Goals	-0.010	-0.011	0.112*	0.110*
	(0.041)	(0.043)	(0.057)	(0.058)
Employer age		0.001		0.001
		(0.002)		(0.003)
N. of workers		-0.003		0.013**
		(0.008)		(0.006)
N. of family members		0.007		-0.005
		(0.014)		(0.011)
N. years in business		0.001		-0.002
		(0.002)		(0.004)
Constant	0.886***	0.832***	0.791***	0.724***
	(0.034)	(0.079)	(0.050)	(0.118)
Observations	406	401	344	342

*Notes: The dependent variable is equal to 1 if the worker answered affirmatively to the question Do you prefer to peel more cassava than your colleagues?. A worker has 'stable peers' if he/she peels always with the same colleagues, while peers are 'unstable' when the composition of the peelers groups changes over time. Standard errors in brackets are adjusted for clustering at the firm level. *** p<0.01, ** p<0.05, * p<0.1.*

Table A.26: **Effect of Competitiveness on Performance and Goal-Setting**

Dep.var:	Bowls peeled (1)	Time peeling (2)	Productivity (3)	Chosen goals (4)
Competitive	-0.034	0.039	0.042	-0.168
	(0.415)	(0.461)	(0.046)	(0.502)
Constant	5.311***	7.382***	0.773***	5.913***
	(0.445)	(0.548)	(0.068)	(0.538)
Observations	829	820	820	828

*Notes: The dependent variable is the number of bowls peeled (column 1), the time spent peeling (column 2) and productivity (column 3) after the goal setting intervention. In columns (4) the dependent variable is the chosen goal. Regressions include individual and week fixed effects. Dependent variables are winsorized on both tails at the 5th and 95th percentiles. Standard errors in brackets are adjusted for clustering at the firm level. *** p<0.01, ** p<0.05, * p<0.1.*

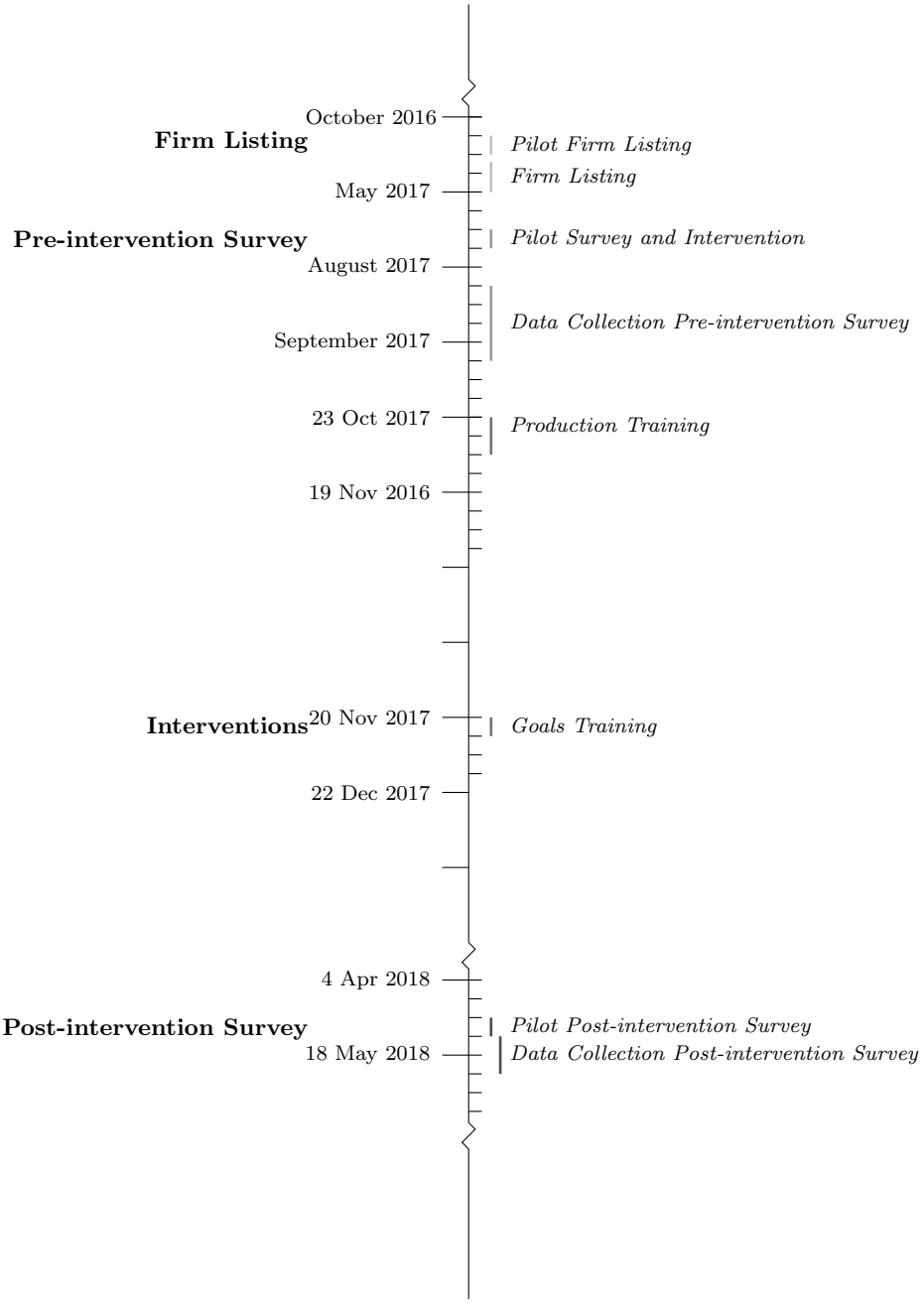
Table A.27: **Effect of Goal Setting by number of Family Members**

