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ILSSI Project

Research Results and Outcomes

Presented by Dawit Mekonnen – International Food Policy Research Institute (IFPRI)

ILSSI Stakeholder Consultation – Dar es Salaam - 17th May 2018

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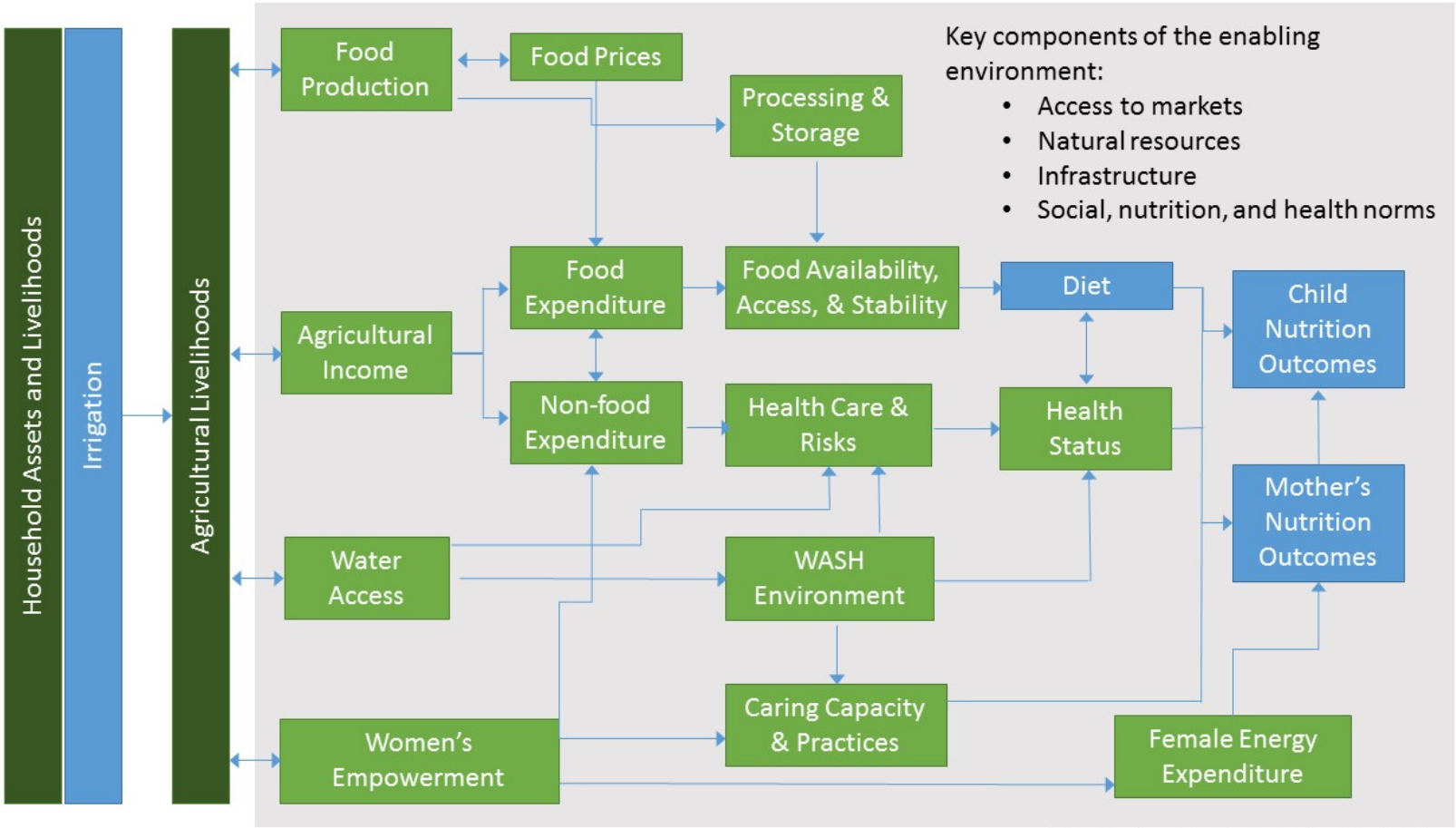
RESEARCH CONCEPTUAL FRAMEWORK



Adapted by the authors from Herforth and Harris, 2014

RESEARCH AIMS

1. What are the constraints to and benefits of adopting small scale irrigation (SSI) technologies? (-> Econometric Analyses)
2. How can nutritional outcomes be strengthened through SSI? (-> Household Survey Analysis, Engagement with nutrition and health departments, Outreach on irrigation-nutrition linkages)
3. How can women's empowerment be strengthened through SSI? (-> Focus Group Discussions and Household Survey Analyses, Training on Gender-Irrigation Linkages, Outreach)

METHODOLOGY

IFPRI implemented detailed household surveys in Tanzania ILSSI intervention villages and nearby control farmers in 2015 and 2017

- In collaboration with Sokoine University of Agriculture
- Data collected on:
  - Crop & livestock inputs, production and practices
  - Household and women's dietary diversity
  - Child health, diet, feeding and anthropometry
  - Household shocks, assets, credit
  - Women's Empowerment in Agriculture Index (WEAI)
- Household surveys accompanied with community surveys, FGDs, and anthropometric measures

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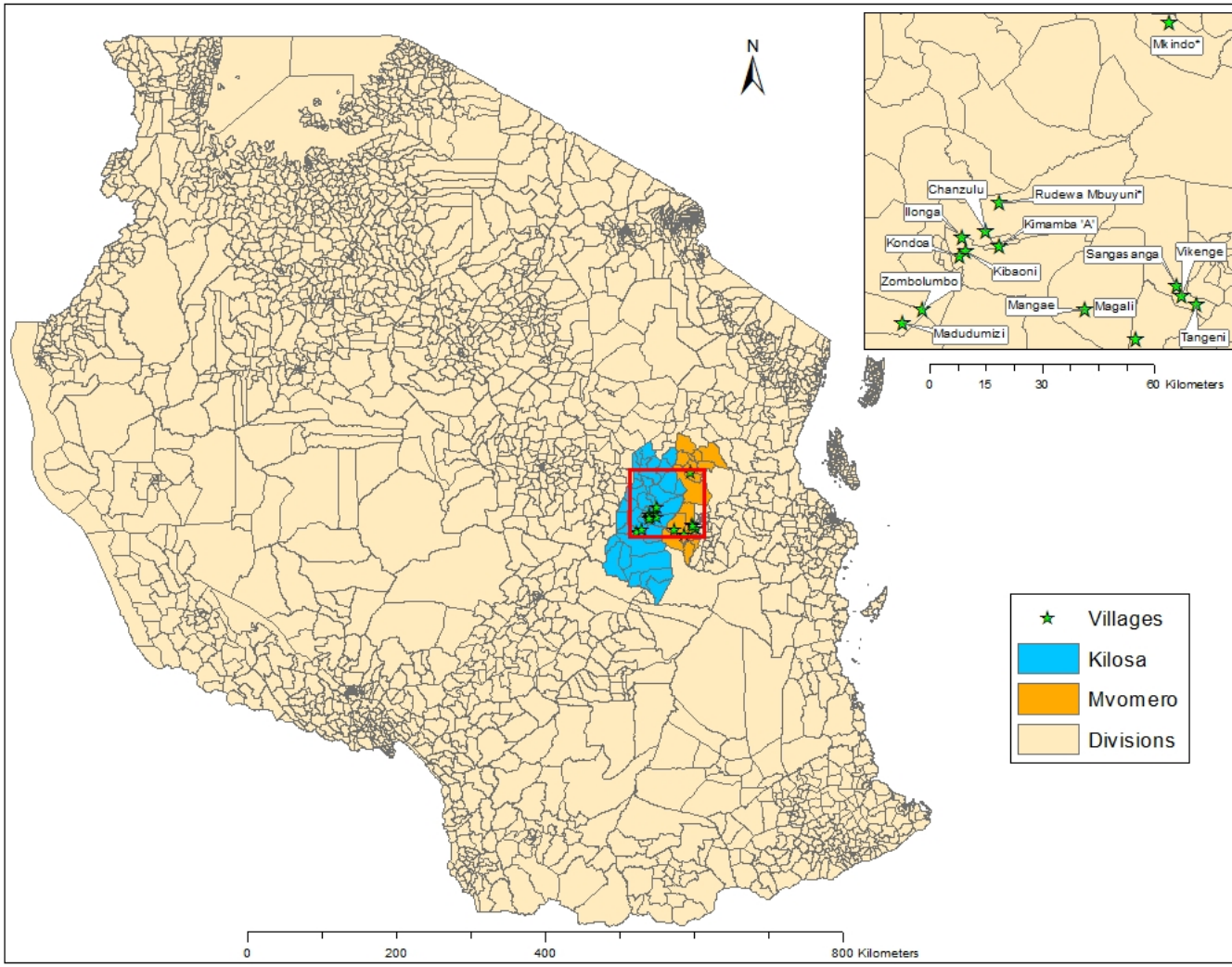
SITES IN TANZANIA

