



# FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative



## ILSSI Project Research Results and Outcomes

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ILSSI Stakeholder Consultation - International Livestock Research Institute, Addis Ababa - 24<sup>th</sup> May 2018

Photo: Desalegne Tadesse/IWMI

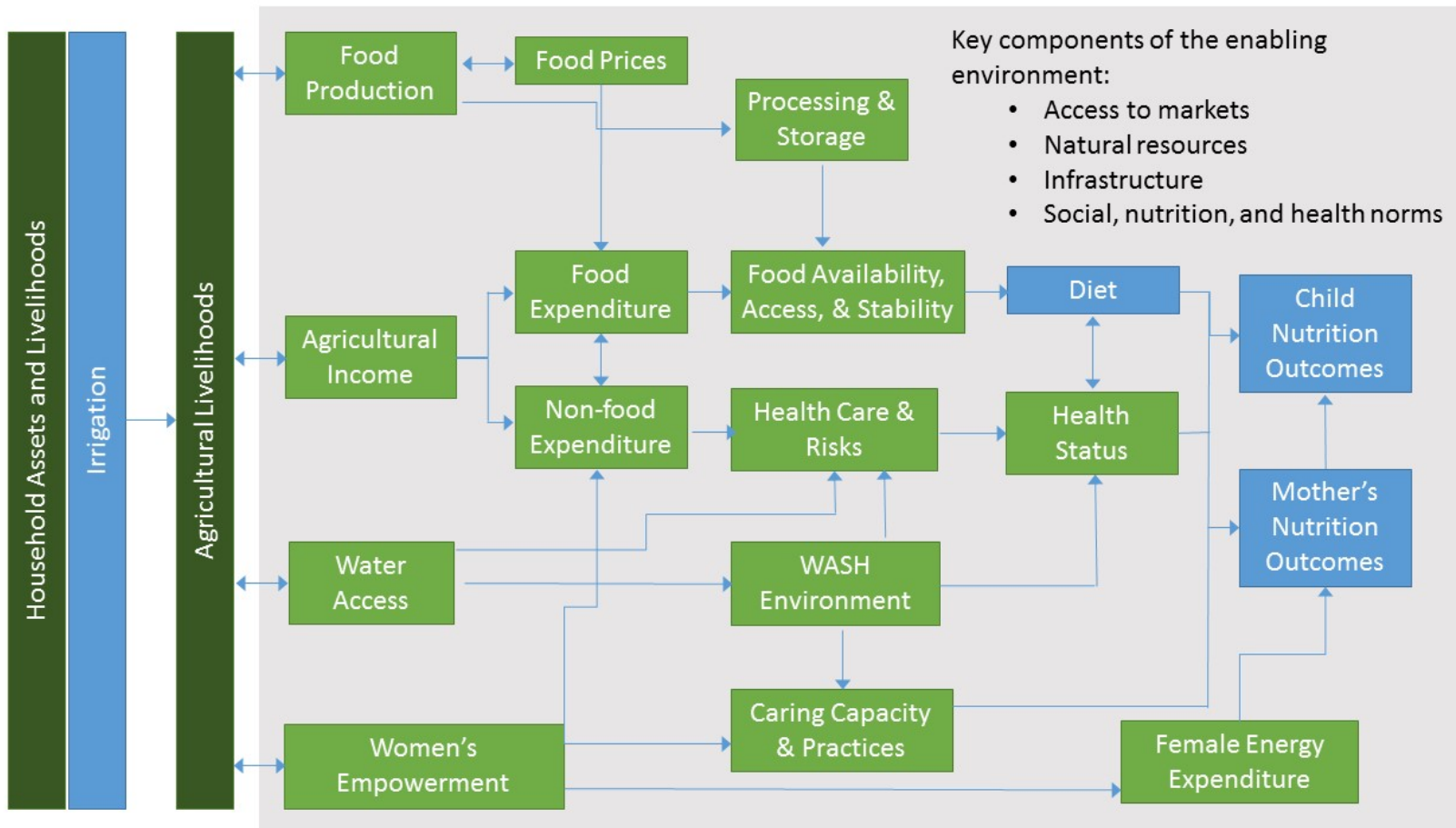




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## RESEARCH CONCEPTUAL FRAMEWORK



Adapted by the authors from Herforth and Harris, 2014





## RESEARCH AIMS

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





## METHODOLOGY

ILSSI collected detailed household survey data in Ethiopia ILSSI intervention villages and nearby control farmers: 2 rounds of survey data (2014, 2017)

- In collaboration with Association of Ethiopian Microfinance Institution
- Topics of the survey include:
  - 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)
- The household surveys are accompanied by community surveys, FGDs, anthropometric measures, and intra-household surveys

