Gendered Misallocation of Agrarian Labor:

A cluster-randomized trial evaluating a labor subsidy to pregnant and postpartum female farmers in Malawi

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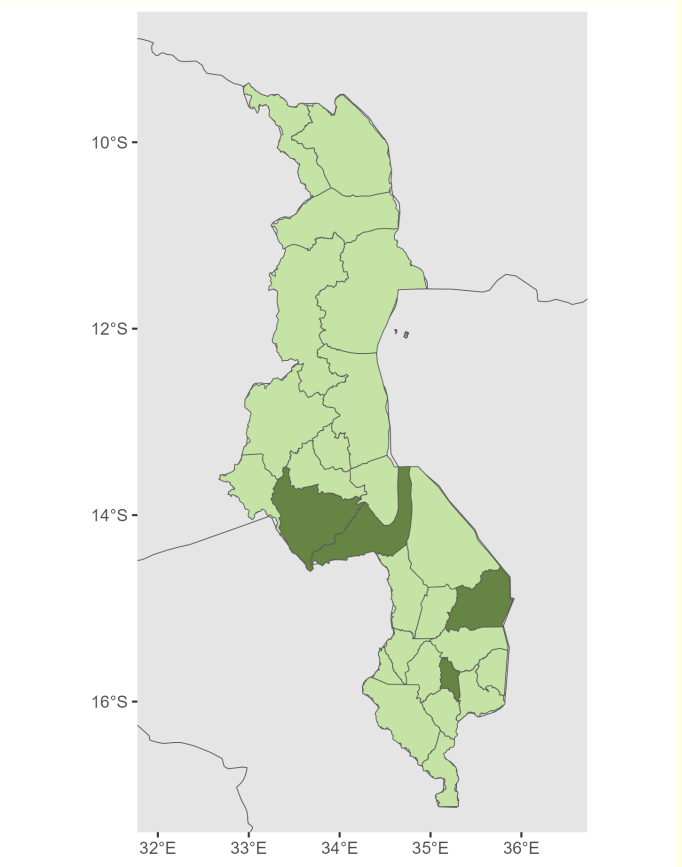
Context: Malawi

- Located in southern Africa
- Approximately 21.1 million people[1], with 80% employed in agriculture (The World Bank)
- GDP per Capita ~ 508 USD
- This experiment spans four districts (Chiradzulu, Dedza, Lilongwe, & Machinga)
- Collaboration with agricultural nonprofit



[1]This equates to roughly ~15 Estonias

Motivation: barriers to women's productivity

- We see systematic differences in agricultural output between men and women
  - Women's plots are 24% less productive in Malawi (Akram-Lodhi 2018)
  - Driven by disproportionate allocation of resources (seeds, fertilizer, labor) and the double burden of domestic and income-generating labor
- This gap widens during pregnancy + postpartum
  - Qualitatively: In Malawi, husbands do not perfectly substitute for labor that would have been supplied by women
- Most interventions in SSA aim to reduce domestic labor burden (Bjorvatn et al., 2022.; Clark et al., 2019; Donald et al, 2023.; Ajayi et al., 2022)
  - How can we think about reducing the double burden in those contexts where it may not be optimal/possible to reduce physiological and childcare barriers to engaging in agricultural employment?

Program Overview

Intervention: Planting Partners

- Vouchers redeemable for **5 days** (6 hours per day) of casual labor throughout agricultural season
- Days can be redeemed for labor on plots using inputs from the non-profit (this is usually one such plot per household, primarily for maize)
- Casuals selected and screened by the partner non-profit's field officers
- Casuals paid **3500 MWK (~2 USD) per day of work**, with an additional travel stipend (1000 MWK).

Implementation

Balance Table of Pre-Intervention Characteristics

Characteristic	Treated Farmers (N = 441/7,386)	Control Farmers (N = 368/6,200)	p-value
Reported pregnant at time trial start	0.074 (0.003)	0.070 (0.003)	0.644
Reported household size at trial start	4.66 (0.019)	4.401 (0.020)	0.058
Reported lines worked per day	26.783 (0.168)	25.507 (0.182)	0.697
Reported hours worked per day	4.058 (0.015)	4.366 (0.022)	0.207
Included in study sample	0.061 (0.003)	0.058 (0.003)	0.548
Number of prior births	3.279 (0.093)	3.359 (0.093)	0.369
Age	32.844 (0.364)	32.524 (0.337)	0.275
Proportion gave birth during trial	0.234 (0.020)	0.288 (0.024)	0.019
Omnibus test using administrative data			0.273
Omnibus test using administrative and survey data			0.102

Table legend: Results presented as mean (standard error). p-values calculated via simple linear regression models with district-level fixed effects and standard errors clustered at the agricultural site-level. Lines worked, hours worked, and household size winsorized at the 1st and 99th percentiles.