Baseline: 14 villages in Kilosa, Mvomero, and Babati districts:

June 24th to July 11th, 2015 (covering 1 year): 451 households

Endline: 17 villages in Kilosa , Mvomero, and Babati districts:

June 26 - to Jul 26, 2017: 540 households



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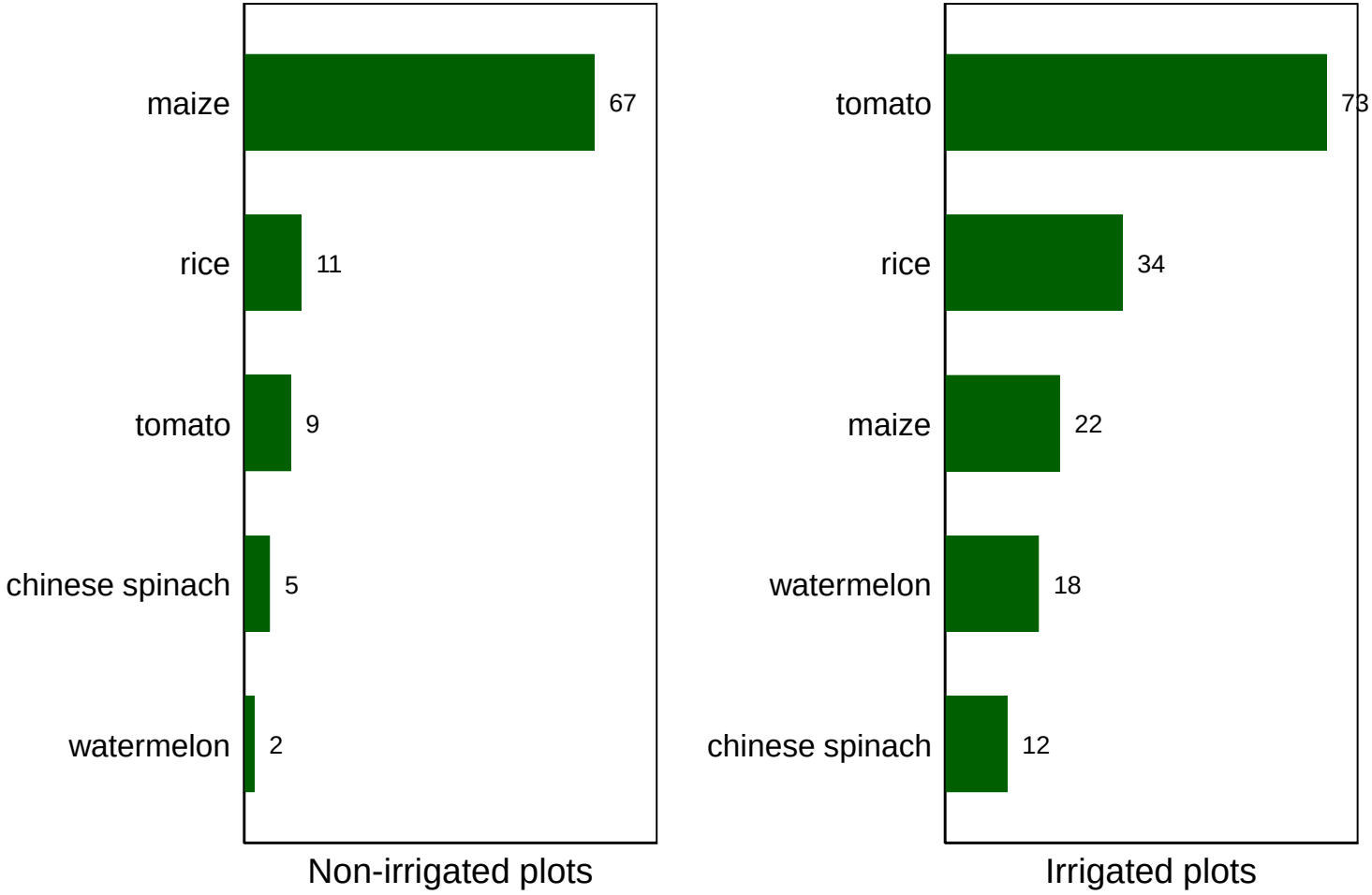
KEY RESEARCH FINDINGS