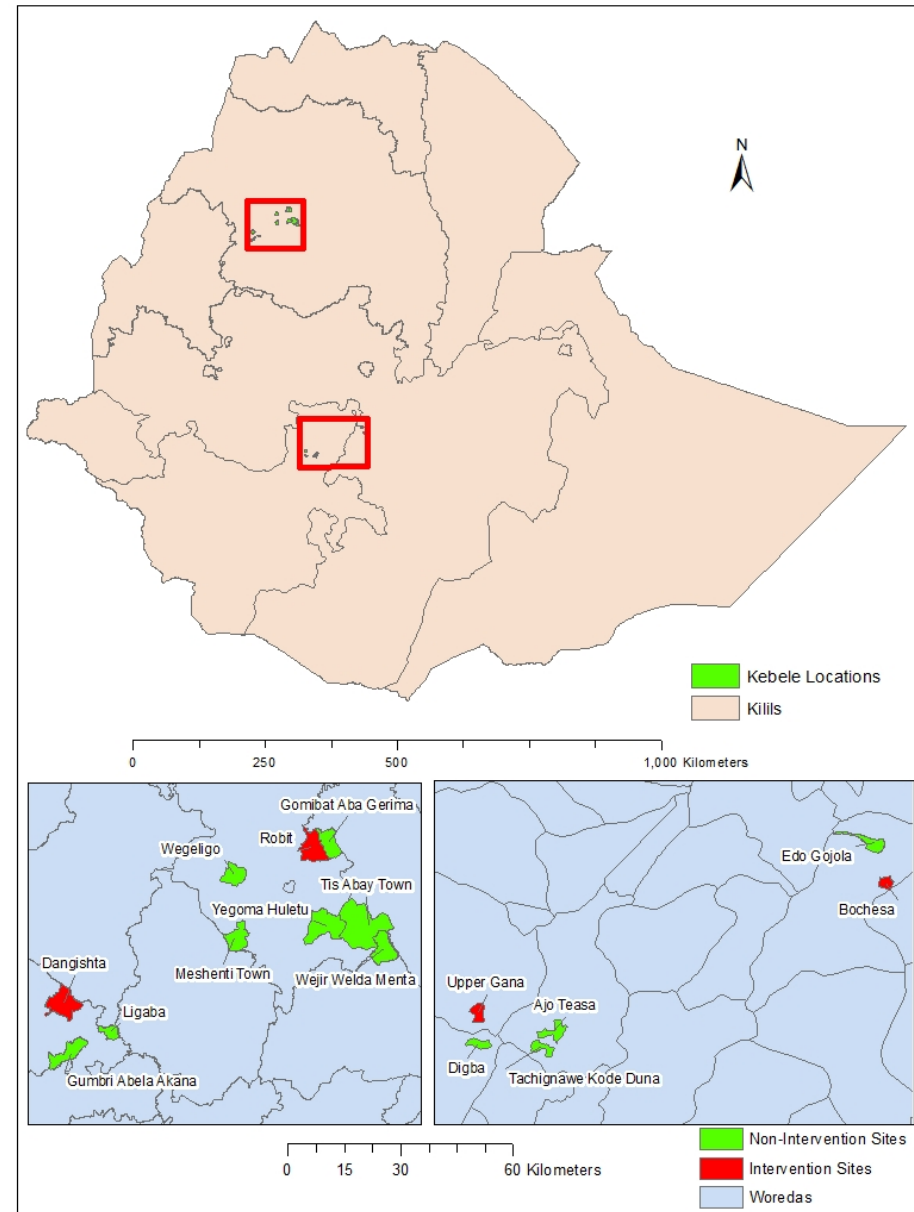


# SITES IN ETHIOPIA

**Baseline:** 15 villages, November 14th - December 26th 2014 (covering 1 year): 439 households

**Endline:** 15 villages, February 20th – April 12, 2017 (covering the preceding one year)

- 439 households from round I
- Additional 100 households under SIPS funding - quantitative nutrition module for 368 households.