Assessment of Planting Partners implementation

Metric	Eligible farmers in treated sites (N = 439)
Utilized Planting Partner program	360 (81.63)
Total hours worked for farmer	12 [6 - 20]
Perceived skill of casual as a farmer	
Worst	17 (4.72)
Poor	17 (4.72)
Average	42 (11.67)
Good	58 (16.11)
Best	226 (62.78)
Perceived PP as better farmer than self	89 (24.72)
Whether farmer paid casual	1 (0.28)

Table legend: Results estimated among those farmers who were randomly selected to participate in the program and who either (1) who gave birth within the two years prior to program start, (2) report a miscarriage since program start, or (3) report a child aged two years or younger in the same household. Results presented as either N (%) or Median [Interquartile Range].

Effect of being assigned to Planting Partners

Agricultural

Outcome	(1) β (SE)	p - value	(2) β (SE)	p - value	Control Mean (SE)
TOTAL AGRICULTURAL OUTPUT (MWK)	213292.19 (82961.77)	0.063	139385.46 (73570.68)	0.196	1299272.07 (66462.93)
Maize production (kgs)	144.71 (71.20)	0.130	90.16 (56.22)	0.335	916.69 (50.96)
Soybean production (kgs)	16.03 (6.35)	0.101	15.64 (6.39)	0.106	22.29 (3.81)
Pigeon Pea production (kgs)	-3.54 (3.11)	0.359	-4.37 (2.72)	0.261	16.67 (2.18)
Tobacco production (kgs)	.32 (2.68)	0.945	-1.10 (3.98)	0.811	7.17 (2.48)
Total amount spent on hired labor (MWK)	-1343.39 (4412.69)	0.836	-3211.60 (6332.58)	0.638	36503.81 (3993.00)
Whether the farmer planted at least some crops in ridges	-0.01 (< 0.01)	0.171	-0.01 (0.01)	0.139	0.99 (<0.01)
Whether the farmer planted at least some crops in lines	0.02 (0.02)	0.468	0.01 (0.02)	0.635	0.07 (0.01)
Whether the farmer measured distance between ridges/lines with stick	0.02 (0.02)	0.542	0.02 (0.03)	0.556	0.84 (0.02)
Whether the farmer measured distance between plants with stick	0.02 (0.02)	0.302	0.02 (0.03)	0.331	0.88 (0.02)
Whether the farmer measured distance between planting station with 15/25 cm stick	0.03 (0.02)	0.349	0.03 (0.03)	0.236	0.86 (0.02)
Total hours of hired labor	-2.86 (7.79)	0.787	-7.20 (9.37)	0.512	54.40 (6.47)
Total hours of unpaid labor	-1.30 (0.93)	0.297	-0.95 (1.36)	0.462	8.55 (0.96)
Average hours of labor per week from other household members	0.60 (1.09)	0.693	-0.91 (1.83)	0.528	24.26 (1.07)
Average hours of labor per week from self	-0.66 (0.70)	0.473	-1.00 (1.02)	0.288	21.65 (0.59)

Table legend: Models (1) and (2) are estimated among those farmers who gave birth within the two years prior to program start, report a miscarriage since program start, or report a child aged two years or younger in the same household. Model (2) adjusts for whether the respondent gave birth during the program period, total acres owned by household, household size, and age. All models account for district fixed-effects and standard errors clustered at the agricultural site-level. Agricultural production, labor spending, and work hours winsorized at the 1st and 99th percentile.