1. Irrigation profile of study households

2. Irrigation-nutrition linkages

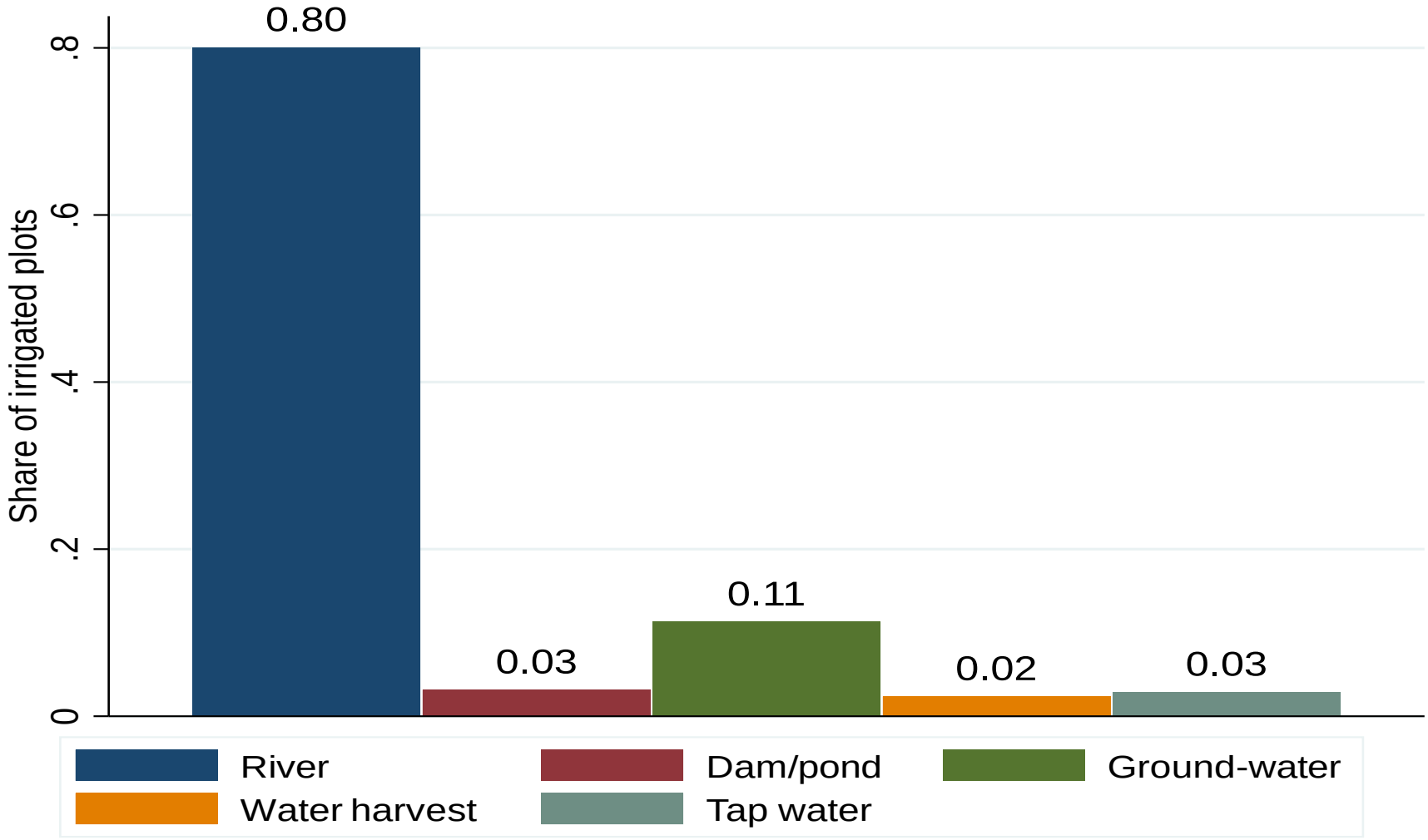
3. Gender considerations for irrigation

IRRIGATION PROFILE: DRY SEASON

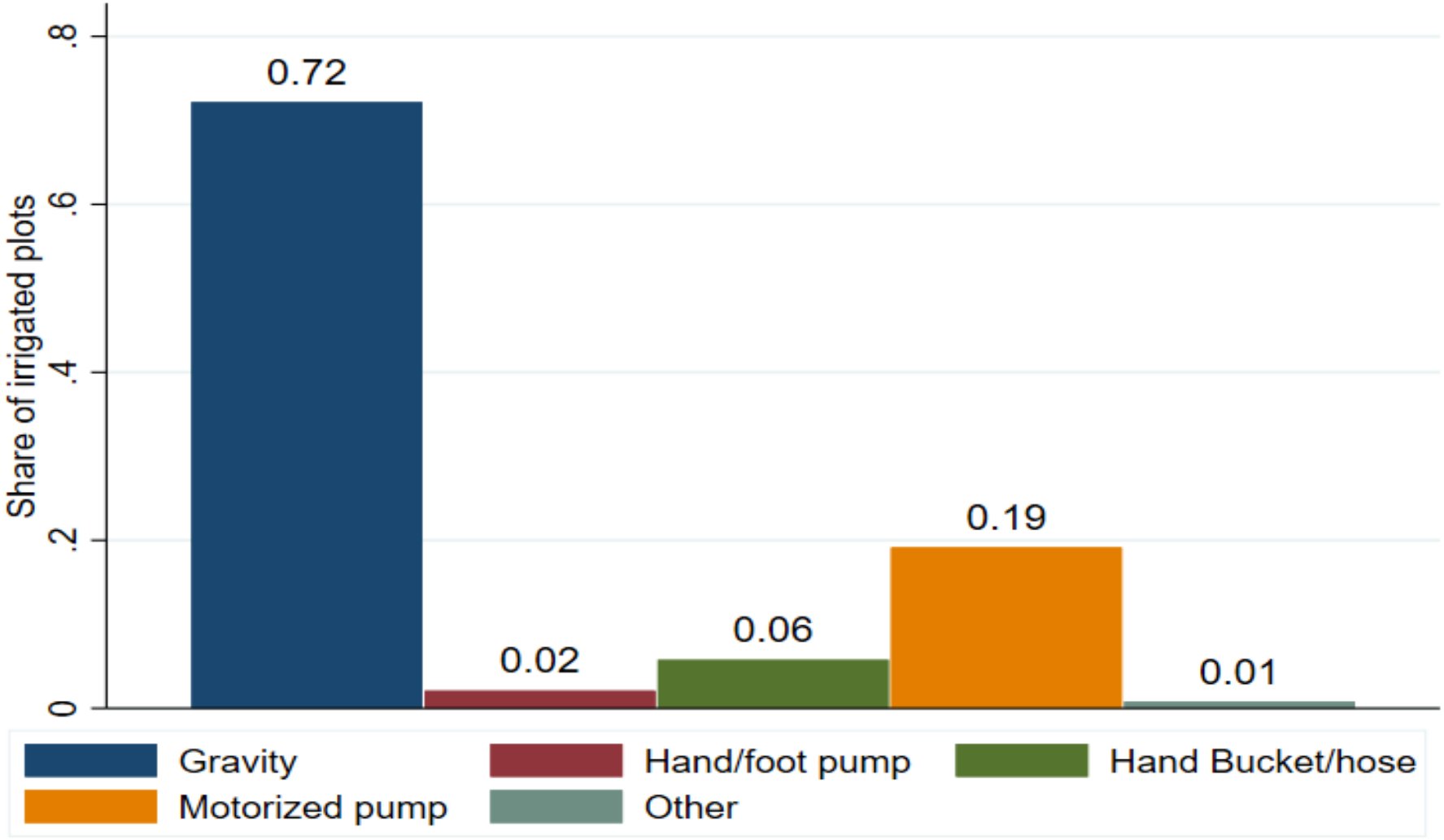