Dep.var:	Less than 3			More than 2		
	Bowls Peeled	Peeling Time	Productivity	Bowls Peeled	Peeling Time	Productivity
	(1)	(2)	(3)	(4)	(5)	(6)
*Goals**Post	0.889***	0.378	0.100*	0.873**	0.513	0.0756
	(0.332)	(0.430)	(0.0562)	(0.379)	(0.378)	(0.0515)
Constant	5.169***	6.540***	0.780***	5.226***	6.591***	0.850***
	(0.298)	(0.308)	(0.0486)	(0.419)	(0.466)	(0.0712)
Observations	1,719	1,696	1,696	1,407	1,393	1,393
N. of Workers	391	387	387	280	279	279

Notes: Less than 3 *is a dummy equal to 1 for firms that employ fewer than 3 family members,* More than 2 *is a dummy equal to 1 for firms that employ at least 3 family members. All regressions included week fixed effects, standard errors in brackets are adjusted for clustering at the firm level. *** p<0.01, ** p<0.05, * p<0.1.*

B Project Timeline

FIGURE 1: STUDY TIMELINE



C Images

Figure C.2: Cassava Peelers at Work

Figure C.3: A Filled Bowl

Figure C.4: Production Booklet

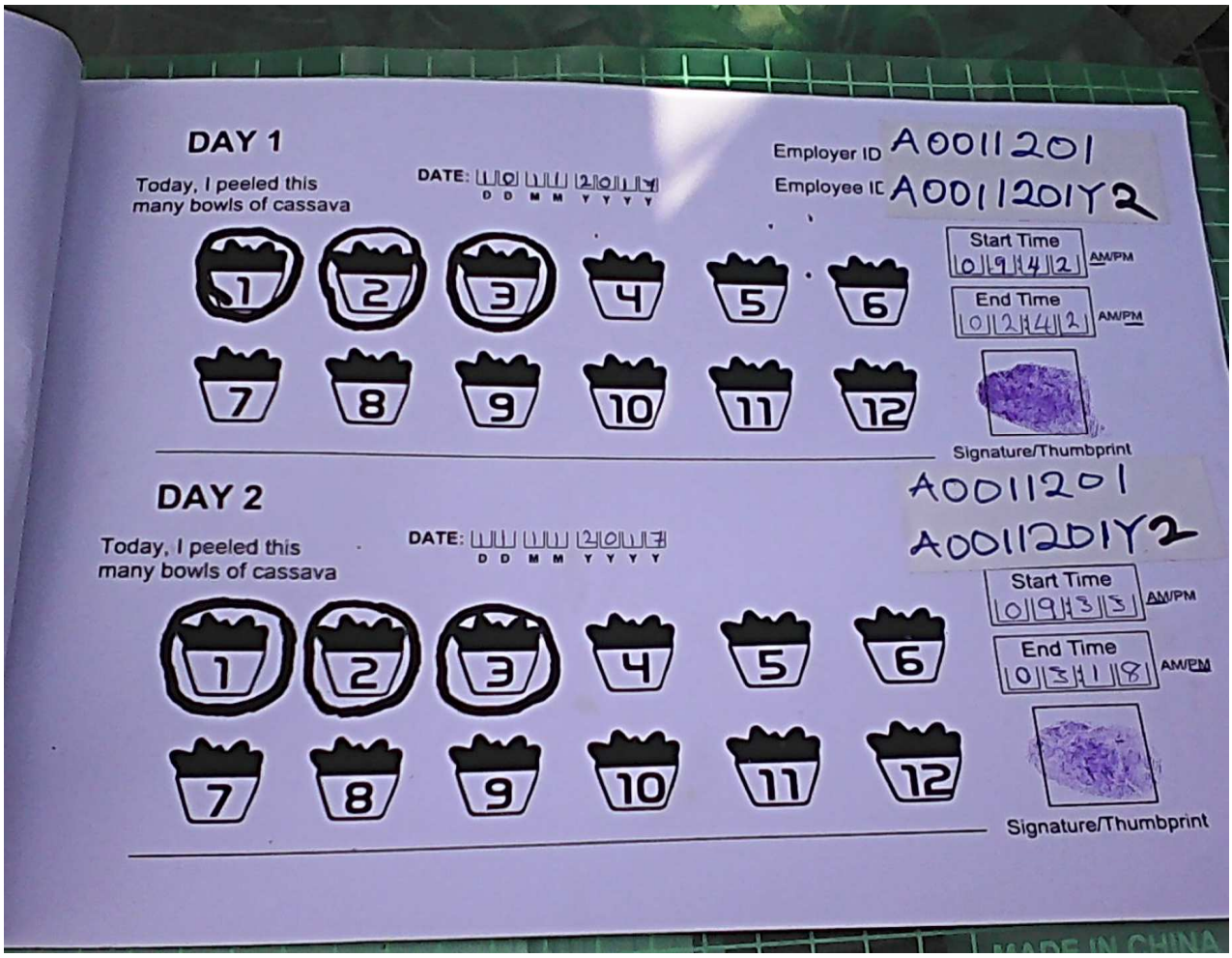
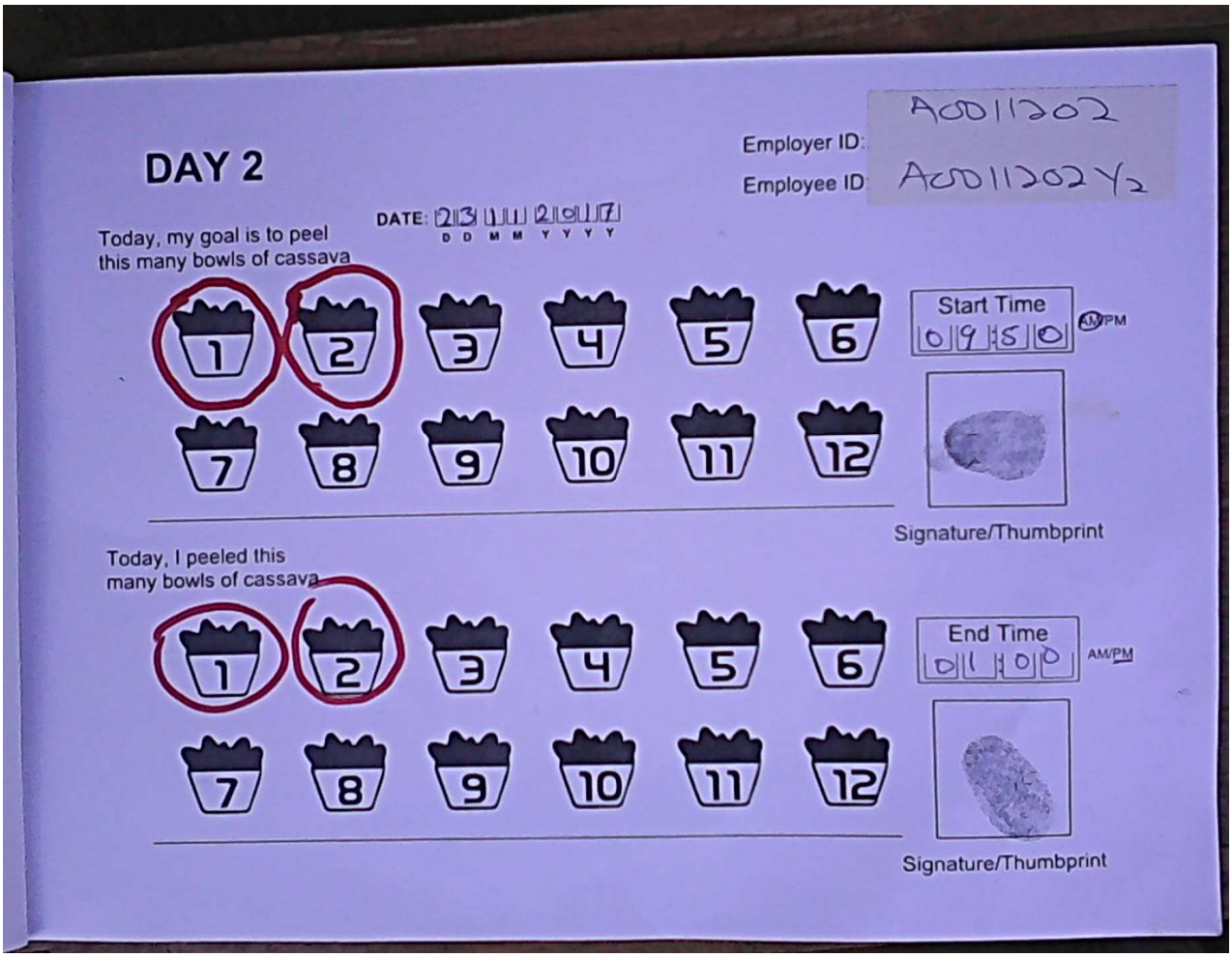


