Improving Workers' Performance in Small Firms:

A Randomized Experiment on Goal Setting in Ghana

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Motivation

- Small firms are the main source of employment in LICs.
- In Sub-Saharan Africa, small firms provide 80% of all jobs, representing an important driver of economic growth (Runde, 2021).
- Understanding how to foster the growth of small firms is an important research and policy goal.

How to Facilitate Small Firms in LICs Growth?

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  - Capital: finance (Ayyagari et al., 2012), cash or in-kind grants (de Mel et al., 2008; Fafchamps et al., 2014).
  - Technology (Serrano et al., 2021)
  - Managerial Practices (McKenzie, 2021)

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  - Managerial Practices (McKenzie, 2021)
- Less attention has been given on how to foster small firm's growth by improving labour performance.
- Very relevant for agricultural and agro-processing firms in LICs: labour productivity is low (Golin et al., 2014) and barriers to capital, management and technologies are high (Fuglie et al., 2020).

Agricultural and Agro-processing Small Firms in LICs

- Primary source of employment in LICs, employing $>$ 1 billion people (ILO, 2013).
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  - Pay for performance has no impact on workers' performance (Bandiera & Fischer, 2013)
  - Low [high] effort is not punished [rewarded] (Davies & Fafchamps, 2021)
- Non-monetary incentives: recognition, praise, goals.
  $\rightarrow$ More promising (Ashraf et al., 2014; Davies & Fafchamps, 2017).

Can non-binding goals improve workers performance?

Goals and Production Measurement

Why Mere Goals?

- Simple to understand and implement.
- No monetary resources required (Brookins et al., 2017; Gonzalez et al., 2020)
- Boost workers' intrinsic motivation:
  - Provides meaning, structure, organization and focus: attaining goals creates a sense of accomplishment and increases satisfaction (Latham & Kinne, 1974; Locke & Latham, 2002)
  - Reference point (Heath et al., 1999; Wu et al., 2008; Corgnet et al., 2015, Dalton et al., 2015; Gonzalez et al., 2020, etc.)
  - Commitment device for self-control (Koch & Nafziger 2011, Hsiaw, 2013)

Why Cassava?

- Cassava has economic relevance in all African economies:
  - 26% of per capita daily consumption in Ghana.
  - 22% of the agricultural gross domestic product (Fao, 2005).
- The technology of cassava processing is simple and labor intensive.
- Several industries in developing countries operate on a similar scale to cassava processors, which increases the external validity of our study.
- About 40% of the employers in our study mentioned labor supply as one of the reasons why their firm is unable to produce more.
- The cassava processing sector is predominantly run by women.

Cassava Processing

Peeling

Washing, Cutting Graining

Roasting → Gari

Pressing → Dough

Experimental Design

- We randomly assign 425 cassava processors to three groups:
  - Production Measurement: production measurement only (N=105)
  - Goals: production measurement + setting goals (N=210)
  - No Intervention: no training (N=110)