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## KEY RESEARCH FINDINGS

1. Irrigation profile of ILSSI sample
2. Irrigation-nutrition linkages
3. Gender considerations for irrigation



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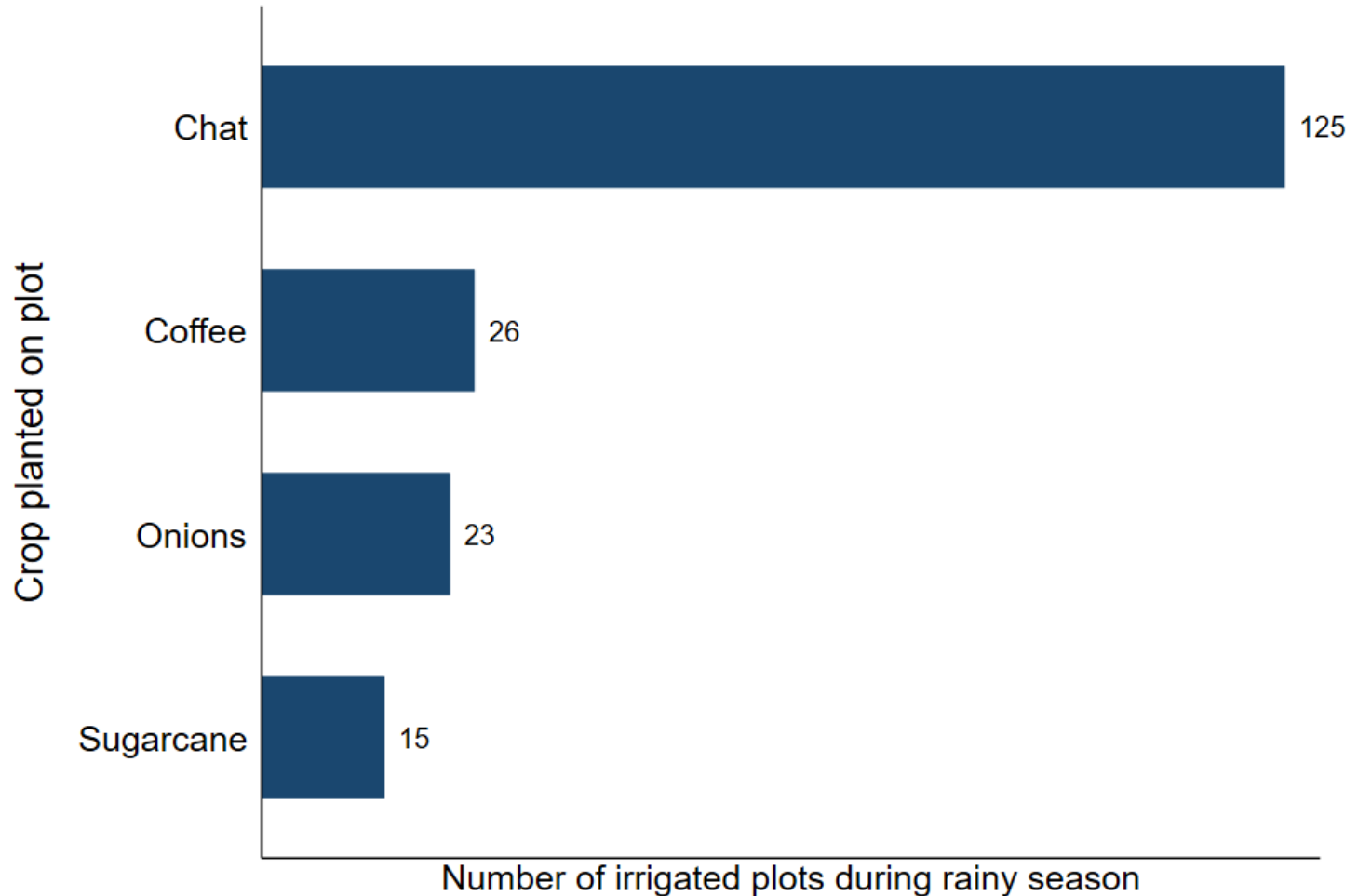
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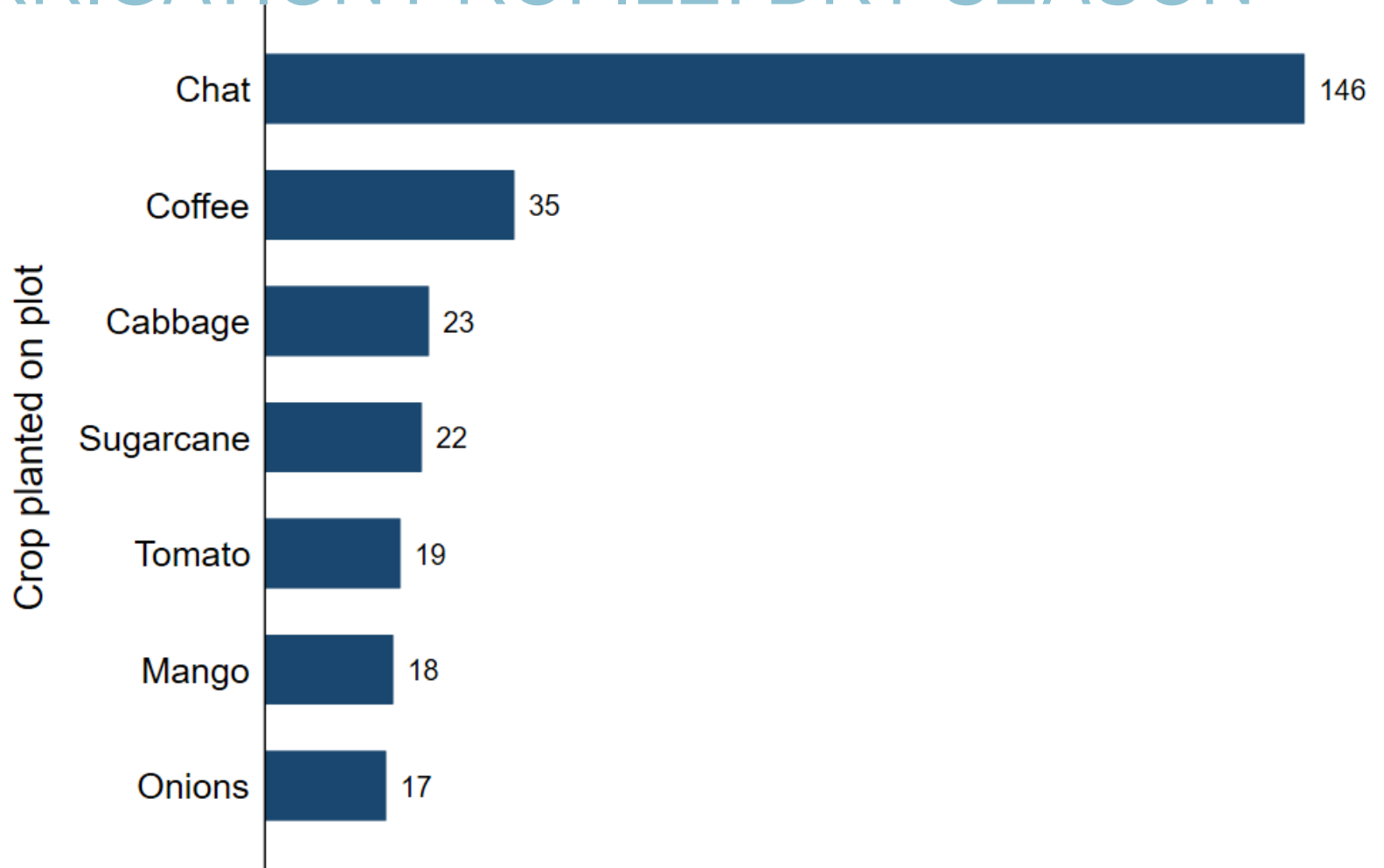
## IRRIGATION PROFILE: RAINY SEASON