Figure C.5: Goals Booklet



D Literature on Goal Setting: A Review

Table D.28: **Goal Setting Literature**

Paper		Literature		Method						Type of goals and incentives					
					Experimental					Who chooses the goal?			Is the goal achievement rewarded?		
Authors	Year	Psychology	Economics	Theory	Lab	Field		Online (e.g. M-turk)	Literature Review	Exogenous	Endogenous	Mixed (employer and employee)	Yes		No
						Developed country	Developing country						Monetarily	Other way	
Latham, Kinne	1974	✓				✓				✓					✓
Latham, Yukl	1975	✓							✓						
Latham, Locke	1979	✓							✓						
Locke et al.	1984	✓			✓					✓	✓				✓
Latham, Locke	1991	✓							✓						
O'Leary-Kelly et al.	1994	✓							✓						
Locke	1996	✓							✓						
Locke	2004	✓							✓						
Wu et al.	2008		✓	✓											
Anderson et al.	2010		✓			✓						✓	✓		
Koch, Nafziger	2011		✓	✓							✓				✓
Gomez-Miñambres	2012		✓	✓						✓				✓	
Hsiaw	2013		✓	✓							✓			✓	
Smithers	2015		✓		✓					✓					
Corgnet et al.	2015		✓		✓					✓			✓		✓
Kaur et al.	2015		✓	✓			✓				✓		✓		
Dalton et al.	2016		✓	✓	✓						✓				
Koch, Nafziger	2016		✓	✓							✓		✓		
Samek	2016		✓			✓					✓				✓
Clark et al.	2016		✓			✓					✓				✓
Brookings, Goerg, Kube	2017		✓			✓					✓		✓		✓
Corgnet et al.	2018		✓	✓	✓					✓					✓
van Lent	2019					✓					✓				✓
Koch, Nafziger	2020		✓	✓	✓					✓					✓
Kaiser et al.	2023		✓					✓			✓				✓
Gonzalez et al.	2023		✓	✓	✓						✓		✓		✓
This Paper			✓				✓					✓			✓

E Persistence and Diffusion

An important question is whether the effects of goal-setting persist over time. We first observe that in *Goals* production and productivity are weakly increasing during the four weeks after the goal-setting training, while the time spent peeling is decreasing (none of these relationships is statistically significant). Result are reported in Table E.29 below, where *Week of intervention* is a week linear trend. The same is confirmed by Figure E.6 and Figure E.7, which shows treatment effects by week. To understand whether firm owners endorse the intervention and adopt it after the experiment period is over, we look at their answers in the post-intervention survey. We observe that the practice has been widely recognized as useful, as they overwhelmingly agree with statements such as *setting goals helps my firm to be more productive* and *setting goals helps my employees to be more productive*. Almost all employers (99%) state that they plan to set goals in the future. Furthermore, firm owners in *Goals* are more likely to say that the last time they had set a goal for their business was on a date after the completion of the intervention. Although this is not statistically significant at conventional levels (p-value = 0.14), it is an indication that the intervention stimulated employers to think more broadly about goal setting. Workers alike display high levels of satisfaction with the intervention, as 92% of them state that they are very satisfied or satisfied. Furthermore, 94% state that the program was very helpful or helpful for them, and 81% state that the process of making and tracking goals did not take away time from peeling, or if it did, it did not affect how much they peeled. All in all, the intervention seemed to be very well received and there are indications that the practice of setting goals will be persistently used by cassava peeling firms.