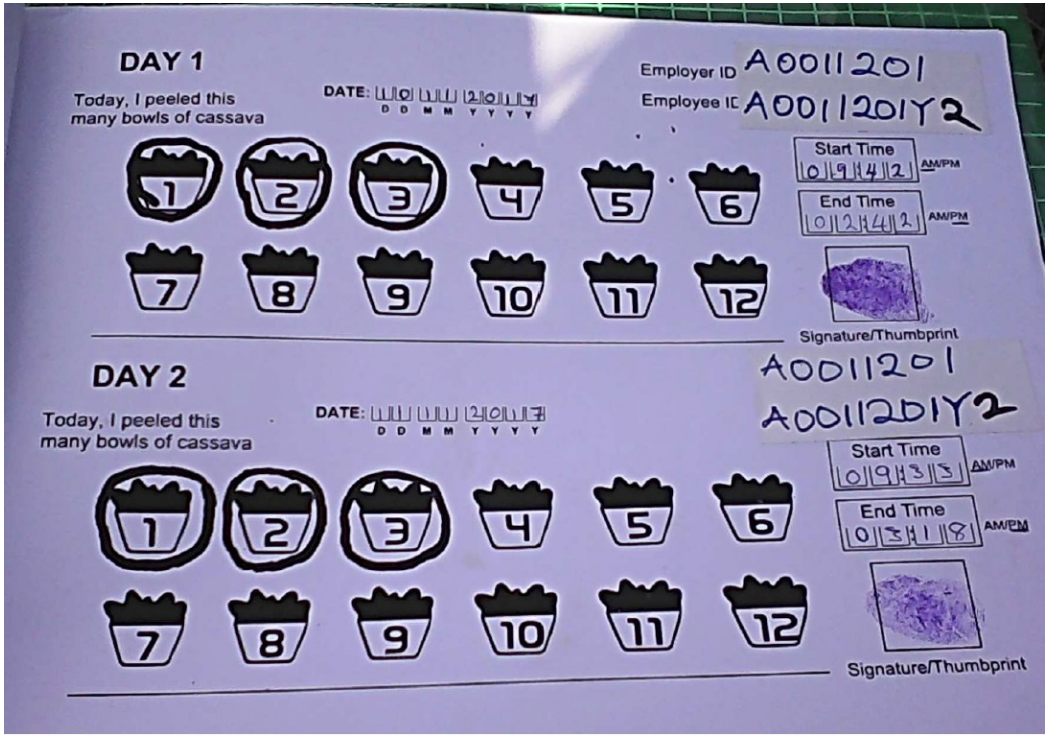
Treatment group	Pre-intervention Survey	Measure Production (week 1-8)	Set Goals (week 4-8)	Post Intervention Survey
Production Measurement	✓	✓		✓
Goals	✓	✓	✓	✓
No Intervention	✓			✓

Production Measurement Training

- 1-hour training on firms' premises for employers and workers to measure and record daily individual production.

- Training materials:
  - Video outlining the protocol
  - Aluminum bowls of a standardized size (one per employee, up to four employees).
  - Stickers with unique ID codes of employee and employer.
  - Production booklet for each employee.
  - Mobile-phone with a camera.
  - Miscellaneous utensils (e.g. pencils, sheets, stickers, markers, etc).

