Feeding Fairly: Gendered Nutrition Interventions and Intra-Household Norms in Uganda

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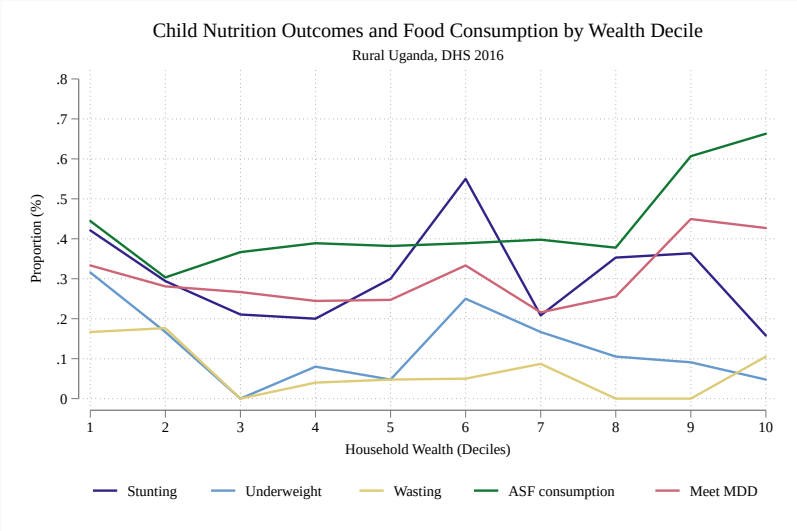
Motivation: Malnutrition remains a global challenge

- Globally, 45 million children under the age of five suffer from wasting, and 149 million are stunted (WFP, WHO, UNICEF, 2022).
- While global rates have declined, progress in many low- and middle-income countries–particularly in sub-Saharan Africa–has stagnated.
- Driven by poor **maternal nutrition** and health, frequent illness, and **inappropriate infant and young child feeding** (WHO, 2022).
- **Not just a poverty problem:** In sub-Saharan Africa, **75% of undernourished individuals are not in the poorest households.** (Brown et al., 2019).

Wealth does not guarantee nutrition.



Improve children's and pregnant women's nutritional outcomes and health.

- Several studies highlight maternal nutrition knowledge as a **critical link in explaining persistent undernutrition across different wealth levels** (Girard et al., 2012; Ruel and Alderman, 2013).
- Maternal education and awareness campaigns have been central to public health efforts (Duflo, 2012; Fiszbein and Schady, 2009; Björkman-Nyqvist et al., 2023).
- Information alone may not be enough to change behavior (Prina and Royer, 2014; Dupas and Miguel, 2017).

Two constraints: From women's knowledge to men's power

In many traditional settings, men play a critical role in shaping food access through two distinct channels.

1. Household Decision-Maker

- Intra-household allocation is influenced by who holds decision-making power (Chiappori, 1992; Lundberg and Pollak, 1993; Thomas, 1997; Quisumbing and Maluccio, 2003; Armand et al., 2020).
- Men control household income and food purchases, especially animal-source foods.

2. Social Norms about food distribution and consumption

- Norms systematically disadvantage women and children, leading to inequitable food allocation (Bursztyn et al., 2020; Haddad, 1999; Sen, 1990).
- Men reinforce norms around food distribution–often receiving priority portions.

Research Questions

1. **Does improving men's nutrition knowledge lead to better household food allocation?**
   - Men may lack awareness of the dietary needs of children and pregnant women.
   - This limits their ability to make informed decisions about resource allocation.

2. **Is information alone enough, or must social norms be addressed?**
   - Norms prioritizing male consumption, especially animal-source foods (ASFs), may restrict child access to nutrients.
   - We test whether targeting norms leads to larger improvements in dietary outcomes.

This paper

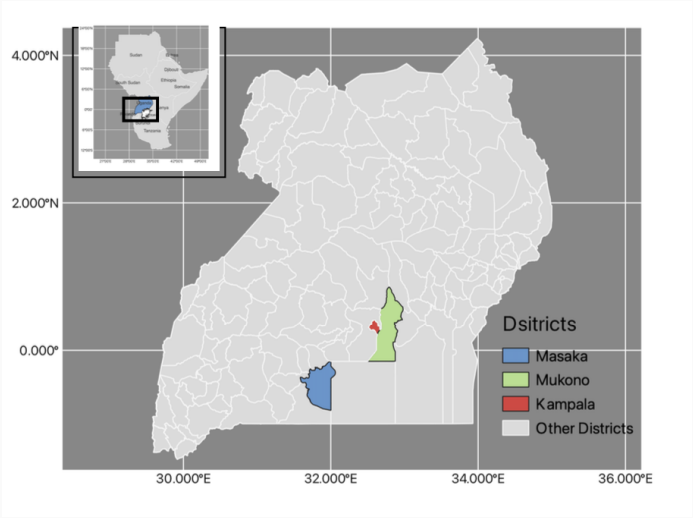
- We evaluate the impact of a **gender-targeted nutrition intervention** and a complementary **social norms intervention** on dietary outcomes in rural Uganda.
- We implement a **clustered randomized controlled trial** in 240 villages in Central Uganda, targeting 1,200 livestock-owning households with young children.
- The intervention has three arms:
  1. **Wife-only information campaign—baseline treatment** [80 villages].
  2. **Couple information campaign** [80 villages].
  3. **Couple information campaign + social norms module** [80 villages].