Another way in which interventions can have enduring effects beyond the implemented experiment is when practices spill over to untreated groups. We test whether workers and firms in *No Intervention* and *Production* groups are more likely to be familiar with goal setting after the conclusion of the intervention, as compared to their answers at pre-intervention. In both groups, after the intervention a larger number of firms state that they know what a goal is, but the increase is statistically significant only in *Production* (Chi-2 test, p-value < 0.01). We also ask employers whether they have ever set a target for their business; again we observe that firms in both groups more frequently answer positively to this question after the intervention, and that this increase is statistically significant for firms in *Production* (Chi-2 test, p-value < 0.05). As far as workers are concerned, we observe that after the inter-

vention period a higher number of workers in *Production* and *No Intervention* state that they had set a goal in their job. The change is marginally statistically significant in the former group (Chi-2 test, p-value < 0.10), but not in the latter (Chi-2 test, p-value $= 0.12$). In sum, there is some evidence that the practice of setting goals has been diffused to firms and workers in non-treated groups, especially among those that were trained in measuring and recording production. While only suggestive, we believe that these potential spillovers to the firms in *Production* are possible because measuring production is a pre-condition to setting goals, and the goal setting practice is easily scalable and transferable.[44]

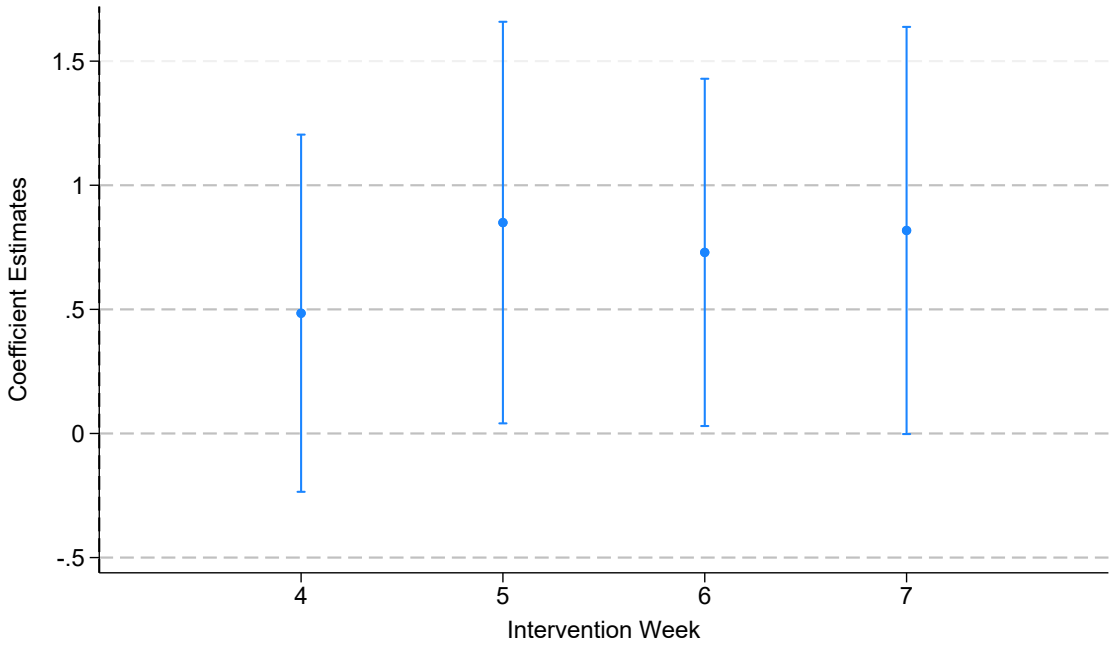
[44]We also test whether diffusion of goal setting is a function of the geographical distance between untreated firms and firms in *Goals*, but we do not find consistent evidence to this effect. Results are available upon request.