Crops grown on less than 15 irrigated plots not shown



## IRRIGATION PROFILE: DRY SEASON



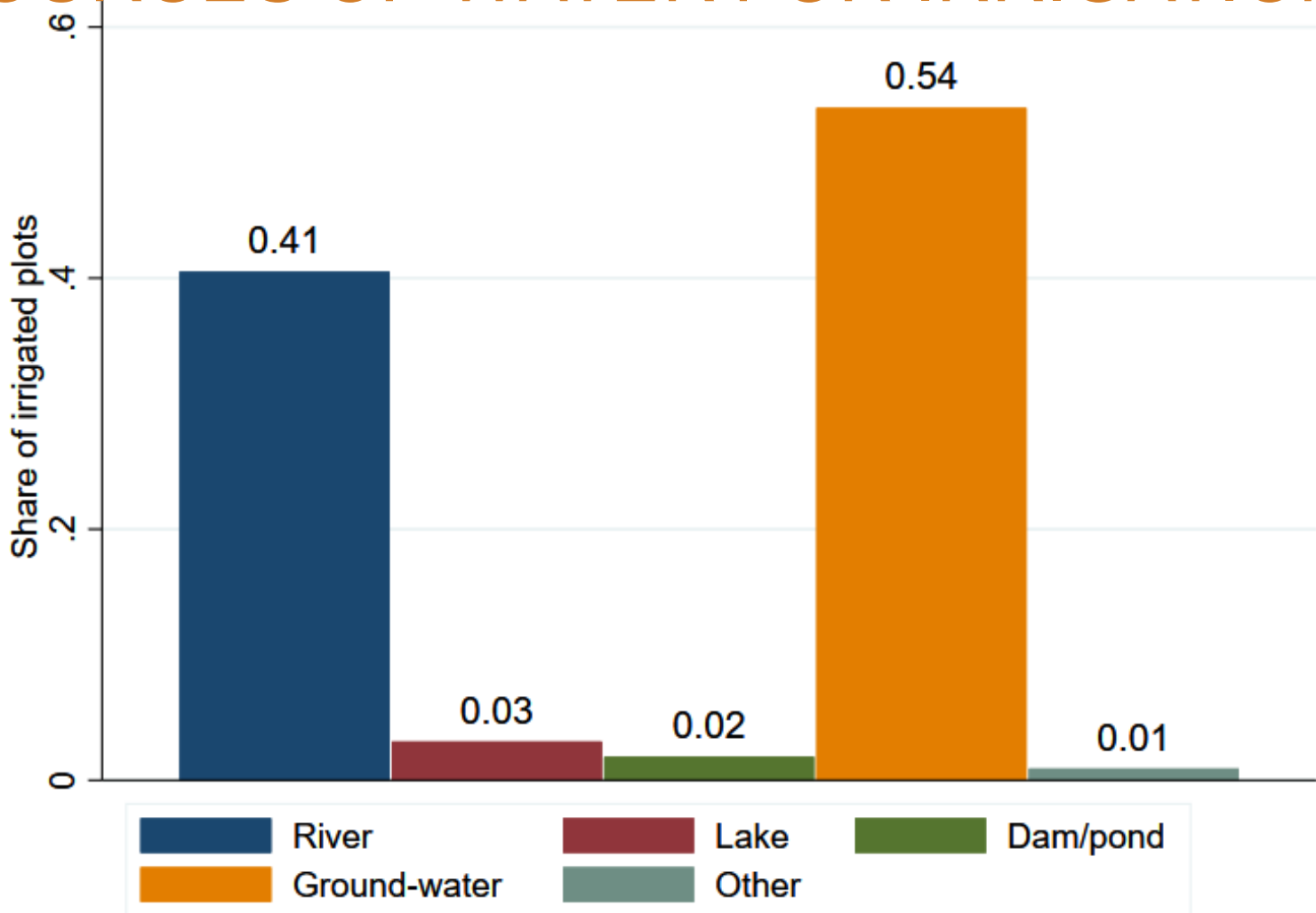
Number of irrigated plots during dry season