Preview of Findings

- **Including men improves nutrition knowledge:**
  - Knowledge gains among men ($+0.31SD$) and women ($+0.20SD$) when both are targeted.
- **Targeting norms leads to better dietary outcomes:**
  - The combined information + norms campaign reduces endorsement of conservative food norms ($-0.20SD$ for men).
  - Increases pro-child food allocation attitudes.
- **Children and women benefit most under the combined arm:**
  - Large increases in MDD: +32 pp for children, +25 pp for women.
  - Higher ASF consumption without increasing total food spending.

Context

Study Districts in Uganda



Interventions

- Led by ILRI, in partnership with Uganda's Ministry of Health, the Buganda Kingdom, and district authorities in Masaka and Mukono.

- **Two campaigns** delivered to livestock-owning households:
  1. **Nutrition knowledge:** ▸ modules
     - VHTs (paired with participants' gender) act as facilitators.
     - 3 video-based sessions ($\approx$ 12 min) + discussion driven by facilitators ($\approx$ 30 min).
     - Diet diversity, maternal and child nutrition.
  2. **Social norms (add-on):** ▸ norms
     - Traditional leaders (paired with participants' gender) act as facilitators.
     - 3 video-based sessions ($\approx$ 15 min) + discussion driven by facilitators ($\approx$ 30 min).
     - Topics: hidden norms (pluralistic ignorance), equity in food distribution, and men's eating habits.
- Three community visits conducted between late July and mid-September 2024.

Sampling and Experimental Design

- Target population: rural households with both partners present, at least one child under age 3, and livestock ownership.
- Sampling frame:
  - 240 villages randomly selected (village size: 10–100 eligible households).
  - Minimum 2 km distance between villages to prevent spillovers.
- Random assignment to one of three arms:
  1. **Wife-only information** (80 villages): women attend nutrition sessions.
  2. **Couple information campaign** (80 villages): men and women attend sessions (separately, same day).
  3. **Couple information + social norms campaigns** (80 villages): men and women attend nutrition + norms module (separately, same day).
- Participants assigned to T0 and T1 were exposed to a placebo video.

Estimation strategy

Estimation Strategy - intent-to-treat (ITT) effects

We estimate the following linear model:

$$Y_{ij} = \alpha + \beta_1 T1_j + \beta_2 T2_j + \delta Y_{ij}^0 + \mathbf{X}_{ij}'\gamma + \epsilon_{ij}$$

- Y_{ij}: Outcome for respondent i in village j (e.g., knowledge, dietary diversity).
- Y_{ij}^0: Baseline value of the outcome.
- $\mathbf{X}_{ij}$: Controls (including strata and enumerator fixed effects).
- T_1: Couple information campaign (both spouses receive nutrition information).
- T_2: Couple information + social norms campaign.
- ϵ_{ij}: Cluster-robust error term at the village level.

Comparison group: Wife-only information campaign (T_0).

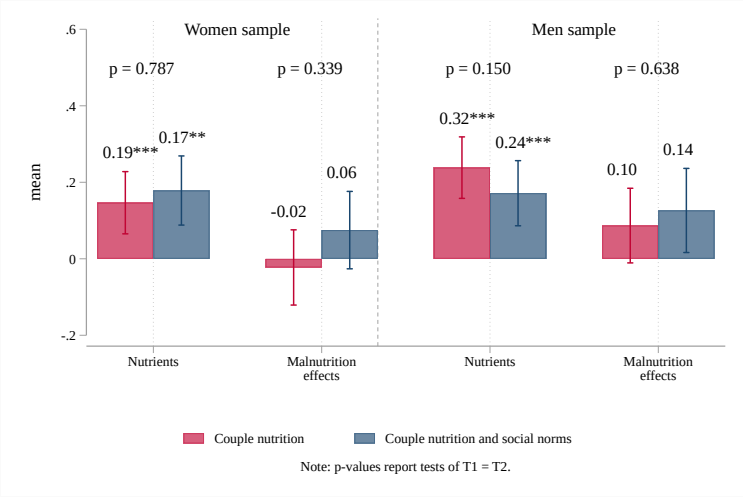
- β_1: Effect of including men in information campaign (T_1 vs. T_0).
- β_2: Combined effect of including men in the information campaign and the social norms campaign (T_2 vs. T_0).