Table E.29: **Time Trends in *Goals* After the Training**

Dep.var:	Bowls peeled (1)	Peeling time (2)	Productivity (3)
Week of intervention	0.091	-0.0111	0.0122
	(0.074)	(0.070)	(0.012)
Constant	5.329***	7.371***	0.770***
	(0.429)	(0.404)	(0.072)
Observations	1,213	1,200	1,200
N. of workers	390	387	387

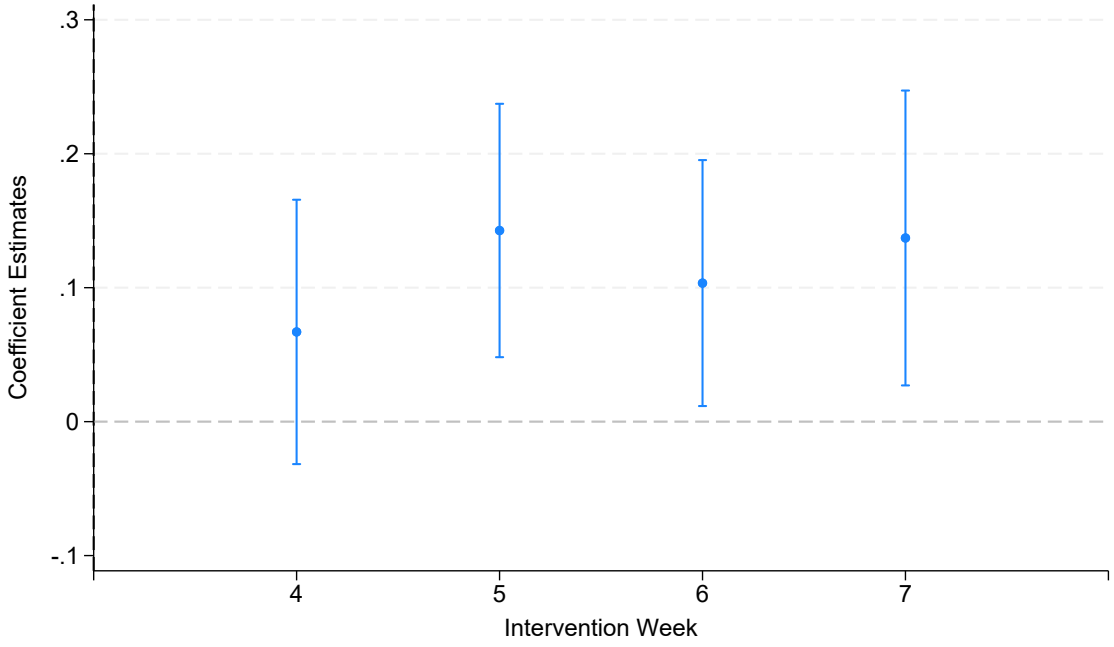
*Notes: Regressions include individual fixed effects. Dependent variables are winsorized on both tails at the 5th and 95th percentiles. Standard errors in brackets are adjusted for clustering at the firm level. *** p<0.01, ** p<0.05, * p<0.1.*

Figure E.6: **Treatment Effects by Week: Production**



*Notes: Treatment effects are estimated using a fixed effects regression model, where weeks are interacted with Goals*Post. The omitted week is the one preceding the start of the intervention.*

Figure E.7: **Treatment Effects by Week: Productivity**



*Notes: Treatment effects are estimated using a fixed effects regression model, where weeks are interacted with Goals*Post. The omitted week is the one preceding the start of the intervention.*

F Cost-Benefit Analysis

In this section, we calculate a ballpark figure of the costs and benefits of the intervention for workers and employers, making assumptions where necessary. A comprehensive calculation of costs and benefits would require precise data of how the intervention impacted all stages of production, but we focused only on the first part of the production chain because it was very similar across all firms. Every firm peels cassava roots using pretty much the same labor-intensive technology, while firms slightly differ in the way they process the peeled cassava. Therefore, we decided to obtain measures of the amount of cassava roots peeled, while giving less attention to how the treatment impacts firms' final output, sales, and profits. We have also collected some firm level data in the pre and post intervention surveys but not surprisingly for the context, these data are very noisy and incomplete. The cost-benefit analysis is based on the data collected during the month in which the goal setting intervention was implemented, and on information collected in the pre-intervention survey. Some considerations are at place. First, all monetary amounts in the cost-benefit calculation are expressed in purchasing power parity dollars. Second, it is important to note that cassava is harvested throughout the year; our intervention was implemented during the dry season, which is characterized by a lower harvest compared to the wet season. Hence, it is likely that the estimated benefits are a low bound.