Crops grown on less than 15 irrigated plots not shown



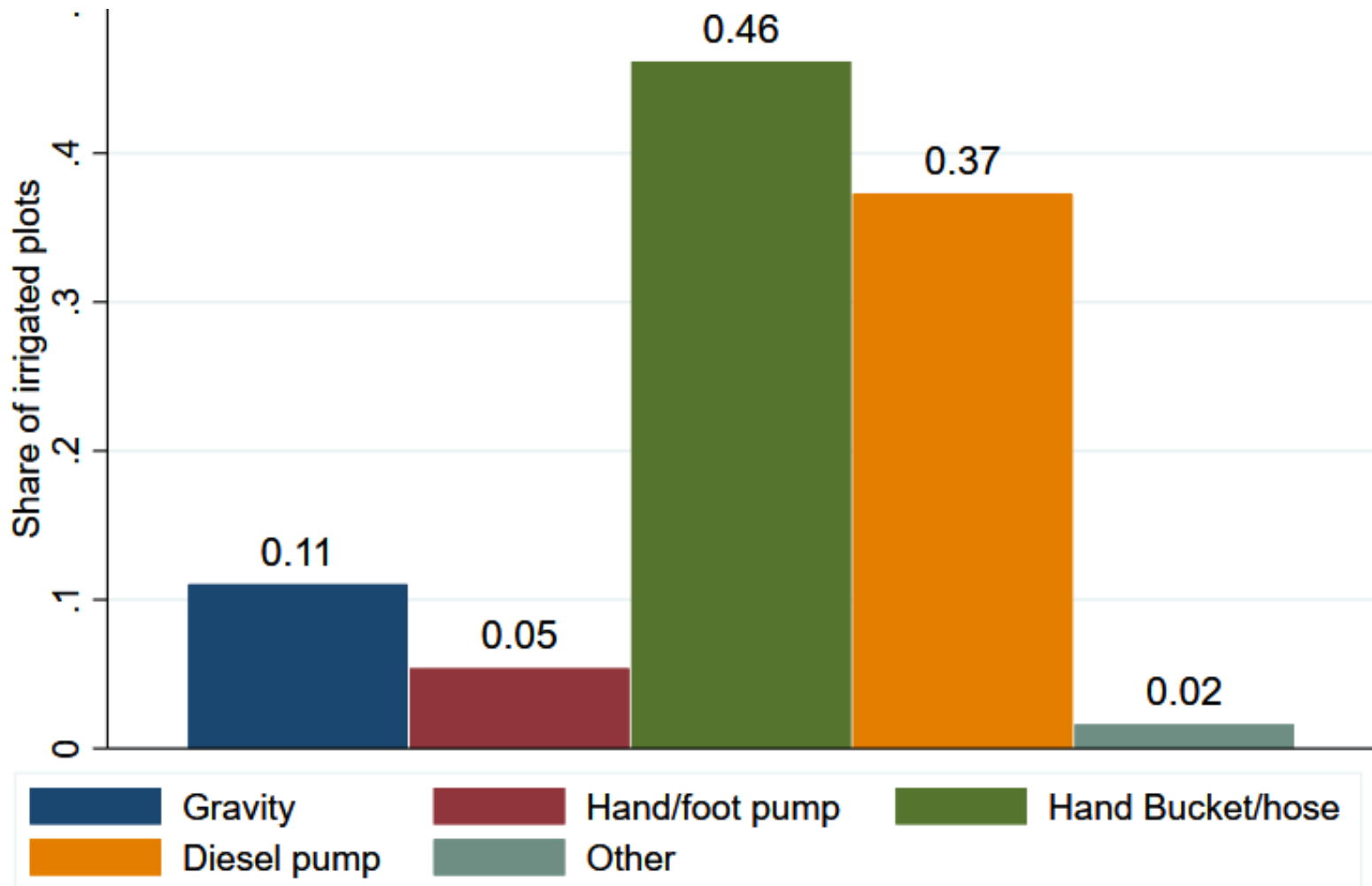


## SOURCES OF WATER FOR IRRIGATION





## METHODS OF OBTAINING WATER FOR IRRIGATION

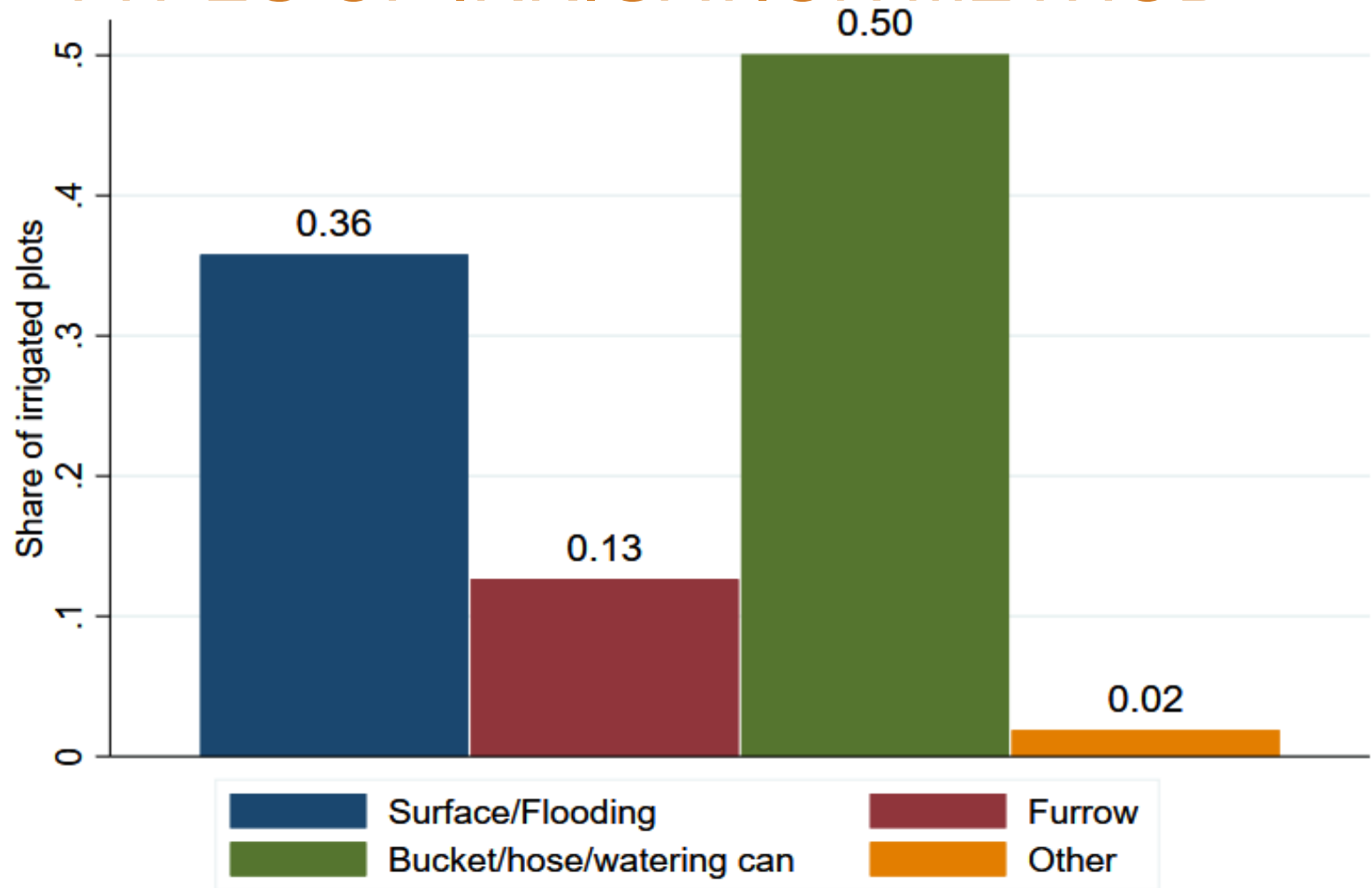


Other includes electric pump





## TYPES OF IRRIGATION METHOD

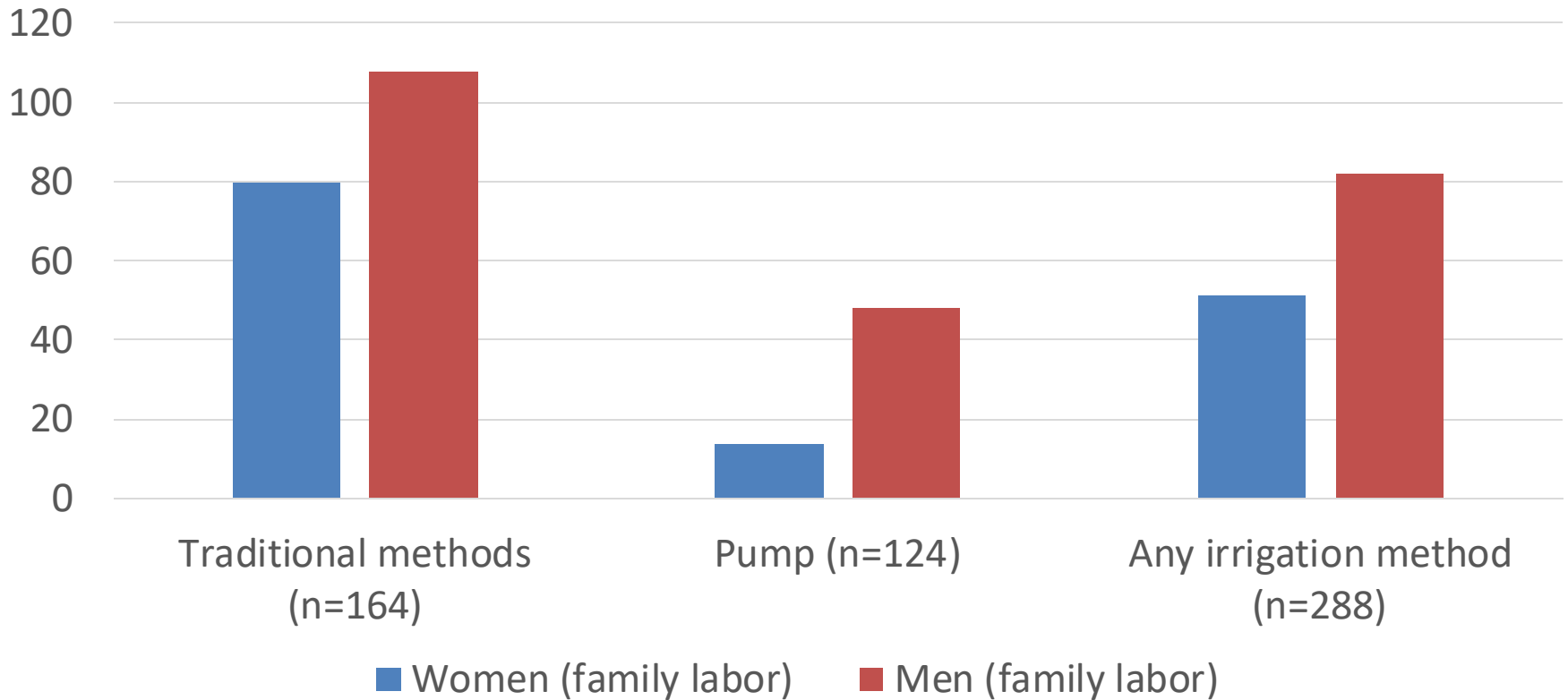


Other includes drip, level basin, and bay/border strip



## LABOR FOR IRRIGATION

(person days/year/hectare)