Data and Measurement

- **Baseline:** October–November 2023
  - 1,200 households (5 per village across 240 villages).
  - Eligible: livestock-keeping, partnered, with $\geq$1 child under age 3.
- **Endline:** November 2024 (1 month after intervention start).
  - 88% tracking rate (balanced across treatment groups) (supplemented with 150 new households to maintain village-level coverage). ▸ attrition
- **Respondents:**
  - Women: full household survey.
  - Men: short module on knowledge and social norms.
- **Outcomes:** Composite indices constructed using Anderson (2008), standardized across the sample. ▸ nutrients ▸ malnutrition ▸ norms ▸ mdd
- **Data:** Sample balanced across treatments for outcomes and individual characteristics. ▸ desc_female ▸ desc_male ▸ balance_female ▸ balance_male

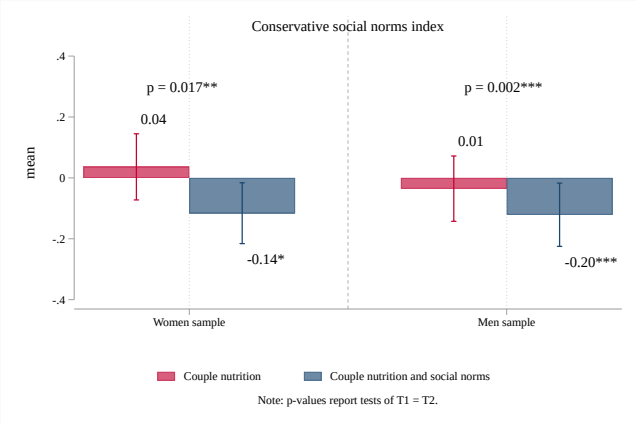
Results

Dual-Gender Campaigns Increase Couples' Knowledge



- Composite indexes - Anderson (2008). CI 95% ▸ nutrients ▸ malnutrition

Social Norms campaign reduces conservative social norm index.



▸ Perceived beliefs ▸ norms

Dual-gender campaigns improve self-reported food consumption

	Meet MDD				Consume ASF			
	Hh	Child	Wife	Husband	Hh	Child	Wife	Husband
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
T1	0.002	0.149***	0.117***	0.062	0.020	0.013	0.050	0.032
	(0.023)	(0.037)	(0.042)	(0.038)	(0.012)	(0.034)	(0.039)	(0.036)
T2	0.037*	0.321***	0.253***	0.071*	0.029***	0.081***	0.203***	-0.013
	(0.022)	(0.041)	(0.046)	(0.037)	(0.011)	(0.030)	(0.039)	(0.040)
Obs.	1050	1050	1050	1049	1050	1050	1050	1049
T1=T2	0.064	0.000	0.002	0.801	0.266	0.025	0.000	0.235
T0 mean	0.900	0.171	0.294	0.351	0.963	0.777	0.466	0.471
ANCOVA	✓	✓	✓		✓	✓	✓	

Standard errors, reported in parentheses, are clustered at the village level. *** p<0.01, ** p<0.05, * p<0.1.

▸ MDD breakdown ▸ mdd

Summary

- Both couple campaigns **improve knowledge**, and the social norms module **reduce adherence to conservative social norms** related to food distribution.
- Both couple campaigns **improve self-reported food consumption** linked to reducing malnutrition (Black et al., 2013; Sheikh et al., 2020).
  - Larger impact among those exposed to the components of social norms.
- **Very short-term results**: just one month after intervention $\rightarrow$ we do no expect changes in anthropometric measures or health-related outcomes. ▸ health outcomes
- We focus on the mechanisms: increase food expenditures? change behavior/ diets/distribution of food?

Additional results

Mechanims

- Social norms component drives change in behavior:
  - Males are more likely to practice pro-child food allocation behavior.
  - Both males and females are less likely to eat away from home, reallocating resources toward household consumption.
- No noticeable change in both overall household and individual expenditure on food and ASF.
- Trade-off: Females are more likely to surrender bargaining power to male household members.

Heterogeneous treatment effects

- **Methodology:**
  - Used Classification Analysis (CLAN) from Generic Machine Learning framework to identify baseline characteristics predicting larger treatment effects.
- **Women:** More heterogeneity when social norms targeted
  - Higher livestock ownership $\rightarrow$ larger improvements in knowledge & diet
  - Poorer, less educated women $\rightarrow$ stronger social norms changes
- **Men:** Limited heterogeneity overall
  - Fewer livestock $\rightarrow$ larger knowledge gains
  - More assets $\rightarrow$ better dietary diversity
- **Overall:** Social norms interventions create more variation, particularly along economic dimensions

Robustness exercises

- **Variable selection:** We implement a Post-Double Selection Lasso procedure to select control variables. ▸ Table
- **Outcome bundling:** We construct composite indices for each outcome domain following Kling et al. (2007). ▸ Table
- **Sample extension:** To maintain five observations per village, additional women were added at intervention start. No baseline data are available for them, and they are excluded from the main analysis. Robustness checks using the extended endline sample confirm the main findings. ▸ Table

Conclusion

Conclusion

- **Including men in nutrition campaigns** improves knowledge for both spouses and enhances dietary outcomes.
- **Targeting social norms** produces additional shifts in food allocation behavior, particularly favoring women and children.
- Short-run improvements in dietary diversity and ASF consumption observed within one month, without major increases in spending.
- Some evidence of **trade-offs in women's decision-making power** suggests the need for careful program design to avoid reinforcing male dominance.
- No anticipated long-term effects on illnesses or anthrops, due to short turnaround time.
- Results highlight the importance of integrating **male engagement** and **norm-sensitive interventions** into nutrition policy.