Daily Production Measurement Protocol

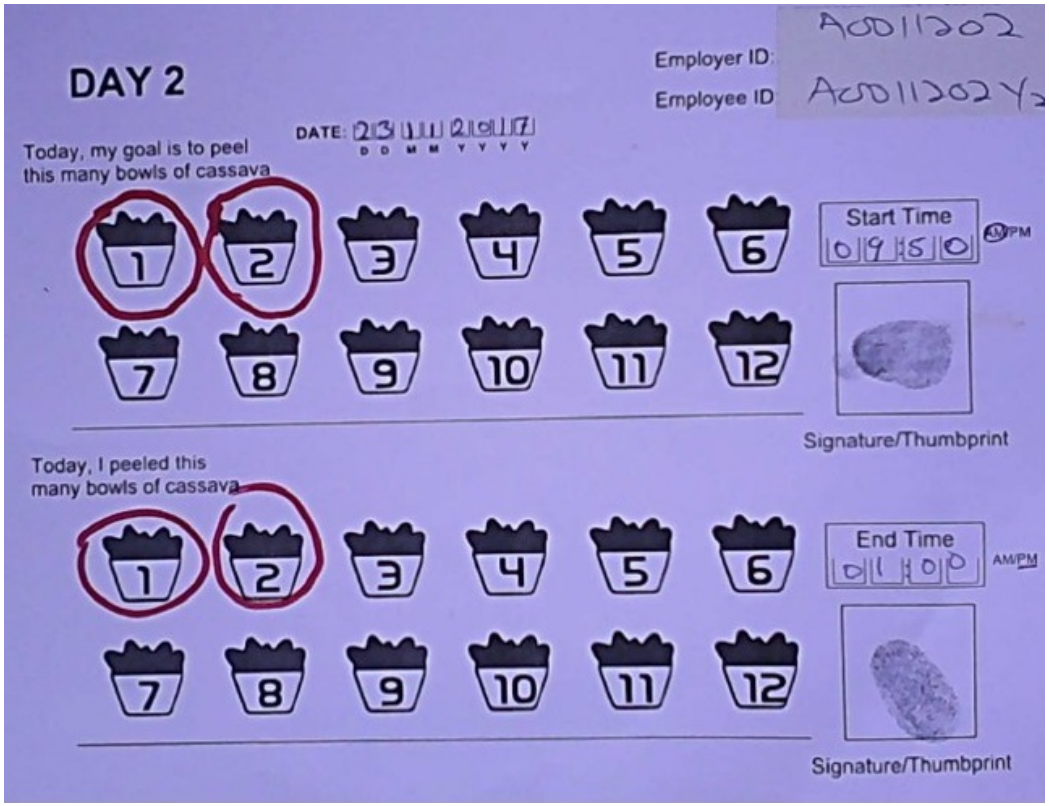


1. Place sticker on bowls with the employer and worker ID and name.
2. Employer fills in the date and start time in the worker's booklet.
3. Worker peels and fills in his/her bowl up to the brim.
4. Employer takes a picture of the filled bowl and circles the bowl in the booklet.
5. End of shift: employer fills in end time, worker puts thumbprint/ signature.

Filled Bowl

Figure: Uniquely identified bowl filled in with peeled cassava

Daily Goal Setting Protocol



1. The worker and employer agree on the production goal for the day.
2. Worker fills in his/her own goals in his/her goals booklet.
3. Employer takes a picture of the filled in goals booklet.
4. Same production measurement protocol applies.

Employers' Characteristics and Balance Tests

Table: Employers' Characteristics and Balance Tests

	(1) Production	(2) Goals	(3) Control	(4) Overall	(1) vs. (2) p-value	(1) vs. (3) p-value	(2) vs. (3) p-value	N
Age	42.837	42.599	42.500	42.632	0.863	0.815	0.938	422
	(1.136)	(0.791)	(0.893)	(0.532)				
Male	0.087	0.072	0.100	0.083	0.653	0.737	0.390	422
	(0.028)	(0.018)	(0.029)	(0.013)				
Education	4.519	4.470	4.155	4.400	0.920	0.496	0.497	422
	(0.397)	(0.279)	(0.360)	(0.193)				
Years in the firm	14.146	13.216	13.473	13.511	0.419	0.631	0.811	421
	(1.068)	(0.612)	(0.912)	(0.464)				
Peeling days	3.048	2.851	2.891	2.910	0.276	0.473	0.824	422
	(0.156)	(0.101)	(0.153)	(0.074)				
N. of workers	4.942	4.729	4.330	4.678	0.535	0.089	0.195	419
	(0.290)	(0.193)	(0.213)	(0.131)				
Family members	2.359	2.295	1.982	2.229	0.765	0.094	0.111	419
	(0.179)	(0.122)	(0.139)	(0.083)				
Sales $PPP	659.349	532.086	483.188	550.445	0.175	0.106	0.524	421
	(93.899)	(46.621)	(57.572)	(35.889)				
Profits $PPP	191.581	158.258	134.753	160.269	0.662	0.515	0.714	421
	(74.120)	(39.172)	(47.859)	(29.264)				
Written records	0.067	0.048	0.027	0.047	0.482	0.167	0.374	422
	(0.025)	(0.015)	(0.016)	(0.010)				
Track output	0.058	0.043	0.036	0.045	0.576	0.462	0.768	422
	(0.023)	(0.014)	(0.018)	(0.010)				
Ever set a goal	0.553	0.570	0.555	0.562	0.776	0.987	0.786	420
	(0.049)	(0.034)	(0.048)	(0.024)				
Life satisfaction	3.538	3.769	3.734	3.703	0.114	0.223	0.803	421
	(0.117)	(0.085)	(0.110)	(0.058)				