Note: Crops grown on less than 15 plots not shown

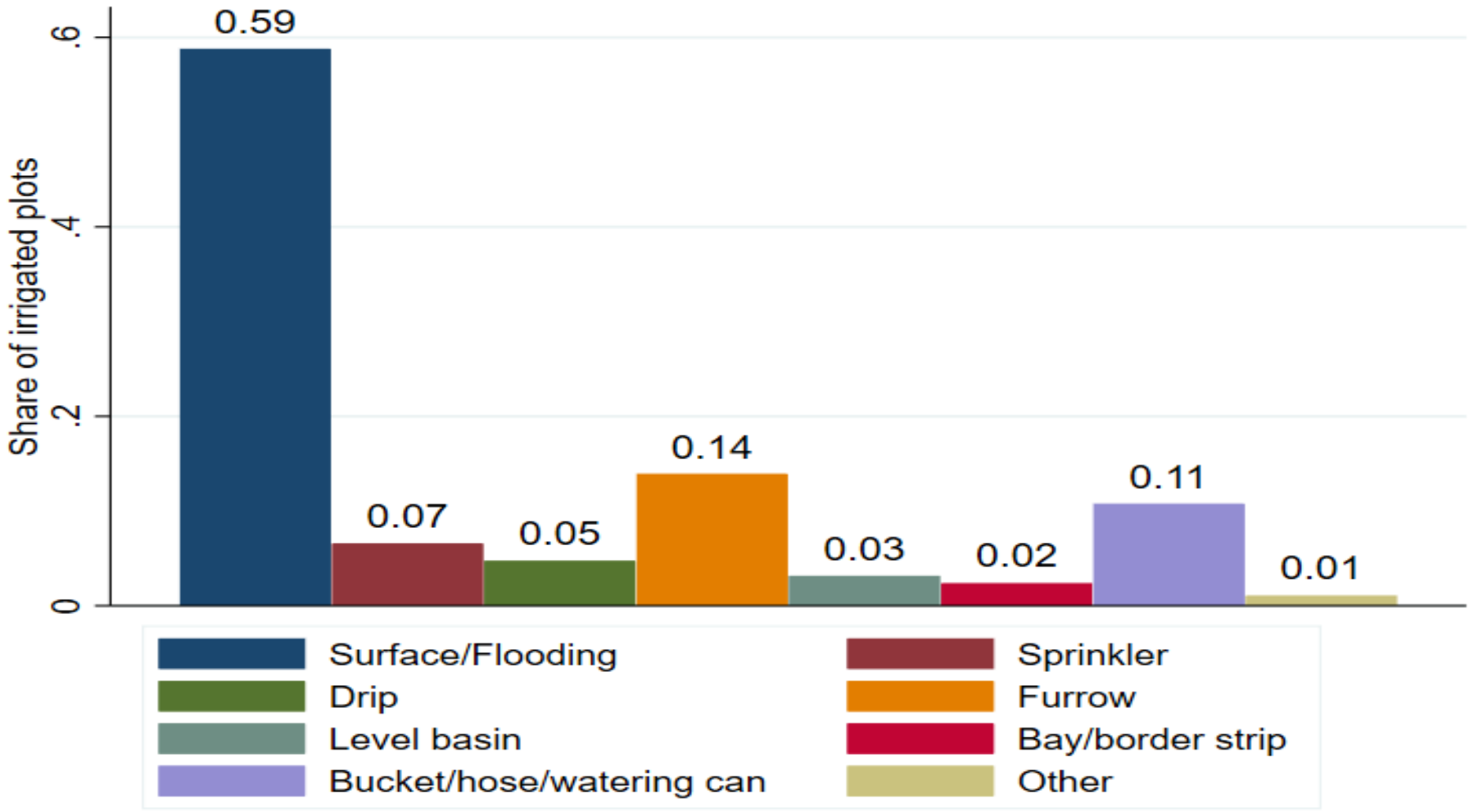
SOURCES OF WATER FOR IRRIGATION



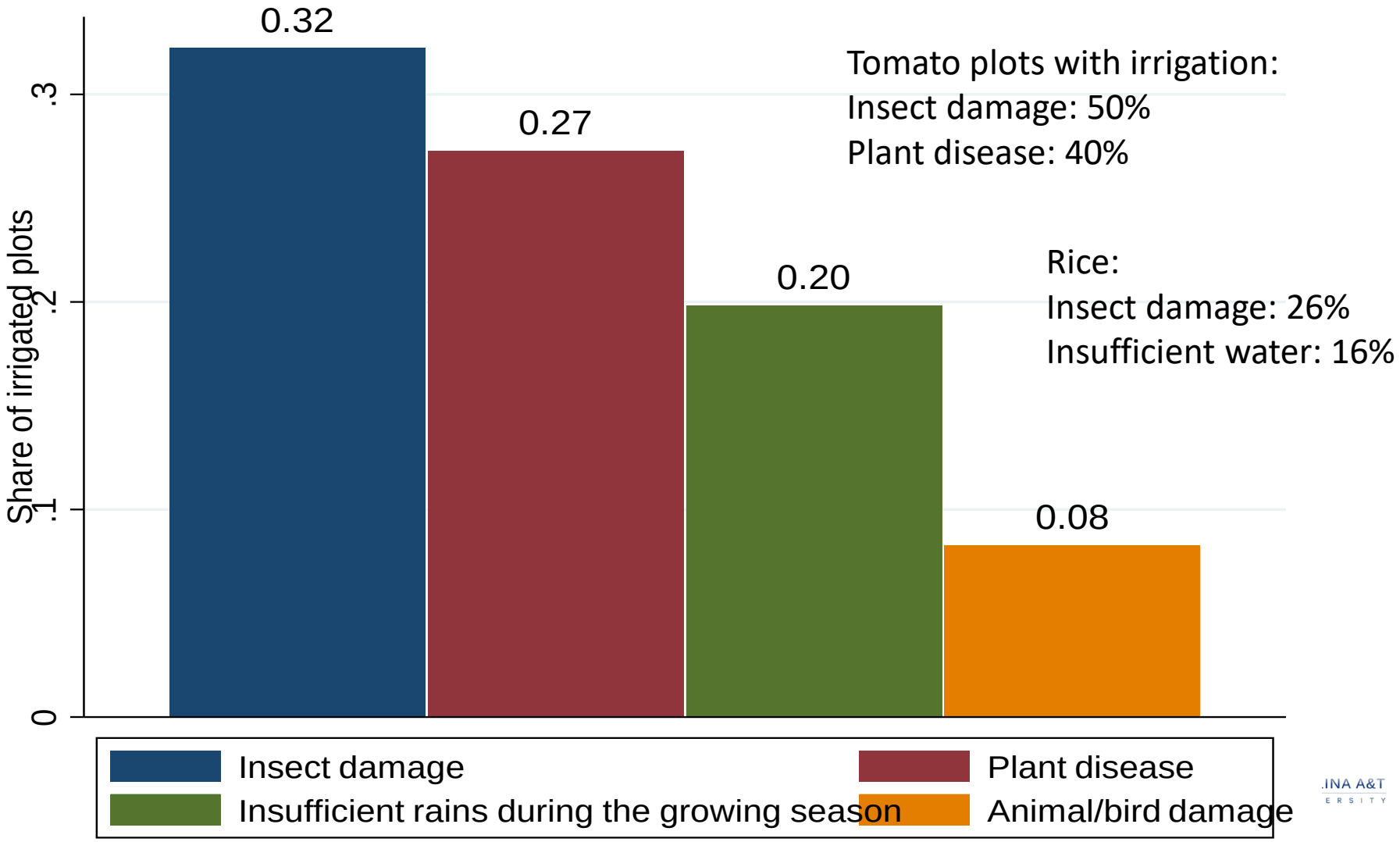
METHODS OF OBTAINING WATER FOR IRRIGATION