THANK YOU!

Appendix

Information Campaign: Module 1

MODULE 1

Understanding Nutrition

This module covers sessions on key definitions of nutrition terms, identifiable signs of malnutrition, and achievement of a balanced (diversified) diet.

Information Campaign: Module 2

MODULE 2

Nutrition in women of childbearing age

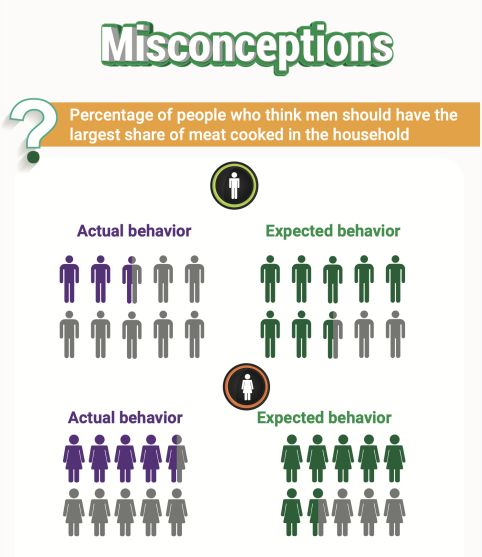
Pregnancy and breastfeeding are important times to review your own nutrition. This module covers sessions on feeding women before, during pregnancy and when breastfeeding and the benefits of ASFs and milk consumption for pregnant and lactating mothers and children.

MODULE 3

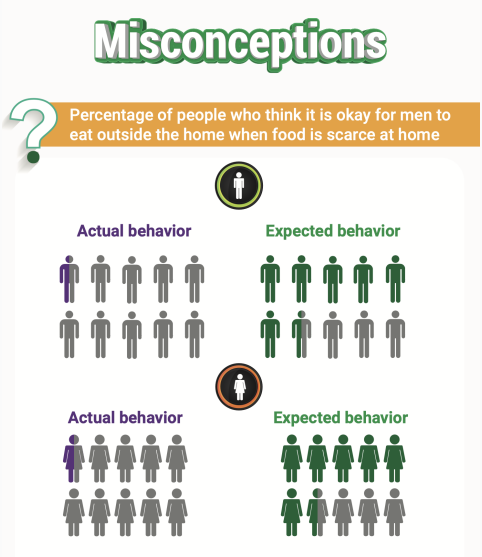
Nutrition for Babies & Young Children

This module covers sessions on Nutrition for babies and young children. The sessions include breastfeeding babies, with detailed information on positioning and attachment, complementary feeding practices for children 6 months and older, and introducing children to ASFs and livestock milk.

Social Norms Campaign: Norms 1



Social Norms Campaign: Norms 2



Social Norms Campaign: Norms 3

Social Norms Campaign: Norms 4

Back

Husbands eating away from home

Men appreciate the importance of providing ASFs to the women and children as part of diversified diets.

Attrition

Back

	Women sample	Men sample
	(1)	(2)
Couple information campaign (T1)	-0.021	-0.019
	(0.023)	(0.024)
Couple information & social norms campaign (T2)	0.024	0.024
	(0.025)	(0.025)
Observations	1200	1200
p-value: T1=T2	0.072	0.093
Wife-only information campaign mean	0.125	0.125

Note: All regressions control for stratification variables, and robust standard errors are clustered at the village level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Descriptive statistics: Women sample

outcomes

	Mean	Median	Std. dev.	Min.	Max.
Age	31.66	31.00	7.13	16	52
Christian	0.86	1.00	0.35	0	1
Baganda	0.64	1.00	0.48	0	1
Has completed 6 years of education	0.56	1.00	0.50	0	1
Currently pregnant	0.10	0.00	0.30	0	1
Married - monogamy	0.92	1.00	0.27	0	1
How many members are in your household:	6.21	6.00	1.98	3	10
Number of children under 4	1.28	1.00	0.50	1	4
Index child is girl	0.50	1.00	0.50	0	1
Index child's age	1.92	2.00	1.06	0	3
Total household food expenditure (thousands)	40.73	35.00	27.89	0	150
Total household ASF expenditure (thousands)	16.13	14.00	13.14	0	60
Consumed home output, last week	0.90	1.00	0.30	0	1
Value of consumed home output, last week	42.43	35.00	32.83	0	148
Index livestock (TLU)	1.62	0.89	2.58	0	41
Household owns land	0.92	1.00	0.27	0	1
Stunting (HAZ <-2)	0.31	0.00	0.46	0	1
Underweight (WAZ < -2)	0.25	0.00	0.43	0	1
Wasting (WHZ < -2)	0.21	0.00	0.41	0	1

Descriptive statistics: Men sample

outcomes

	Mean	Median	Std. dev.	Min.	Max.
Age	40.18	40.00	9.94	20	85
Christian	0.88	1.00	0.32	0	1
Baganda	0.73	1.00	0.44	0	1
Has completed 6 years of education	0.49	0.00	0.50	0	1