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Age	38.231	35.200	35.277	35.968	0.027	0.066	0.955	844
	(1.128)	(0.782)	(1.137)	(0.561)				
Male	0.178	0.234	0.195	0.210	0.110	0.642	0.269	844
	(0.027)	(0.021)	(0.027)	(0.014)				
Education	5.346	5.764	5.616	5.622	0.202	0.473	0.651	843
	(0.264)	(0.190)	(0.268)	(0.134)				
Experience	5.364	4.567	4.144	4.655	0.059	0.009	0.274	834
	(0.366)	(0.235)	(0.285)	(0.165)				
Income $PPP	28.435	26.672	20.741	25.597	0.563	0.005	0.020	737
	(2.551)	(1.735)	(1.087)	(1.109)				
Piece rate	0.327	0.378	0.332	0.353	0.209	0.914	0.247	844
	(0.033)	(0.024)	(0.032)	(0.016)				
Flat rate	0.495	0.451	0.505	0.476	0.293	0.847	0.196	844
	(0.035)	(0.024)	(0.034)	(0.017)				
Ever set a goal at job	0.543	0.571	0.490	0.544	0.663	0.461	0.185	398
	(0.052)	(0.035)	(0.050)	(0.025)				

Notes: 'Income' indicates weekly income,'Experience' is the number of years in the firm.

Estimation Method

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- y_{it} outcome variable of worker i on day t.
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- Effect of goal setting on firms' average product of labour: # bowls/# no of workers:

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

Results

Impact of Goal Setting

Table: Effect of Goal Setting on Worker's Performance

Dep.var:	*Bowls peeled*		*Peeling time*		*Productivity*	
	(1)	(2)	(3)	(4)	(5)	(6)
*Goals**Post	0.822***	0.818***	0.658**	0.503*	0.0846	0.0726*
	(0.288)	(0.268)	(0.324)	(0.281)	(0.0550)	(0.0406)
Constant	5.185***	5.187***	6.743***	6.600***	0.882***	0.809***
	(0.274)	(0.259)	(0.349)	(0.282)	(0.0929)	(0.0435)
Observations	3,126	3,126	3,089	3,089	3,089	3,089
N. of workers	671	671	666	666	666	666
Winsorized		YES		YES		YES

Notes: Regressions include worker and week fixed effects. Deependent variables are winsorized on both tails at the 1st and 99th percentiles. Standard errors are clustered at the firm level. *** p<0.01, ** p<0.05, * p<0.1.

- Setting goals increases production by 0.82 bowls a day, 16% more than in *Production Measurement* (0.30 s.d.), and increases working time by about 40 minutes, i.e. 10% more (0.24 s.d.)

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- Productivity increase by 0.08 bowls per hour, i.e. 9% more (0.16 s.d.)

Average Product of Labor

Table: Effects of Goal Setting on the Average Product of Labor

Dep.var:	*Average Product of Labor*	
	(1)	(2)
*Goals**Post	0.660**	0.656***
	(0.274)	(0.251)
Constant	4.965***	4.923***
	(0.218)	(0.208)
Observations	1,527	1,527
N. of firms	272	272
Winsorized		YES

Notes: Average Product of Labor is defined as total bowls peeled in a firm during a day, divided by the number of workers. Regressions include firm and week fixed effects. Standard errors are clustered at the firm level. *** p<0.01, ** p<0.05, * p<0.1.

- Setting goals increases the average product of labor by 0.66 bowls per worker a day, 13% more than in *Production Measurement* (0.23 s.d.)

Mechanisms: Why Do Goals Increase Performance?

Goals as Self-regulation Devices

- Goals ↑ motivation/effort because they act as reference points, which can be used as commitment devices by individuals with low self-control.

- Suggestive evidence:
  - Effects stronger for workers with lower self-control, proxied by lower savings, lower life-satisfaction and higher impatience (Cobb-Clark et al., 2022).
  - Effects driven by those workers paid piece-rate, who benefit directly from increasing production → behavioral constraint.

HTEs: By Payment Scheme at Baseline

Table: 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	1.708***	0.196	0.691	0.698	0.214**	-0.0108
	(0.381)	(0.329)	(0.603)	(0.435)	(0.108)	(0.0572)
Constant	5.235***	5.130***	6.460***	7.695***	0.908***	0.789***
	(0.446)	(0.278)	(0.385)	(0.500)	(0.130)	(0.0639)
Observations	779	1,374	768	1,358	768	1,358
N. of workers	173	299	169	298	169	298

Notes: 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.