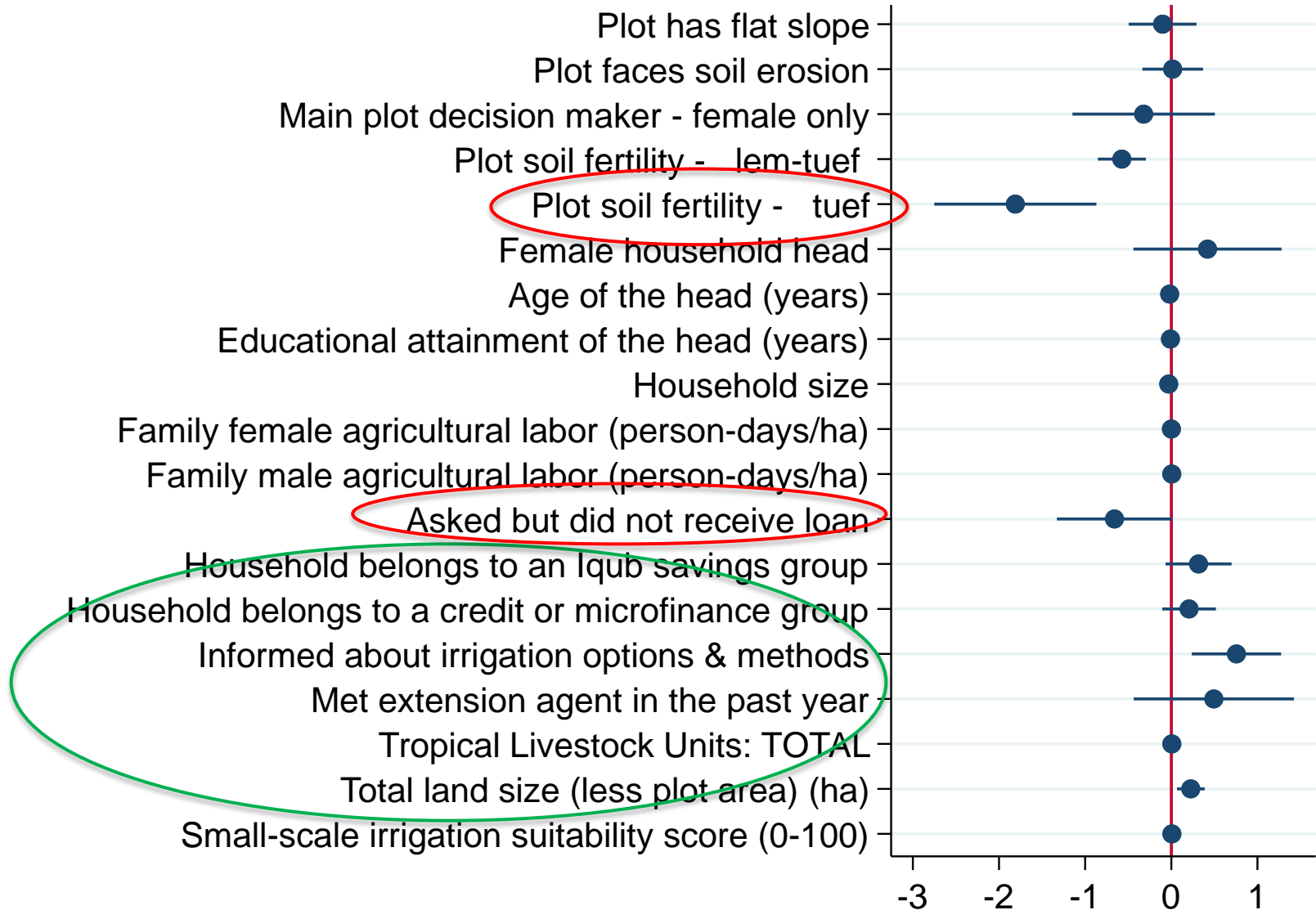
## SELECTED SAMPLE CHARACTERISTICS

|   | Non-irrigators | Irrigators | P-value |
|---|----------------|------------|---------|
| <b>Dry/Belg season</b>                              | (1)            | (2)        | (1)-(2) |
| Female household head                               | 0.087          | 0.10       |         |
| Age of the head (years)                             | 46.7           | 43.6       | ***     |
| Educational attainment of the head (years)          | 4.88           | 2.64       | ***     |
| Plot size (ha)                                      | 0.19           | 0.18       |         |
| Main plot decision maker - female only              | 0.041          | 0.077      | *       |
| Main plot decision maker - male only                | 0.34           | 0.34       |         |
| Plot soil fertility - lem                           | 0.49           | 0.76       | ***     |
| Plot soil fertility - lem-tuef                      | 0.42           | 0.22       | ***     |
| Homestead-plot travel time (minutes)                | 5.36           | 8.00       | ***     |
| Family child agricultural labor (person-days/ha)    | 42.3           | 164.7      | ***     |
| Family male agricultural labor (person-days/ha)     | 199.9          | 590.5      | ***     |
| Family female agricultural labor (person-days/ha)   | 122.0          | 372.5      | ***     |
| Total cultivated area (ha)                          | 0.51           | 0.55       |         |
| Tropical Livestock Units: TOTAL                     | 3.54           | 4.46       | ***     |
| Informed about irrigation options & methods         | 0.74           | 0.94       | ***     |
| Household belongs to an Iqub savings group          | 0.096          | 0.38       | ***     |
| Household belongs to a credit or microfinance group | 0.35           | 0.44       | **      |
| Total value of harvest (thousands of Birr/ha)       | 45.8           | 90.5       | ***     |
| Value of coffee harvest (thousands of Birr/ha)      | 4.94           | 5.61       |         |
| Value of chat harvest (thousands of Birr/ha)        | 9.33           | 37.1       | ***     |
| Value of hopes/gesho harvest (thousands of Birr/ha) | 0.50           | 4.90       | ***     |





## CONSTRAINTS TO IRRIGATION ADOPTION





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## IRRIGATION – NUTRITION LINKAGES