Balance tables - Women sample

outcomes

	Control mean	T1 coeff.	T1 (s.e.)	T2 coeff.	T2 (s.e.)	T1=T2 p-value	obs
Age	31.16	0.43	(0.60)	0.41	(0.58)	0.98	1200
Christian	0.87	-0.02	(0.03)	-0.01	(0.03)	0.58	1200
Baganda	0.62	0.02	(0.03)	0.01	(0.03)	0.87	1200
Distance to lake Victoria (km)	16.11	0.38	(0.53)	-0.24	(0.51)	0.21	1200
At least 6 years educ.	0.55	0.03	(0.03)	-0.00	(0.04)	0.39	1200
Currently pregnant	0.09	0.01	(0.02)	0.01	(0.02)	0.99	1200
Married monogamy	0.95	-0.06***	(0.02)	-0.04**	(0.02)	0.38	1200
Household size	6.09	0.16	(0.15)	-0.03	(0.15)	0.17	1200
Children under 4	1.30	-0.05	(0.03)	-0.03	(0.04)	0.41	1200
Child is girl	0.51	-0.02	(0.03)	0.01	(0.03)	0.28	1200
Child's age	1.91	-0.03	(0.08)	0.05	(0.08)	0.34	1200
Food exp. (thousands)	41.38	-0.61	(2.23)	-0.24	(2.14)	0.87	1200
ASF exp. (thousands)	16.34	-0.47	(1.04)	-0.35	(0.99)	0.90	1200
Consumed home output	0.91	-0.03	(0.03)	-0.03	(0.03)	0.98	1200
Value home output	43.59	-1.97	(2.35)	-2.40	(2.40)	0.86	1200
Livestock (TLU)	1.51	0.11	(0.16)	0.11	(0.19)	0.99	1196
Owns land	0.90	0.03	(0.02)	0.01	(0.02)	0.25	1200
Household income	1.78	0.10	(0.07)	0.05	(0.07)	0.53	1185

Balance tables - Women sample

outcomes

	Control mean	T1 coeff.	T1 (s.e.)	T2 coeff.	T2 (s.e.)	T1=T2 p-value	obs
Illness last 30 days	0.61	-0.00	(0.04)	0.02	(0.04)	0.50	1200
Child sick past 2 weeks	0.84	0.01	(0.03)	-0.02	(0.03)	0.29	1200
VHT visit frequency (6 m)	2.02	0.09	(0.16)	0.17	(0.16)	0.62	1196
HH met MDD	0.85	-0.04	(0.03)	-0.03	(0.03)	0.57	1200
HH consumed ASF	0.98	0.01	(0.01)	-0.00	(0.01)	0.38	1200
Child met MDD	0.12	0.07**	(0.03)	0.03	(0.03)	0.17	1200
Child consumed ASF	0.81	0.01	(0.03)	-0.02	(0.03)	0.17	1200
Respondent met MDD	0.26	0.04	(0.04)	0.02	(0.03)	0.55	1200
Respondent consumed ASF	0.41	0.01	(0.04)	0.04	(0.03)	0.46	1200
Child stunted	0.31	0.01	(0.03)	-0.00	(0.03)	0.59	1145
Child underweight	0.24	0.00	(0.04)	0.02	(0.04)	0.63	1181
Child wasted	0.22	-0.00	(0.03)	0.02	(0.03)	0.48	1121
Knowledge: Nutrients	-0.00	0.10	(0.07)	0.13*	(0.08)	0.66	1200
Knowledge: Malnutrition	0.00	0.04	(0.07)	-0.04	(0.06)	0.14	1200
Social norms beliefs	0.00	-0.02	(0.07)	0.04	(0.08)	0.44	1200
Decision-making (activities)	-0.00	-0.08	(0.08)	-0.01	(0.07)	0.34	1198
Satisfied with decision-making	0.00	-0.00	(0.09)	-0.00	(0.08)	0.98	1199

Note: All regressions control for stratification variables, and robust standard errors are clustered at the village level. Column 8 reports the number of

Balance tables - Men sample

outcomes

	Control	T1		T2		T1=T2	
	mean	coeff.	(s.e.)	coeff.	(s.e.)	p-value	obs
Age	39.71	0.39	(0.83)	0.45	(0.80)	0.94	1200
Christian	0.89	-0.01	(0.03)	-0.00	(0.02)	0.72	1199
Baganda	0.70	0.06	(0.04)	0.03	(0.04)	0.50	1200
At least 6 years educ.	0.50	0.00	(0.04)	-0.01	(0.04)	0.62	1200
Knowledge: Nutrients	-0.00	0.08	(0.07)	-0.06	(0.08)	0.07*	1200
Knowledge: Malnutrition	0.00	0.09	(0.07)	0.06	(0.08)	0.62	1200
Social norms beliefs	-0.00	-0.01	(0.07)	0.03	(0.07)	0.59	1200
Decision-making (activities)	-0.00	0.07	(0.07)	0.10	(0.07)	0.69	1197
Satisfied with decision-making	0.00	0.03	(0.09)	-0.03	(0.09)	0.54	1198

Note: All regressions control for stratification variables, and robust standard errors are clustered at the village level. Column 8 reports the number of observations.*** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Perceptions of prevailing social norms