- Goal Setting is very effective for workers who are paid piece-rate: bowls peeled increase by 32%, (0.6 s.d.) and productivity increases by 24% (0.26 s.d.).
- Note: Piece-rate schemes are as common in *Goals* as in *Production*, both at baseline and after the intervention. 76% of firms use one of these schemes for all their workers, firms are not different on observables.

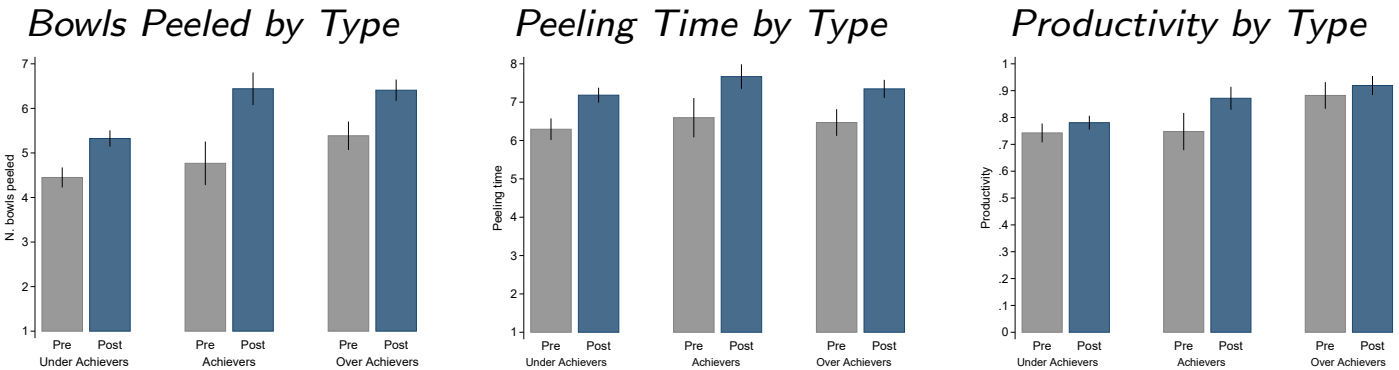
Alternative Mechanisms

- Goals may be used to signal ambition to the employer.
  - If signaling was an important mechanism, we should see results for workers paid flat-rate.
  - No need to signal: no career concerns, no asymmetric information (results hold for workers who are family members)

- Goals may have stimulated competition among workers.
  - Post-intervention survey: Higher level of competitiveness in workers assigned to Production **and** Goals (wrt. No-Intervention).
  - Goals are effective for competitive **and** non-competitive workers.
  - If competition was an important mechanism, we should see results for workers paid flat-rate.

Goal Setting Types

- We classify individual workers in types by looking at whether goal-production gap are *mostly* > 0 (under-achiever), $= 0$ (just-achiever) or < 0 (over-achiever).
- 50% of workers are under-achievers, 16% achievers, 34% are over-achievers.



- Goal setting increase production, peeling time and productivity for all types of workers, specially those just-achievers.

Practice Persistence and Diffusion

- **Persistence** over time:
  - Overwhelming agreement with the statements that "Setting goals helps my firm to be more productive" and "Setting goals helps my employees to be more productive".
  - Almost all employers state that they plan to set goals in the future.
  - Firms in *Goals* are more likely to say that the last time was on a date after the intervention (p=0.14).

- **Diffusion** to untreated firms:
  - Suggestive evidence that firms in *Control* and *Production* set goals after the intervention.

Conclusions

- First paper studying the effect of a non-monetary incentive on labor performance in small informal firms in a LIC.
- Goal setting as a technology that improves labor productivity seemingly releasing a behavioral constraint (ability to self-control)
- Specially relevant in poor contexts:
  - firm's face higher credit constraints to access capital to improve their technology,
  - poverty makes self-control problems more consequential.
  - It is inexpensive and easy to implement.
- It is effective in female-lead firms with female workers.
- It is scalable and replicable.

Thank you very much for your attention and questions!