Health

Outcome	(1)		(2)		Control Mean (SE)
	β (SE)	p - value	β (SE)	p - value	
Whether farmer had three meals yesterday	0.08 (0.03)	0.028	0.07 (0.03)	0.085	0.35 (.02)
Whether farmer had three meals the day before	0.06 (0.03)	0.159	0.05 (0.03)	.259	0.33 (.02)
Days of maternal meat consumption in the past month	-0.14 (0.18)	0.503	-0.20 (0.24)	.392	2.08 (.15)
Days of maternal egg consumption in the past month	-0.25 (0.24)	0.403	-0.28 (0.25)	.349	2.21 (.18)
Days of maternal usipa consumption in the past month	0.10 (0.46)	0.851	0.05 (0.38)	.927	3.9 (.29)
Days of maternal fish consumption in the past month	0.79 (0.25)	0.044	0.64 (0.32)	.091	3.87 (.24)
Days of child meat consumption in the past month	0.66 (0.41)	0.234	0.27 (0.52)	.593	5.38 (.33)
Days of child fruit & vegetable consumption in the past month	0.83 (0.48)	0.252	0.19 (0.81)	.785	11.97 (0.57)
Days of child carb consumption in the past month	0.07 (0.42)	0.899	-0.39 (0.86)	.527	22.53 (0.58)
Number of sick visits for youngest child	-0.15 (0.16)	0.458	-0.18 (0.18)	.364	2.91 (0.13)
Number of routine visits for youngest child	-0.11 (0.24)	0.758	-0.24 (0.26)	.484	5.58 (0.20)

Table legend: Models (1) and (2) are estimated among those farmers who gave birth within the two years prior to program start, report a miscarriage since program start, or report a child aged two years or younger in the same household. Model (2) adjusts for whether the respondent gave birth during the program period, total acres owned by household, household size, and age. All models account for district fixed-effects and standard errors clustered at the agricultural site-level. Agricultural production, labor spending, and work hours winsorized at the 1st and 99th percentile.

Heterogeneity

Heterogeneity

Outcome	Treatment		Enrolled 1st/2nd trimester		Enrolled 3rd trimester		Interaction: 1st/2nd trimester		Interaction: 3rd trimester	
	Estimate (SE)	p - value	Estimate (SE)	p - value	Estimate (SE)	p - value	Estimate (SE)	p – value	Estimate (SE)	p - value
Total agricultural output (MWK)	71047.34 (133702.55)	0.597	-142952.8 (125971.2)	0.260	-104438.28 (112487.75)	0.356	210031.77 (233963.95)	0.372	105641.98 (181812.03)	0.563
Total amount spent on hired labor (MWK)	-2938.17 (8225.61)	0.722	-7057.35 (8844.71)	0.428	382.99 (10465.9)	0.971	16539.6 (13248.61)	0.216	-16177.14 (12685.42)	0.206
Total hours of hired labor	-5.36 (13.52)	0.693	-14.93 (12.81)	0.248	-4.31 (14.04)	0.760	23.31 (20.81)	0.266	-28.88 (19.52)	0.144
Total hours of unpaid labor	-1.67 (1.47)	0.257	-0.80 (2.95)	0.786	0.44 (2.35)	0.852	2.22 (3.37)	0.514	1.23 (3.46)	0.724
Average hours of labor per week from other household members	-1.45 (1.64)	0.379	3.33 (2.16)	0.127	1.03 (2.38)	0.665	1.20 (3.43)	0.728	2.11 (4.83)	0.664
Average hours of labor per week from self	-1.24 (1.05)	0.241	-3.19 (1.31)	0.017	-1.13 (1.84)	0.542	0.92 (1.91)	0.632	0.78 (2.73)	0.775
Whether farmer had three meals yesterday	0.01 (0.04)	0.850	-0.09 (0.05)	0.063	-0.09 (0.05)	0.105	0.20 (0.08)	0.018	0.08 (0.09)	0.342
Whether farmer had three meals the day before	-0.03 (0.05)	0.571	-0.13 (0.07)	0.070	-0.15 (0.05)	0.002	0.23 (0.09)	0.015	0.19 (0.08)	0.018
Days of maternal meat consumption in the past month	-0.52 (0.27)	0.061	-0.17 (0.45)	0.709	-0.23 (0.31)	0.464	1.21 (0.70)	0.090	0.30 (0.45)	0.508
Days of maternal egg consumption in the past month	-0.45 (0.36)	0.225	-0.22 (0.50)	0.663	-0.22 (0.47)	0.647	0.8 (0.80)	0.316	-0.18 (0.56)	0.748
Days of maternal usipa consumption in the past month	-0.58 (0.66)	0.378	-0.42 (0.80)	0.599	-0.59 (.570)	0.299	2.6 (1.09)	0.020	0.84 (0.82)	0.311
Days of maternal fish consumption in the past month	0.64 (0.53)	0.228	0.68 (0.43)	0.114	-0.93 (0.65)	0.154	-0.68 (0.88)	0.439	1.05 (0.90)	0.248