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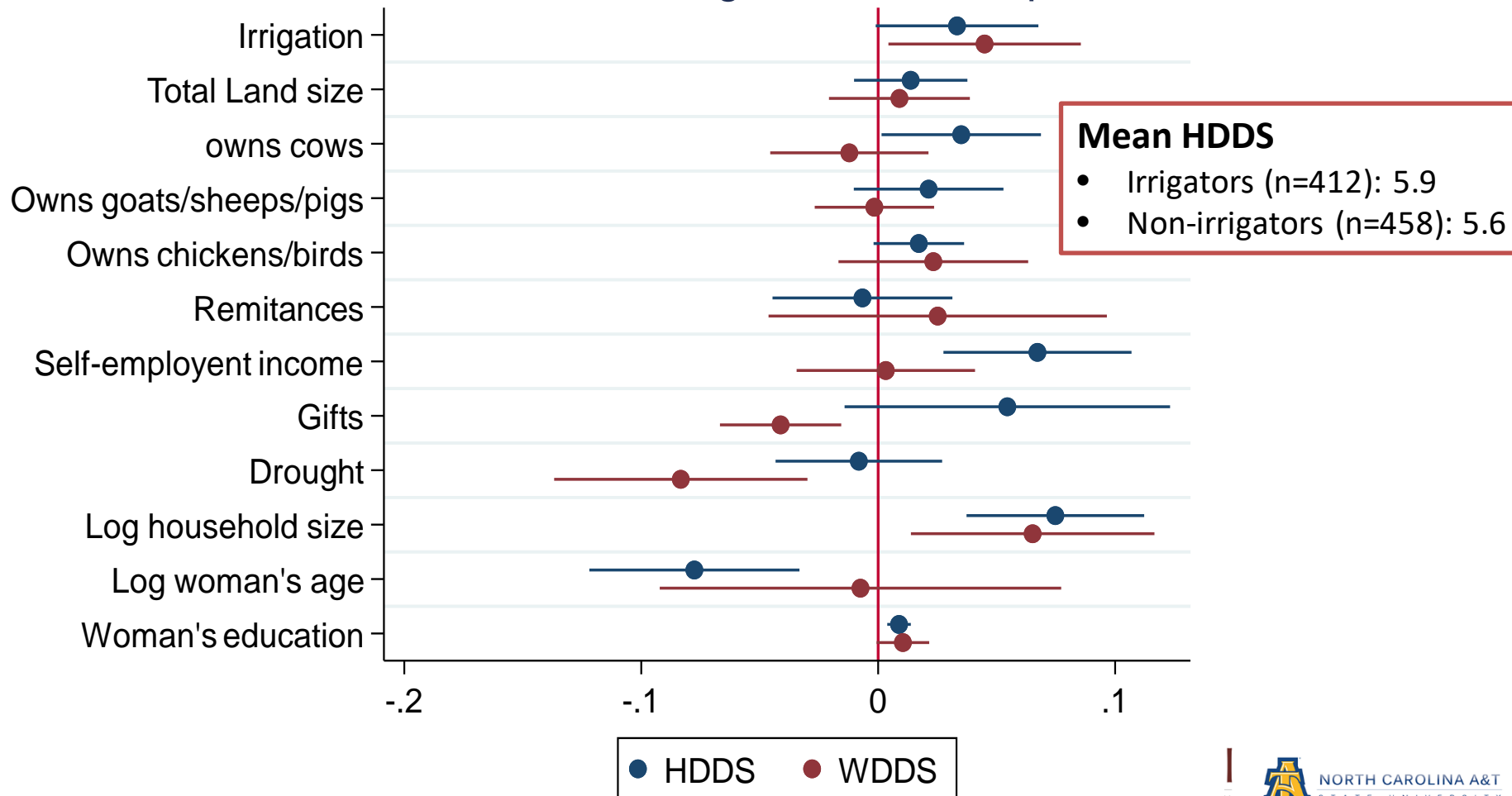
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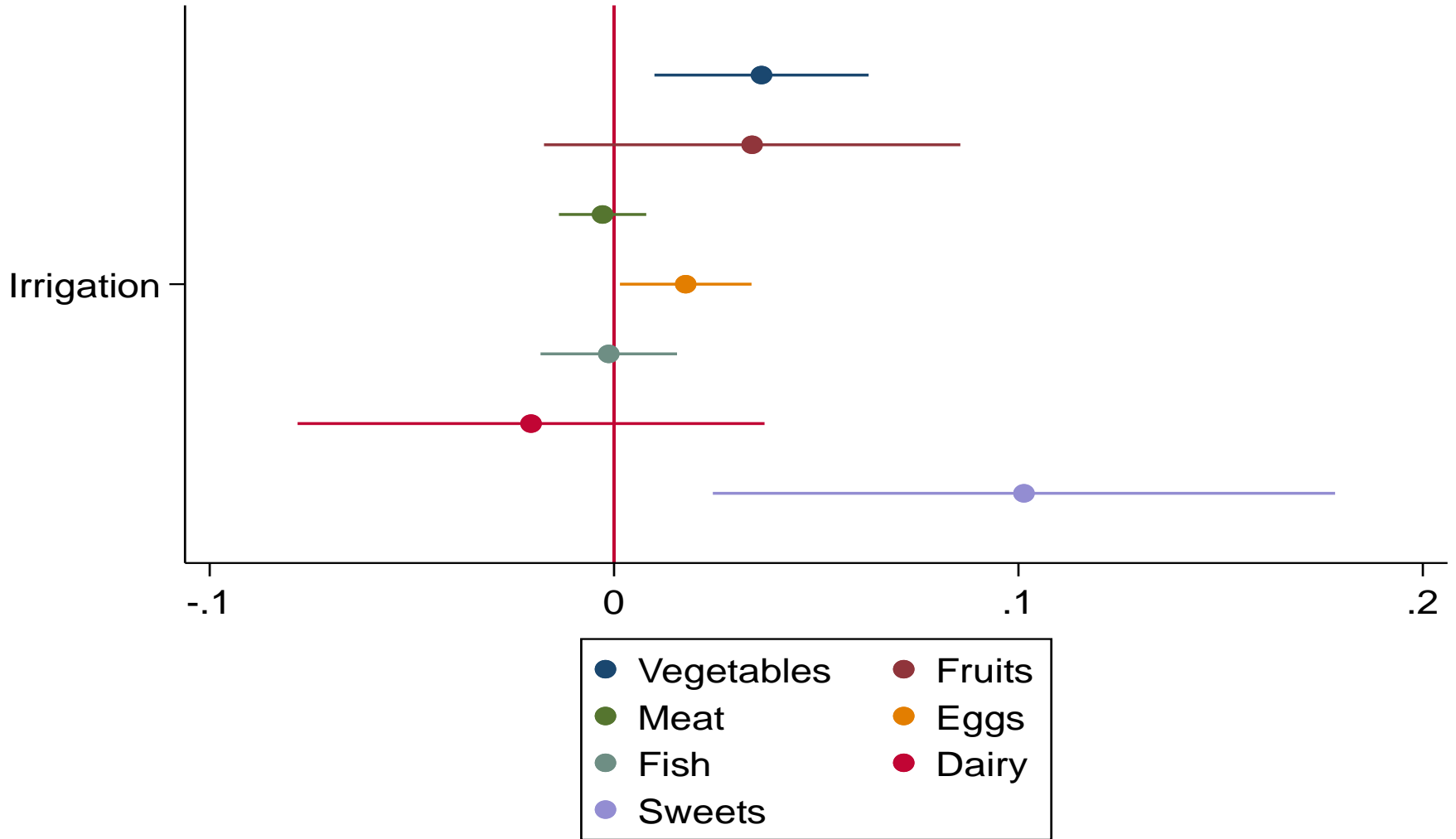