TYPES OF IRRIGATION METHOD



MAJOR CONSTRAINTS IN IRRIGATED AGRICULTURE

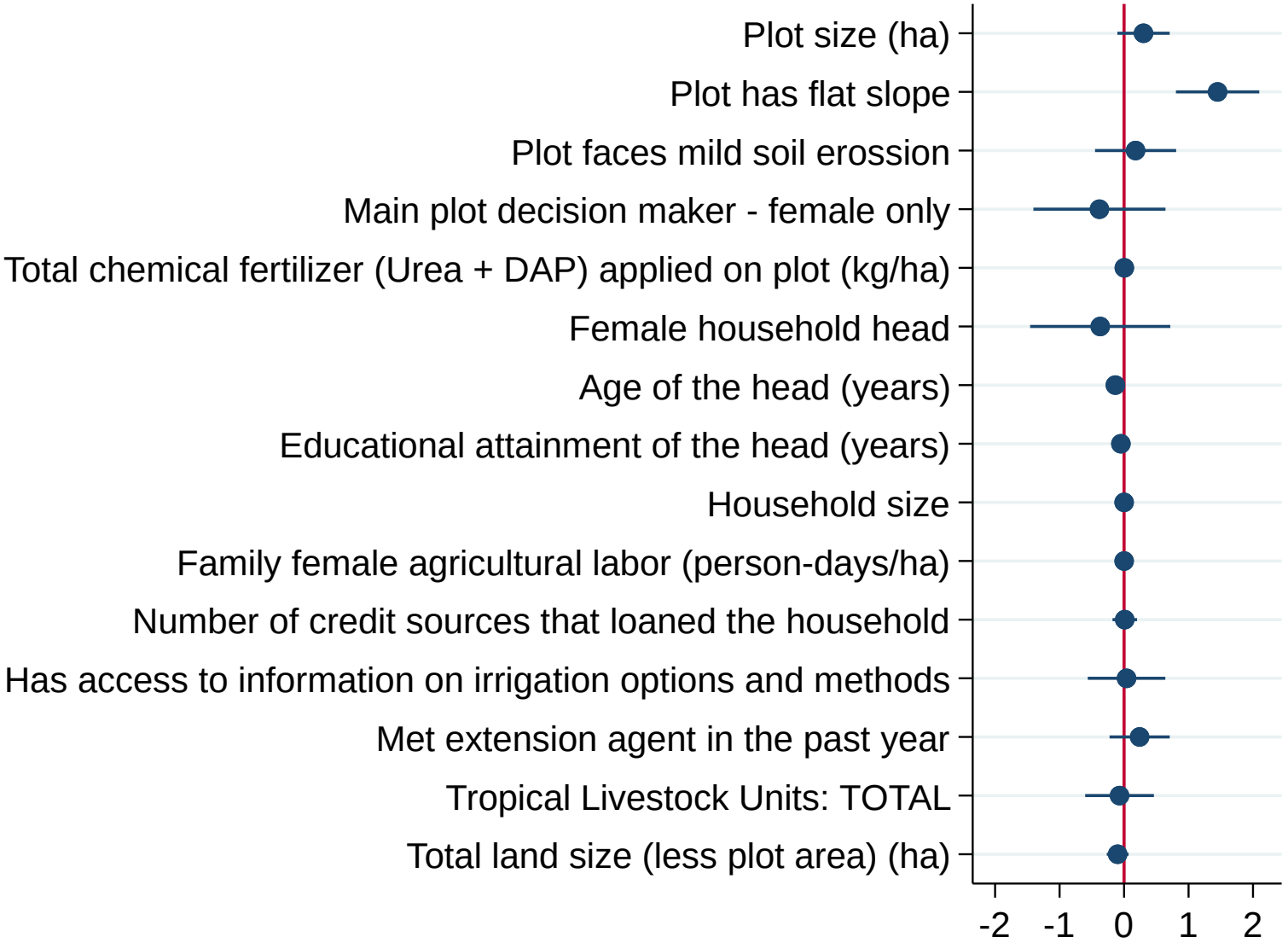


SELECTED SAMPLE CHARACTERISTICS

Dry season	Non-irrigators (1)	Irrigators (2)	P-value (1)-(2)
Female household head	0.23	0.10	***
Age of the head (years)	46.3	43.9	
Educational attainment of the head (years)	6.45	6.39	
Total land size (ha)	1.84	1.81	
Main plot decision maker - female only	0.30	0.12	***
Plot has flat slope	0.67	0.77	*
Family male agricultural labor (person-days/ha)	73.7	161.2	*
Family female agricultural labor (person-days/ha)	96.0	131.3	
Total chemical fertilizer (Urea + DAP) applied on plot (kg/ha)	10.7	56.4	***
Tropical Livestock Units: TOTAL	0.39	0.22	*
Has access to information on irrigation options and methods	0.22	0.19	
Met extension agent in the past year	0.58	0.60	
Household belongs to a credit or microfinance group	0.10	0.17	
Total value of harvest (million TSH/ha)	0.98	6.76	**
Value of rice harvest (million TSH/ha)	0.29	0.60	
Value of tomato harvest (million TSH/ha)	0.28	5.07	**
Number of households	60	190	

* p<0.1, **p<0.05, *** p<0.001

CONSTRAINTS TO IRRIGATION ADOPTION



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IRRIGATION – NUTRITION LINKAGES

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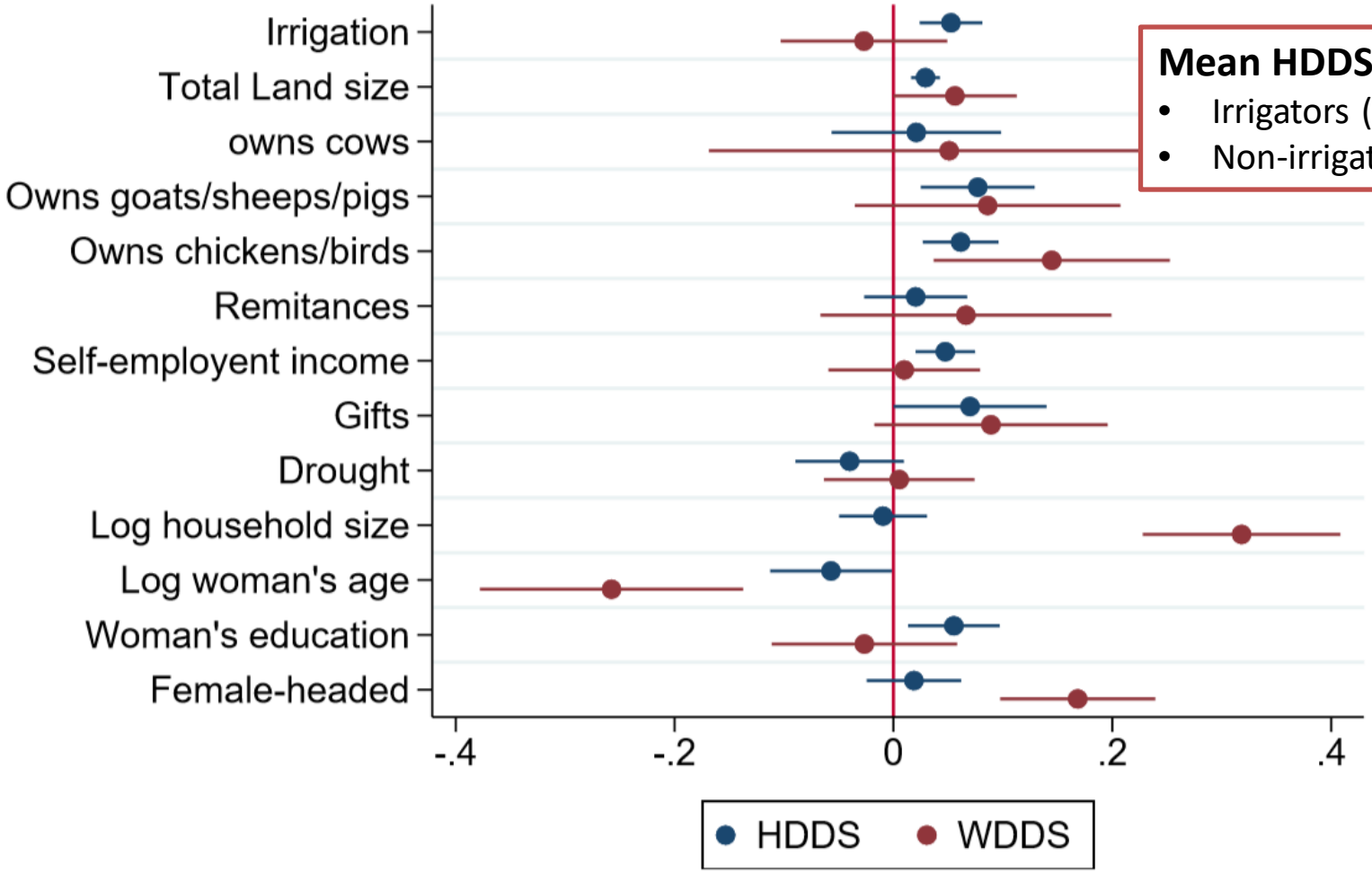
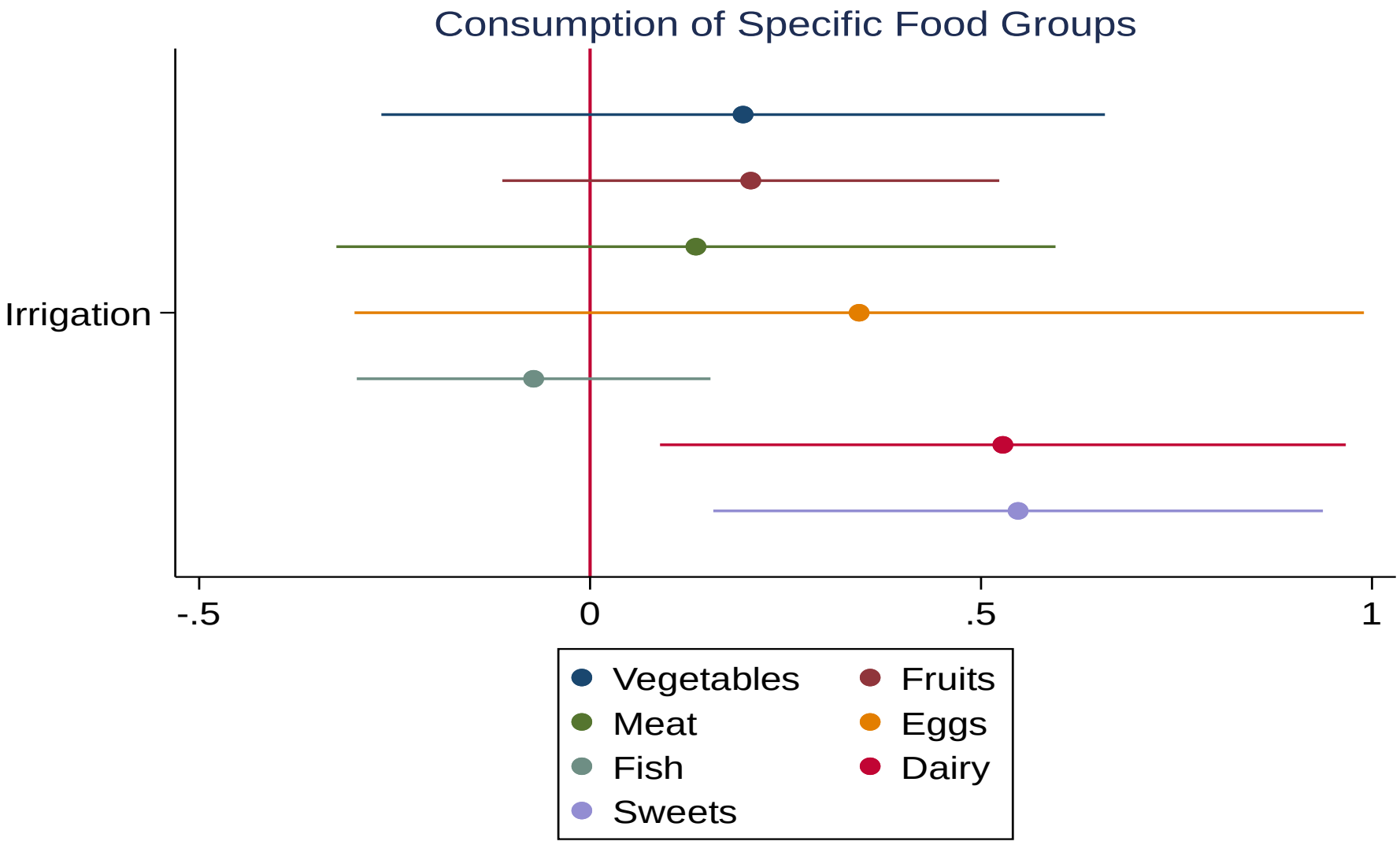
HDDS and WDDS - 24 hour recalls
Poisson Regression - Tanzania