Table legend: Model is estimated among those farmers who gave birth within the two years prior to program start, report a miscarriage since program start, or report a child aged two years or younger in the same household. Model adjusts for total acres owned by household, household size, and age. All models account for district fixed-effects and standard errors clustered at the agricultural site-level. Agricultural production, labor expenditure, and hours of labor winsorized at the 1st and 99th percentile.

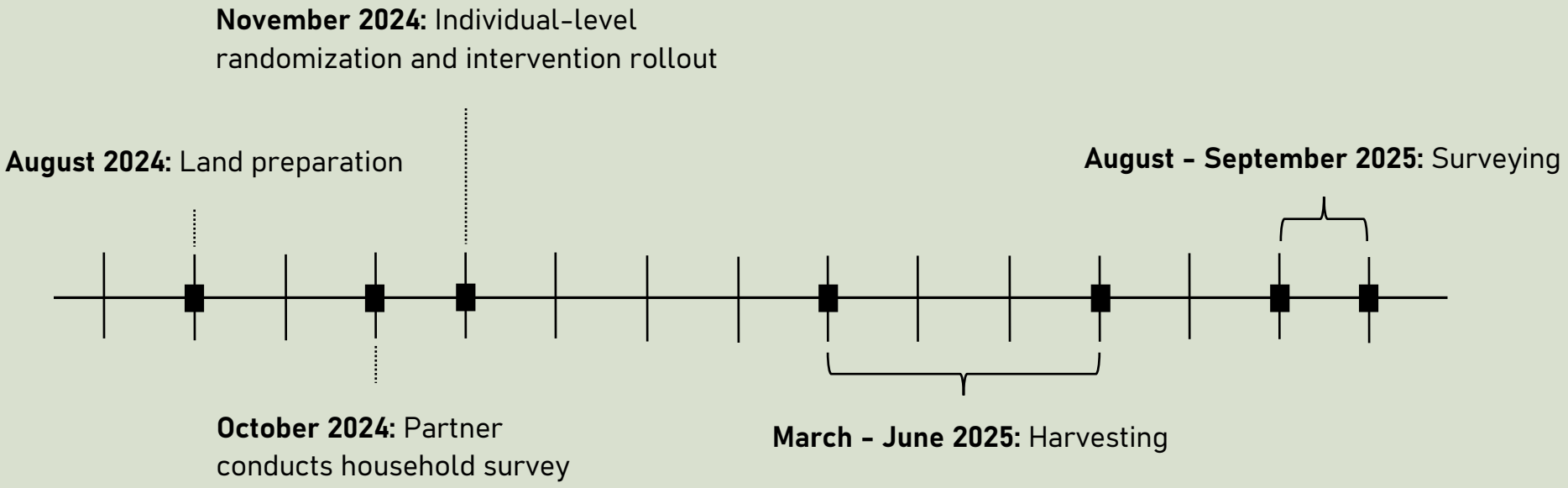
To Summarize

Findings

- Overall, 10% increase in agricultural output with a 10% decrease in labor spending
- Larger estimate of effects on production and maternal consumption for those enrolled in early stages of pregnancy, along with an increase in hired labor
- Possible that those enrolled in early pregnancy reinvested savings from voucher into more hired labor leading to greater returns to agricultural production.
- Future research should explore scaling this intervention while targeting those who are pregnant at the start of the agricultural season.

Thank you for your time

Appendix


November 2024: Individual-level randomization and intervention rollout
August 2024: Land preparation
August – September 2025: Surveying
October 2024: Partner conducts household survey
March – June 2025: Harvesting

Timeline

Participant identification + sample compliance

- Eligible participants were identified by randomly selecting up to 45 women per site who reported being pregnant and/or having a child aged 1 year or younger.
- Eligibility was then verified by partner post-randomization in November 2024 for the treatment group and March 2025 for the control group
- Final study sample comprised of the subsample of those randomly selected initially that made it past the verification process + reported data that satisfied original eligibility criteria during survey procedures