F.A Firm Level Analysis

Costs

Regarding costs, we first consider those that would need to be incurred by a firm who wants to implement the goal-setting practice. These are a) materials costs per employee: one aluminum bowl and one booklet to keep records, and b) the opportunity cost of the firm owner of spending one hour in the training. At the time of the intervention, the price of a bowl was about $10 and a booklet that could be used for 1 month cost $1. Note that these are the actual prices we paid to purchase the materials, but firms may be able to find cheaper items. Based on pre-intervention survey data, we estimate that one hour of training has an opportunity cost for the employer of $4. We do not include the fixed costs for the video outlining the protocol, as it is freely available, and the opportunity cost of filling in the booklets, as it is negligible (this is confirmed by the post-intervention survey, where around 80% workers state

that the process of making and tracking goals did not reduce their peeling time). Also, the costs of the mobile phone with camera and the salaries of the field team are excluded from the calculations, as these costs are incurred only for data collection purposes.

Next, we consider salary costs that firms incur as a result of the intervention, distinguishing between piece-rate and flat-rate payment schemes (recall that firms tend to pay all their employees either with one scheme or the other). From the pre-intervention survey we know that on average, workers paid piece rate earn $31 during a week in the low season. For these workers, setting goals increases the amount of bowls peeled by 33% during the period of study (c.f. column 1 in Table 3); we assume that this increase in production translates into an increase in salary costs of the same magnitude, that is an increase of $10 per week. Extra salary costs are thus equivalent to $40 per worker-month in firms that pay piece-rate. Salary costs did not increase for firms that pay flat-rate.[45] To summarize, for a representative firm with four employees the intervention has a one-off investment cost of $45 (4 bowls plus booklet and the opportunity cost of one hour of training), and additional salary costs of $160 if the firm pays workers with a piece-rate scheme.

Benefits

Our starting point in the calculation of firms' benefits is that goal setting increases the amount of cassava that workers peel during a shift. We only calculate benefits for firms that pay piece-rate, as the benefits for firms that pay flat-rate are negligible and statistically insignificant. Setting goals increases production of piece-rate workers by 33% (c.f. column (1) in Table 4). Based on our interviews with cassava processors, we infer that firms can buy more cassava to peel in response to workers' increased production, and that all the peeled cassava is processed into gari or dough and sold in the market. Since salary costs of piece-rate workers increase in proportion to the increase in peeled cassava, we assume that also profits grow at the same rate, that is by approximately $319 per month. This figure is already net of the additional salary costs incurred by the firm.

To summarize, for a firm that pays piece-rate, setting goals has a one-off invest-

[45]Salary costs could increase in firms that pay flat-rate if, for example, workers would demand higher salaries when working longer. Since we do not observe an increase in output for these workers, it is reasonable to assume that flat-rate payment schemes did not change as a result of the intervention.

ment cost of $45 and $319 of additional profits. These figures indicate that the intervention has on balance positive effects for firms who pay piece-rate. In contrast, setting goals does not seem to be a beneficial policy for firms that pay their employees flat-rate, as costs are not matched by a sufficient increase in output. It remains to be seen whether the intervention would be beneficial if workers and firms renegotiate flat payment fees.

Note that these calculations do not include the potential monetary gains from avoiding raw cassava waste. Cassava roots are highly perishable, and post-harvest physiological deterioration (PPD) is such that roots need to be processed within maximum 72 hours after harvest. The incidence of PPD in Ghana is very high, ranging from 10% to 35%, and is partly attributable to the inefficiencies in the peeling process (The Rockefeller Foundation Cassava Innovation Challenge). It is sensible to assume that the increase in production can fully eliminate the issue of PPD. Moreover, by setting goals piece-rate workers become more productive (c.f. column (5) in Table 4); the amount of cassava bowls they peel in one hour increases by 21% on average. Although this productivity increase does not have direct benefits for firms paying piece-rate, it may still benefit firms in so far as the available workforce can, for example, complete other tasks during the time that is freed up from peeling. We do not quantify these benefits.

F.B Worker Level Analysis

As described in the firms' costs section, workers paid piece-rate earn about $40 extra per month when they set goals which corresponds to a salary increase of around 30%. Workers are also more productive, which means that compared to the pre-treatment period, they are able to increase their earnings with a less-than proportional increase in time spent working. Differently stated, for a given production level workers trained in setting goals enjoy an increase in leisure time of about 21%. Workers paid flat rate earn on average $23 per week during the low season. They also peel more cassava as a result of goal setting, but the increase is negligible (1%). They do spend more time at work though when setting goals, around 40 extra minutes per shift equivalent to an 8% increase, for which they are supposedly not compensated. If we assume that leisure time has the same monetary value as labor, then this amounts to a loss of $7.2 per month. The fact that we do not observe a decrease in well-being among workers paid flat-rate (c.f. column 3 in Table A.15), suggests that the lost

leisure time did not have a strong impact on workers, maybe because the practice of goal setting can, on its own, increase satisfaction (Locke and Latham, 2002).