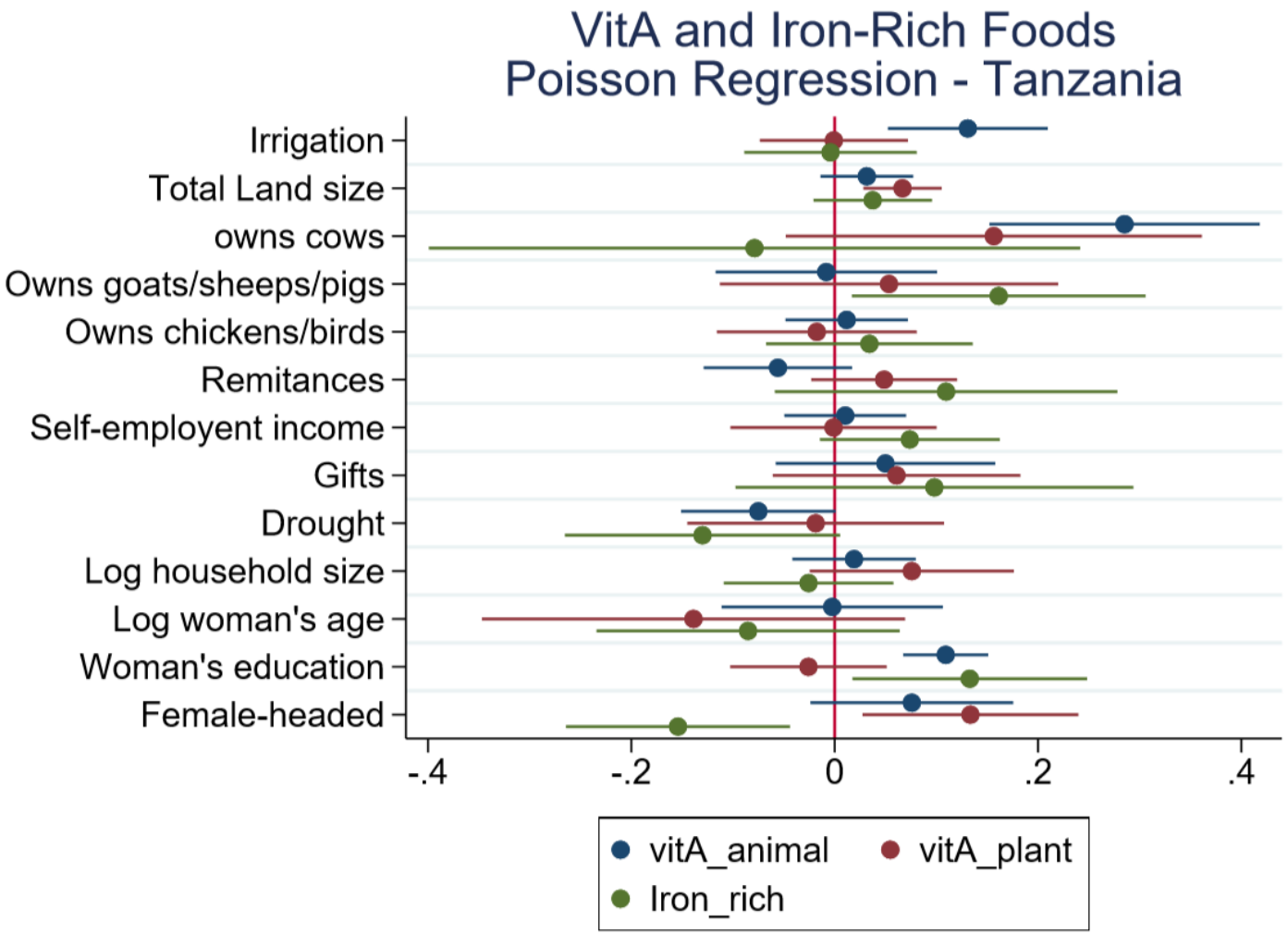


Mean HDDS

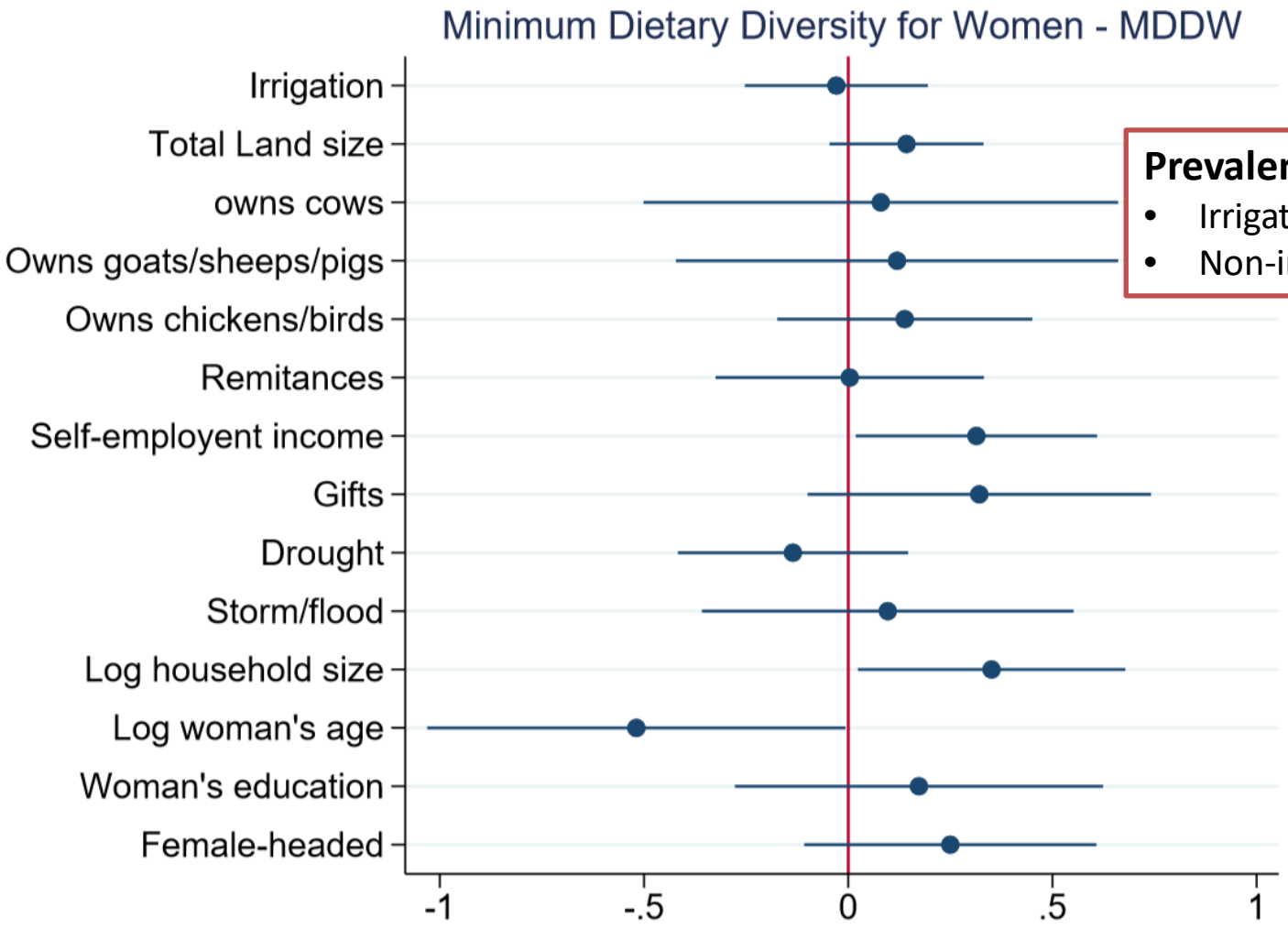
- Irrigators (n=200): 6.25
- Non-irrigators (n=367): 6.01