Back

	Social Norms Index			
	Women sample		Men sample	
	Own beliefs	Perceived community beliefs	Own beliefs	Perceived community beliefs
T1	0.039	0.042	0.008	0.046
	(0.077)	(0.051)	(0.072)	(0.062)
T2	-0.139*	0.086	-0.204***	-0.011
	(0.072)	(0.054)	(0.070)	(0.063)
Obs	1050	1050	1049	1049
T1=T2	0.016	0.429	0.002	0.347
T0 mean	-0.000	-0.000	0.000	0.000

Children's food consumption (last 24 hours)

Back

	T1		T2		T1=T2	T0
	coeff.	(s.e.)	coeff.	(s.e.)	p-value	mean
grains	0.000	(0.007)	0.000	(0.007)	0.956	0.993
legumes	0.074**	(0.036)	0.141***	(0.032)	0.039**	0.747
meat	0.160***	(0.041)	0.355***	(0.040)	0.000***	0.305
chicken	-0.002	(0.016)	0.016	(0.015)	0.239	0.041
pork	0.006	(0.011)	0.007	(0.012)	0.941	0.025
beef	0.023	(0.022)	0.004	(0.023)	0.360	0.092
fish	-0.010	(0.035)	-0.011	(0.035)	0.974	0.391
mukene (fish)	0.002	(0.031)	-0.015	(0.032)	0.579	0.218
eggs	0.124***	(0.041)	0.304***	(0.043)	0.000***	0.339
dairy products	0.001	(0.037)	0.046	(0.036)	0.211	0.471
vegetables and fruits	0.036	(0.030)	0.052	(0.034)	0.599	0.817
non healthy food	-0.011	(0.021)	-0.007	(0.023)	0.831	0.369

Wife's food consumption (last 24 hours)

Back

	T1		T2		T1=T2	T0
	coeff.	(s.e.)	coeff.	(s.e.)	p-value	mean
grains	-0.008	(0.007)	0.001	(0.004)	0.128	0.992
legumes	0.083**	(0.037)	0.160***	(0.033)	0.015**	0.747
meat	0.117***	(0.043)	0.310***	(0.043)	0.000***	0.301
chicken	0.010	(0.018)	0.057***	(0.022)	0.049**	0.042
pork	0.005	(0.015)	0.022	(0.019)	0.253	0.025
beef	-0.010	(0.023)	-0.009	(0.024)	0.980	0.096
fish	-0.058	(0.038)	-0.061	(0.039)	0.933	0.384
mukene (fish)	-0.036	(0.031)	-0.038	(0.033)	0.961	0.203
eggs	0.171***	(0.039)	0.369***	(0.042)	0.000***	0.251
dairy products	-0.006	(0.036)	0.009	(0.036)	0.670	0.348
vegetables and fruits	0.027	(0.033)	0.044	(0.035)	0.592	0.806
no healthy food	-0.016	(0.020)	0.007	(0.020)	0.253	0.364

Husband's food consumption (last 24 hours)

Back

	T1		T2		T1=T2	T0
	coeff.	(s.e.)	coeff.	(s.e.)	p-value	mean
	(1)	(2)	(3)	(4)	(5)	(6)
grains	0.004	(0.003)	0.003	(0.003)	0.349	0.999
legumes	0.008	(0.037)	0.011	(0.035)	0.936	0.684
meat	-0.005	(0.030)	0.008	(0.030)	0.663	0.188
chicken	0.012	(0.015)	0.014	(0.017)	0.917	0.042
pork	-0.012	(0.012)	0.004	(0.014)	0.192	0.023
beef	-0.004	(0.025)	-0.028	(0.025)	0.317	0.114
fish	-0.029	(0.037)	0.007	(0.036)	0.277	0.418
mukene (fish)	-0.014	(0.029)	0.014	(0.029)	0.293	0.184
eggs	0.029	(0.022)	0.043*	(0.025)	0.581	0.118
dairy products	0.054	(0.037)	-0.010	(0.039)	0.085*	0.333
vegetables and fruits	0.010	(0.026)	-0.017	(0.025)	0.292	0.826
no healthy food	0.011	(0.021)	-0.002	(0.018)	0.527	0.407

Children and women's health

Back

	Child was sick (last 2 weeks)		Respondent was sick (last 30 days)	
	At least once	Number of symptoms	At least once	Number of days
T1	-0.007	0.005	-0.002	-0.099
	(0.029)	(0.014)	(0.034)	(0.588)
T2	0.014	0.002	0.003	0.308
	(0.029)	(0.013)	(0.036)	(0.525)
Obs.	1029	1029	1050	1050
T1=T2	0.477	0.793	0.906	0.443
T0 mean	0.843	0.271	0.643	5.403
ANCOVA	✓	✓	✓	✓