F.C Comparison with Other Interventions

How do these results compare to other interventions which aim at increasing productivity/profitability of small firms in developing countries? Conducting a direct cost-benefit comparison is challenging due to several key differences with the existing studies; whereas they primarily concentrates on entrepreneurs, our study focuses on workers. Moreover, most studies aim to impart a range of management practices to entrepreneurs. This is in contrast to our approach, where both workers and entrepreneurs are trained in one specific practice (for a comprehensive review of this literature, see VoxDevLit 'Training Entrepreneurs', vol. 1, issue 1-2). In contrast to our 1-hour of training, the mode of knowledge transfer in existing studies is often resource-intensive, involving methods like business consulting (as seen in Bloom et al., 2013; Bruhn et al., 2018; Anderson and McKenzie, 2020; Iacovone et al., 2020), classroom trainings (reviewed by McKenzie, 2021), mentoring (Brooks et al., 2018; Anderson et al., 2020; Assinova, 2020; Bakhtiar et al. 2021), outsourcing (Anderson and McKenzie, 2020), or peer interactions (Fafchamps and Quinn 2016; Cai and Szeidl, 2018; Dalton et al, 2022). Finally, while these studies typically rely on firm-level outcome measures collected through baseline and endline surveys (e.g., management practices, sales, profits), our study is distinct in its focus on measuring worker-level performance during the intervention.

Despite the differences outlined above, it's informative to look at the broader impact of these interventions as reviewed by McKenzie (2021). Generally, these initiatives show modest effects on profits and sales, typically around 5-10%, with many studies not reaching statistical significance due to low power. The costs of these interventions also exhibit a wide range, from as low as $21 for a course in the Dominican Republic (Drexler et al., 2014) to as high as $553 per firm for mentoring in Kenya (McKenzie and Puerto, 2020) and $740 for a three-week training course in Ghana (Mano et al., 2012). Given these costs and impacts, our intervention stands out as particularly cost-effective.

A notable difference between our study and this literature is that we obtain performance measures at the worker level. These are mostly not available in other studies because they focus on micro firms, which typically do not employ any staff (Woodruff and McKenzie, 2014). Furthermore, even in studies that involve firms with employees, obtaining accurate productivity data at the individual level poses considerable challenges in developing countries, especially in small firms.[46] As Oye and Schaefer (2011) underscore, collecting reliable individual-level production data is one of the most significant hurdles in personnel economics research. Iacovone et al. (2022) is one exception which measures labor productivity using administrative firm-level data. They found that a group-based firm training increased labor productivity by 11-14%, though the result is not statistically significant. The intervention cost $10,500 per firm.

Finally, we can relate our study to other field experiments aiming at directly increasing labor productivity in routine tasks (see Bandiera et al., 201 and Levitt, 2014 for a review of field experiments in the firm). These studies typically concentrate on a single firm, altering the incentive structures (monetary or non-monetary) within a specific section of that firm or organization. In contrast, our approach utilizes both within and between firm variation. This methodological differences might explain why the impact of various interventions on productivity tends to be highly variable and context specific. For example, Shearer (2004) collaborated with a Canadian tree-planting firm and found that switching from flat-rate to piece-rate pay increased worker productivity by 20%. Bandiera et al. (2013) observed a 24% productivity boost in fruit pickers at a UK firm due to team monetary performance bonuses, but this effect was limited to highly productive workers. Similarly, team bonuses led to a 3% performance increase in a large retail firm's seller, as reported by Friebel et al. (2017). In a different context, Hosein and List (2012) found a 1% productivity increase in a Chinese high-tech manufacturing facility due to framing manipulation. The papers in this literature mostly do not provide detailed cost-benefit analysis, probably because the focus is on testing specific incentives on workers' performance,

[46]Bloom et al. (2013) measures the effect of management consulting on total factor productivity (TFP) in large textile firms in India, where TFP is defined at the firm level as log(value added) Äì 0.42*log(capital) Äì 0.58*log(labor), where the factor weights are the cost shares for cotton weaving in the Indian Annual Survey of Industry, and labor is production hours.

rather than examining how such incentives affect firms' outcomes like sales and profits.