Consumption of Specific Food Groups
Irrigation
-.5
0
.5
1
Vegetables
Fruits
Meat
Eggs
Fish
Dairy
Sweets

NUTRIENT-DENSE FOODS



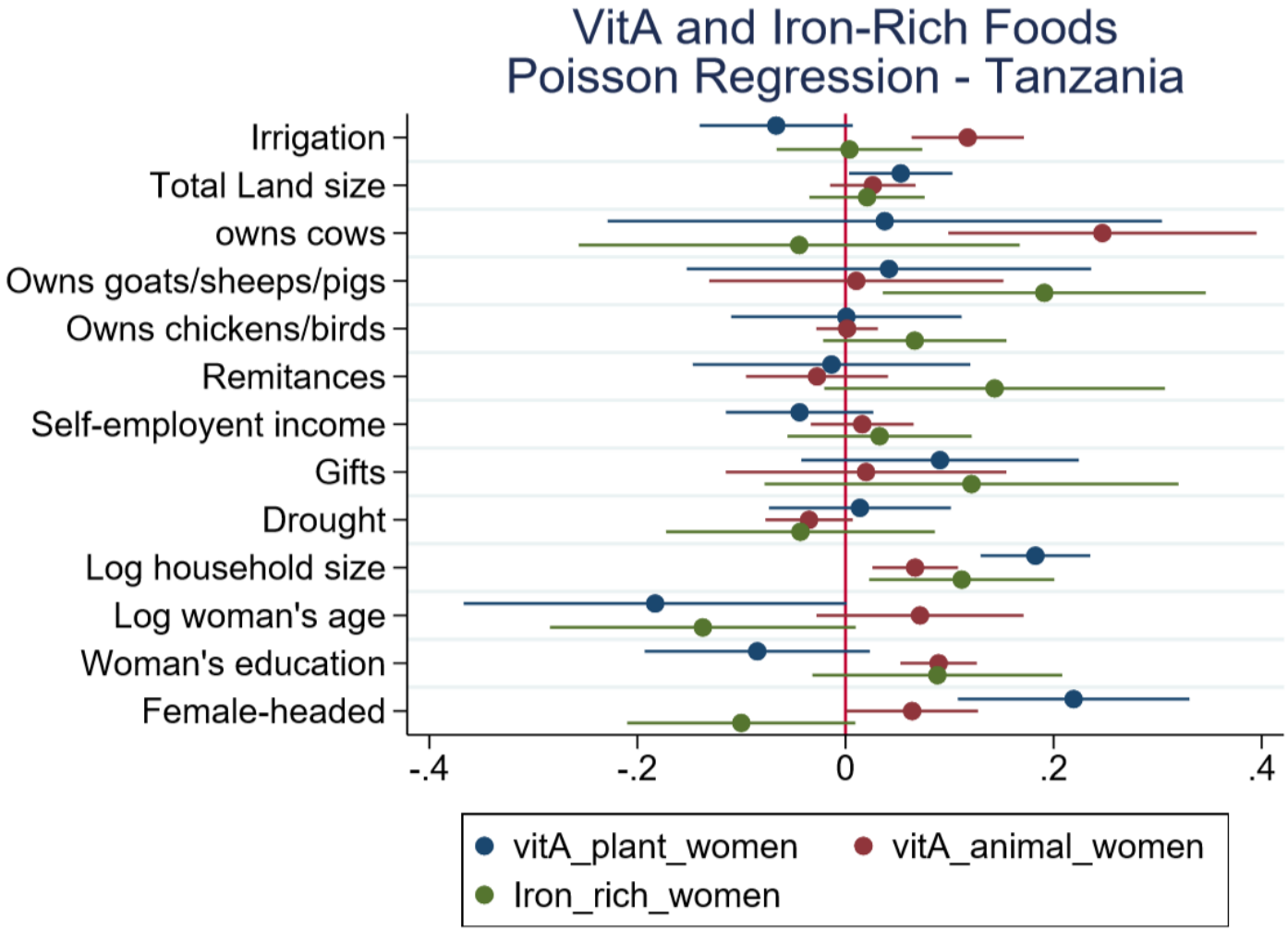
WOMEN'S DIETARY DIVERSITY

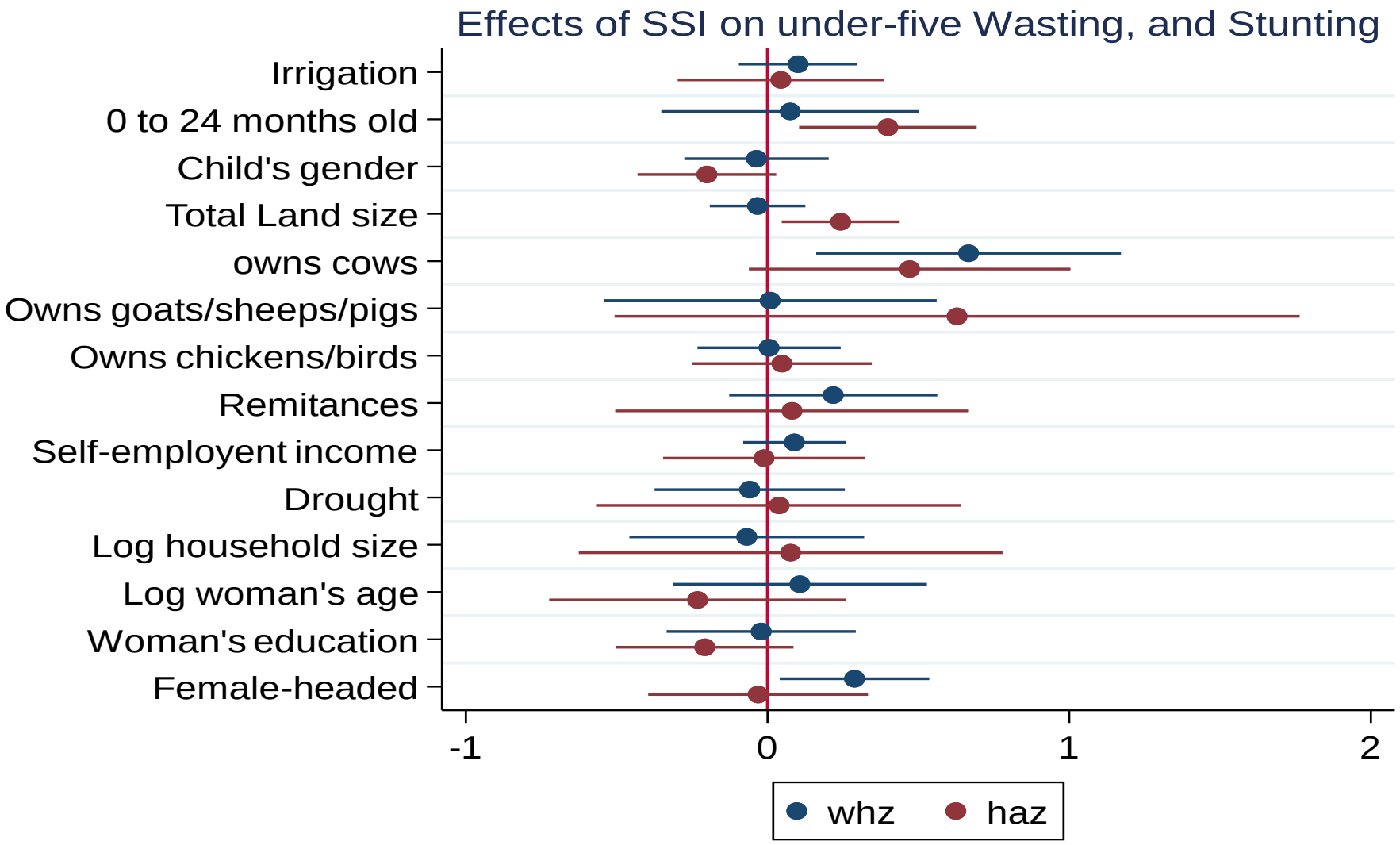


Prevalence, MDDW=1

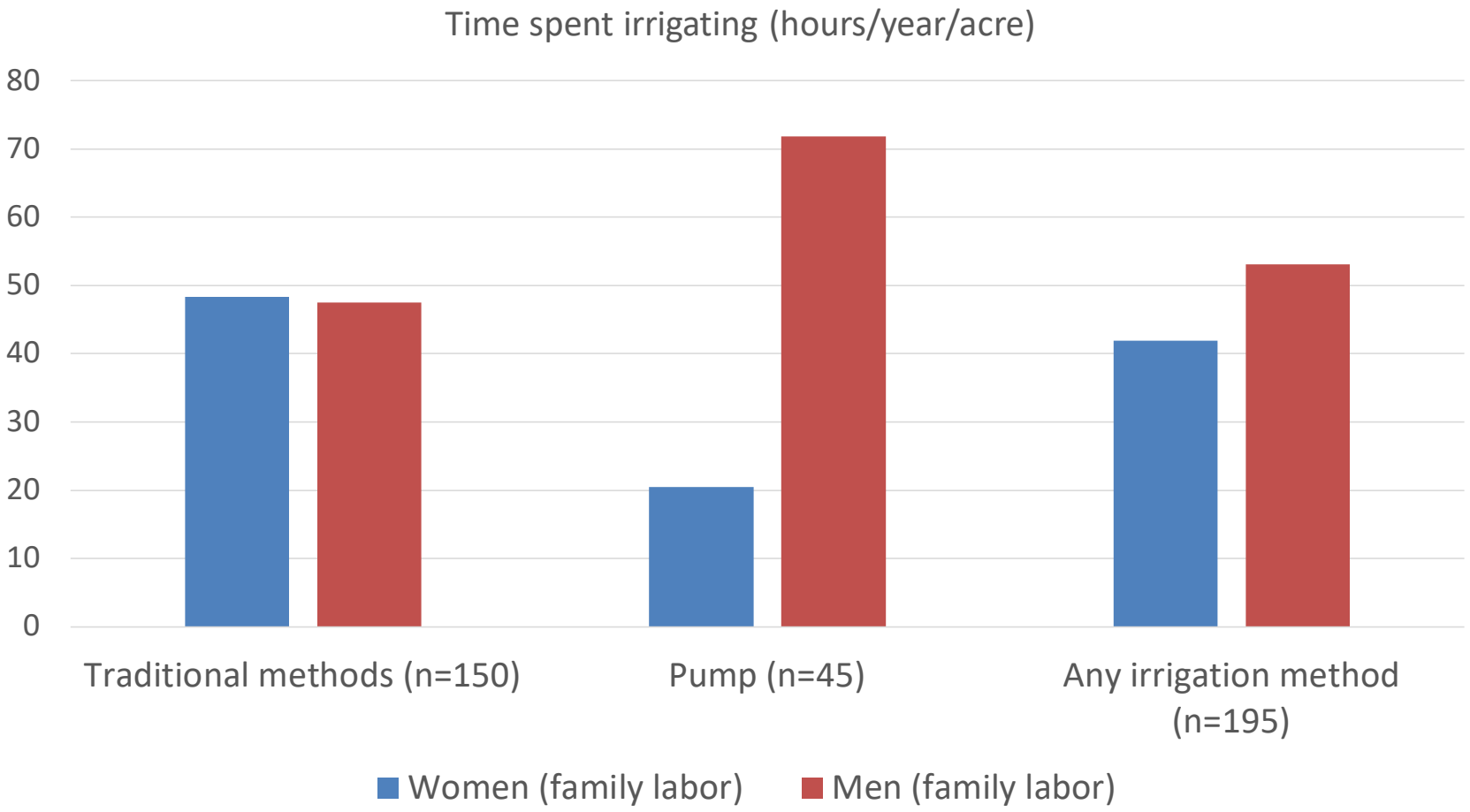
- Irrigators (n=198): 32%
- Non-irrigators (n=347): 24%

SPECIFIC MICRONUTRIENTS




Effects of SSI on under-five Wasting, and Stunting
Irrigation
0 to 24 months old
Child's gender
Total Land size
owns cows
Owns goats/sheeps/pigs
Owns chickens/birds
Remitances
Self-employent income
Drought
Log household size
Log woman's age
Woman's education
Female-headed
-1
0
1
2
whz
haz

LABOR FOR IRRIGATION



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WOMEN'S ROLE IN DECISION-MAKING

	Women's Responses: Tanzania, Baseline				Women's Responses: Tanzania, Endline			
	Input into decisions about…		Input into decisions about use of income from…		Input into decisions about…		Input into decisions about use of income from…	
	Irrigated food crop farming	Irrigated cash crop farming	Irrigated food crop farming	Irrigated cash crop farming	Irrigated food crop farming	Irrigated cash crop farming	Irrigated food crop farming	Irrigated cash crop farming
No input	0%	0%	1%	0%	2%	3%	1%	2%
Input into very few decisions	9%	11%	11%	14%	12%	10%	11%	8%
Input into some decisions	23%	31%	26%	30%	28%	27%	26%	28%
Input into most decisions	30%	24%	29%	23%	21%	24%	25%	25%
Input into all decisions	37%	34%	34%	34%	36%	35%	37%	37%

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KEY MESSAGES

- Irrigation is positively associated with household dietary diversity (economic access to foods). The irrigation-nutrition pathway at play appears to be the income pathway.
- Irrigation has positive effect on the consumption of dairy products, sugar and honey
- Irrigation is positively associated with the consumption of Vit-A rich animal source foods (both at the household level and women's diets)