Post-Double Selection Lasso - Women sample

	T1		T2		T1=T2
	coeff.	(s.e.)	coeff.	(s.e.)	p-value
Knowledge - Nutrients	0.139*	(0.077)	0.177**	(0.081)	0.563
Knowledge - Malnutrition effects	–0.037	(0.085)	0.069	(0.086)	0.231
Social Norms	0.050	(0.097)	–0.122	(0.089)	0.066*
Food distribution	–0.078	(0.094)	–0.042	(0.089)	0.694
Ate away from home in the past 7 days	–0.007	(0.025)	–0.064***	(0.025)	0.014**
Child ate away from home in the past 7 days	0.005	(0.019)	0.016	(0.019)	0.622
Household met minimum dietary diversity	0.015	(0.025)	0.050**	(0.024)	0.108
Child met minimum dietary diversity	0.142***	(0.039)	0.330***	(0.044)	0.000***
Respondent met minimum dietary diversity	0.114**	(0.045)	0.267***	(0.048)	0.001***
Household consumed animal-source foods	0.019	(0.012)	0.031***	(0.011)	0.159
Child consumed animal-source foods	0.007	(0.035)	0.081***	(0.030)	0.016**
Respondent consumed animal-source foods	0.073*	(0.039)	0.215***	(0.040)	0.000***
Child was sick in the past 2 weeks - intensity	–0.026	(0.029)	0.014	(0.029)	0.178
Had illness/injury in past 30 days	–0.003	(0.036)	0.004	(0.038)	0.860

Note: Robust standard errors are clustered at the village level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Post-Double Selection Lasso - Men sample

Back

	T1		T2		T1=T2
	coeff.	(s.e.)	coeff.	(s.e.)	p-value
Knowledge - Nutrients	0.242***	(0.069)	0.178**	(0.070)	0.265
Knowledge - Malnutrition effects	0.086	(0.080)	0.127	(0.093)	0.633
Social Norms	–0.033	(0.098)	–0.108	(0.093)	0.442
Food distribution	0.119	(0.088)	0.190**	(0.089)	0.409
Ate away from home in the past 7 days	0.058	(0.041)	–0.162***	(0.043)	0.000***
Respondent met minimum dietary diversity	0.052	(0.039)	0.070*	(0.041)	0.665
Respondent consumed animal-source foods	0.069*	(0.036)	–0.002	(0.039)	0.052*

Note: Robust standard errors are clustered at the village level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Composite indices following Kling et al. (2007) - Women sample

	T1		T2		T1=T2
	coeff.	(s.e.)	coeff.	(s.e.)	p-value
Knowledge - Nutrients	0.060***	(0.021)	0.073***	(0.022)	0.492
Knowledge - Malnutrition effects	–0.015	(0.073)	0.058	(0.073)	0.339
Social Norms	0.008	(0.040)	–0.099***	(0.037)	0.005***
Food distribution	–0.036	(0.036)	0.005	(0.037)	0.256
Ate away from home in the past 7 days	–0.026	(0.024)	–0.067***	(0.024)	0.050*
Child ate away from home in the past 7 days	0.003	(0.016)	0.019	(0.018)	0.403
Household met minimum dietary diversity	0.002	(0.023)	0.037*	(0.022)	0.064*
Child met minimum dietary diversity	0.149***	(0.037)	0.321***	(0.041)	0.000***
Respondent met minimum dietary diversity	0.117***	(0.042)	0.253***	(0.046)	0.002***
Household consumed animal-source foods	0.020	(0.012)	0.029***	(0.011)	0.266
Child consumed animal-source foods	0.013	(0.034)	0.081***	(0.030)	0.025**
Respondent consumed animal-source foods	0.050	(0.039)	0.203***	(0.039)	0.000***
Child was sick in the past 2 weeks - intensity	–0.009	(0.029)	0.014	(0.029)	0.439
Had illness/injury in past 30 days	–0.003	(0.034)	0.004	(0.035)	0.841

Note: Robust standard errors are clustered at the village level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Composite indices following Kling et al. (2007) - Men sample

Back

	T1		T2		T1=T2
	coeff.	(s.e.)	coeff.	(s.e.)	p-value
Knowledge - Nutrients	0.087***	(0.019)	0.070***	(0.019)	0.298
Knowledge - Malnutrition effects	0.044**	(0.018)	0.056***	(0.021)	0.520
Social Norms	–0.014	(0.036)	–0.143***	(0.036)	0.000***
Food distribution	0.049	(0.034)	0.112***	(0.033)	0.047**
Ate away from home in the past 7 days	0.047	(0.041)	–0.163***	(0.045)	0.000***
Respondent met minimum dietary diversity	0.066*	(0.037)	0.075**	(0.037)	0.804
Respondent consumed animal-source foods	0.039	(0.036)	–0.006	(0.040)	0.236

Note: Robust standard errors are clustered at the village level. *** p<0.01, ** p<0.05, * p<0.1.

Complete Endline- Women sample

	T1		T2		T1=T2
	coeff.	(s.e.)	coeff.	(s.e.)	p-value
Knowledge - Nutrients	0.198***	(0.070)	0.188***	(0.072)	0.874
Knowledge - Malnutrition effects	–0.013	(0.074)	0.060	(0.073)	0.346
Social Norms	0.045	(0.077)	–0.132*	(0.072)	0.019**
Food distribution	–0.059	(0.081)	0.012	(0.080)	0.387
Ate away from home in the past 7 days	–0.021	(0.023)	–0.059***	(0.023)	0.063*
Child ate away from home in the past 7 days	–0.006	(0.015)	0.012	(0.015)	0.282
Household met minimum dietary diversity	0.002	(0.020)	0.039*	(0.020)	0.029**
Child met minimum dietary diversity	0.141***	(0.037)	0.329***	(0.040)	0.000***
Respondent met minimum dietary diversity	0.091**	(0.042)	0.270***	(0.044)	0.000***
Household consumed animal-source foods	0.019*	(0.011)	0.029***	(0.010)	0.194
Child consumed animal-source foods	0.019	(0.032)	0.082***	(0.028)	0.027**
Respondent consumed animal-source foods	0.056	(0.038)	0.241***	(0.037)	0.000***
Child was sick in the past 2 weeks - intensity	–0.013	(0.029)	0.013	(0.029)	0.372
Had illness/injury in past 30 days	–0.005	(0.031)	–0.006	(0.035)	0.979

Note: Robust standard errors are clustered at the village level. Column 6 reports the number of observations.*** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Complete Endline- Men sample

Back

	T1		T2		T1=T2
	coeff.	(s.e.)	coeff.	(s.e.)	p-value
Knowledge - Nutrients	0.318***	(0.063)	0.233***	(0.063)	0.108
Knowledge - Malnutrition effects	0.105	(0.069)	0.138	(0.084)	0.672
Social Norms	0.022	(0.071)	–0.197***	(0.071)	0.001***
Food distribution	0.099	(0.076)	0.237***	(0.072)	0.051*
Ate away from home in the past 7 days	0.052	(0.039)	–0.165***	(0.043)	0.000***
Respondent met minimum dietary diversity	0.063*	(0.036)	0.091**	(0.035)	0.423
Respondent consumed animal-source foods	0.030	(0.035)	0.013	(0.038)	0.634

Note: Robust standard errors are clustered at the village level. Column 6 reports the number of observations.*** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Village Health Teams visits in the last 6 months

Back

	Women			Men		
	At least one	Frequency	Discussed nutrition	At least one	Frequency	Discussed nutrition
T1	-0.013	-0.118	-0.014	0.082**	0.281*	0.157***
	(0.034)	(0.150)	(0.039)	(0.034)	(0.160)	(0.038)
T2	0.003	-0.105	-0.003	0.063*	0.142	0.139***
	(0.032)	(0.153)	(0.037)	(0.034)	(0.180)	(0.035)
Obs	1045	1045	1045	988	863	988
T1=T2	0.646	0.936	0.785	0.535	0.404	0.597
T0 mean	0.800	2.549	0.617	0.676	1.993	0.433

Note: Robust standard errors are clustered at the village level. Column 6 reports the number of observations.*** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Nutrition knowledge–Nutrients

- **Protein:** outcomes results
  - Is Chicken high or low in protein?
  - Are Bananas high or low in protein?
  - Are Beans high or low in protein?
  - Is Mukene high or low in protein?
  - Is Posho high or low in protein?
  - Is Matooke high or low in protein?
  - Is Beef high or low in protein?
  - Is Pork high or low in protein?
- **Meat alternatives:**
  - Are Carbohydrates considered a healthy alternative to meat?
  - Are Pulses and Legumes considered a healthy alternative to meat?
  - Are Vegetables considered a healthy alternative to meat?
  - Are Fruits considered a healthy alternative to meat?
  - Are Fatty foods considered a healthy alternative to meat?

Nutrition knowledge–Malnutrition effects

- How can you recognize that children are malnourished?
- What are the major health problems or diseases that are related to low intake of proteins?
- Do you recognize the condition of the child in the photo?
- What condition can lead to this outcome in a child?
- Imagine someone was malnourished as a child. In your opinion, how would this affect this person in the long-term?

Responses to these questions were aggregated into the index. ▸ outcomes ▸ results

Conservative social norm

▸ outcomes ▸ results

- Men should have the largest share of meat cooked in the household.
- Men should be given the best part of meat in the household.
- When there is no food available in the households, it is okay for men to eat outside at pork joints and other street restaurants.
- When there is food available in the household, it is okay for men to eat outside at pork joints and other street restaurants.
- When scarce, available eggs should be given to the man.
- Children below the age of four should only be given the feet, head, or wings of a chicken in the household.
- When scarce, available eggs should not be given to children below the age of four.

For each question, respondents received a positive or negative framing with 50% probability.

Minimum Dietary Diversity Score (MDD) outcomes results

Children aged 6–23 months: A child meets the minimum dietary diversity threshold if they consumed foods from at least **5 out of 8** specified food groups.

Women of reproductive age (MDD-W): A woman meets the threshold if she consumed foods from at least **5 out of 10** food groups. **Common food groups include:**

- Grains, roots, and tubers
- Legumes and nuts
- Dairy products
- Flesh foods (meat, poultry, fish)
- Eggs
- Vitamin A–rich fruits and vegetables
- Other fruits and vegetables
- (Plus additional categories for MDD-W such as dark green leafy vegetables and oils/fats)

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