- However, irrigation is not associated with minimum dietary diversity for women and child nutrition

KEY MESSAGES

- Several factors appear to constrain irrigation's full potential for improving welfare:
  - 50% of tomato plots (the single most frequently irrigated crop) are affected by insect damage while 40% of them are affected by plant diseases.
  - 25% of rice plots (the second most irrigated crop) affected by insect damage.
  - 20% of irrigated plot affected by insufficient amount of water during the growing season

RECOMMENDATIONS

If irrigation is to have a meaningful effect on nutrition through increased income and diversified food production/availability, there is a need to address the challenges that irrigated agriculture is facing

- from insect diseases through improved agronomic practices
- from plant diseases through improved varieties that are less susceptible to disease
- from water shortages by investing in improved water management techniques and technologies that can help produce more for the same level of water

Research on the importance of irrigation interventions with intensive nutrition education and gender trainings, with an eye on differences in intra-household preferences and challenges of men and women is also needed.

PUBLICATIONS UNDER PREPARATION

1. Small-Scale Irrigation Improves Household Dietary Diversity through Increased Income: Evidence from Ethiopia and **Tanzania**
2. Irrigation and Gender: Women's Empowerment and Decision-Making in Water Management Practices in Ethiopia, **Tanzania**, and Ghana
3. Small Scale Irrigation and child nutrition outcomes: Evidence from Ethiopia, Ghana, and **Tanzania**
4. Constraints and opportunities for adoption of small scale irrigation technologies. Evidence from **East** and West **Africa**

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