## HDDS and WDDS - 24 hour recalls Poisson Regression - Ethiopia





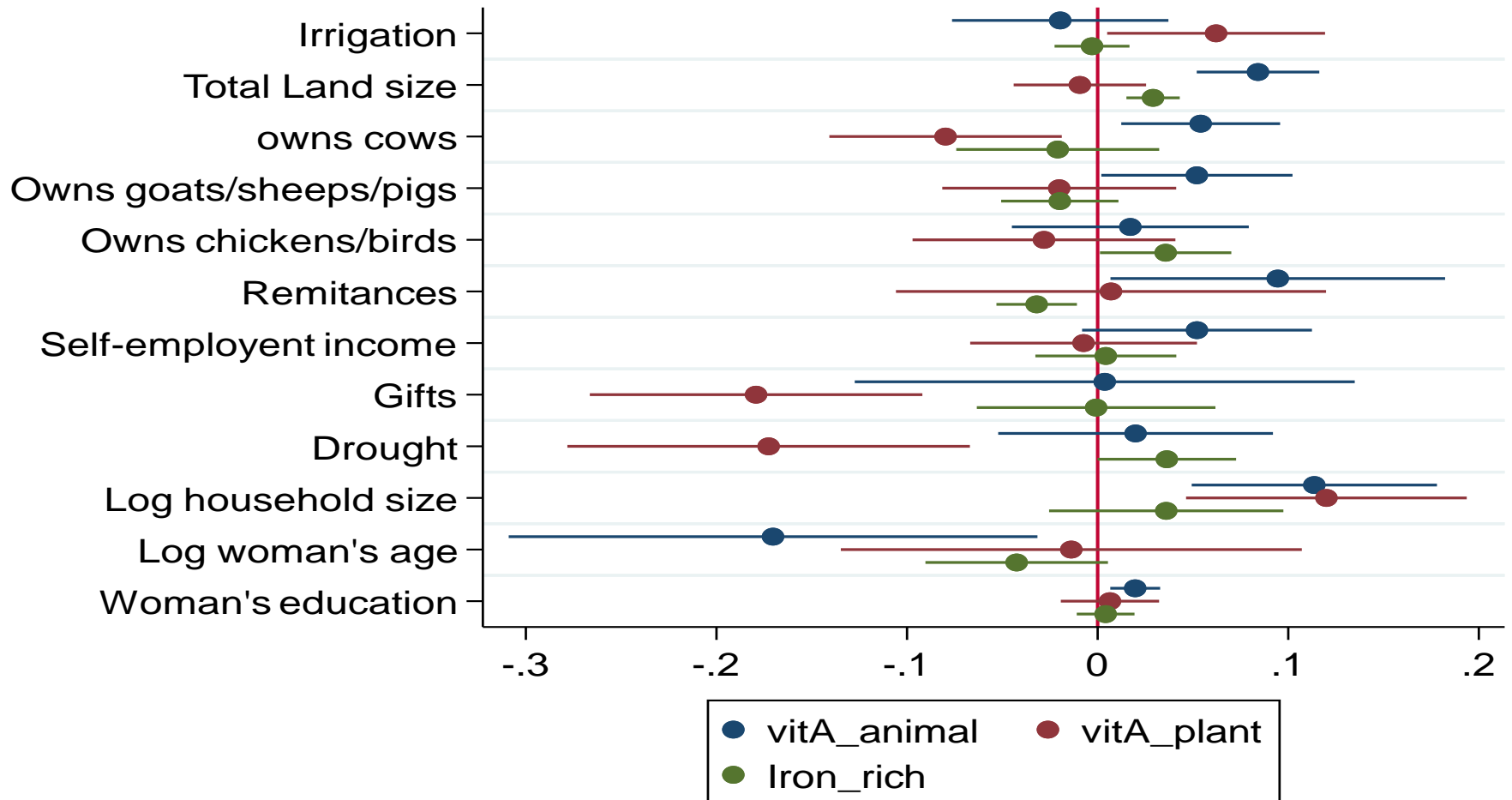
## Consumption of Specific Food Groups





## NUTRIENT-DENSE FOODS

### VitA and Iron-Rich Foods

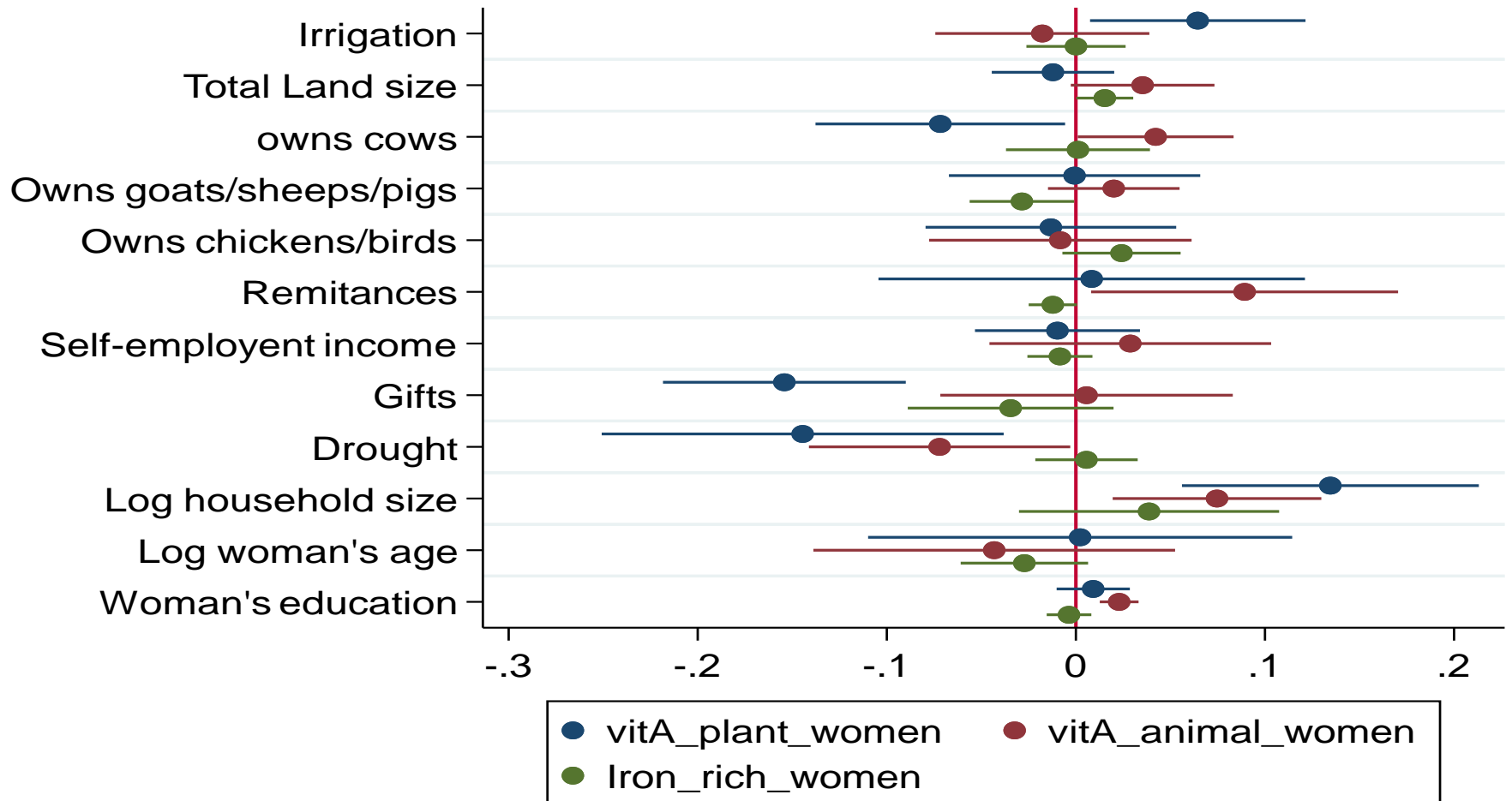






## NUTRIENT-DENSE FOODS: WOMEN'S DIETS

### VitA and Iron-Rich Foods

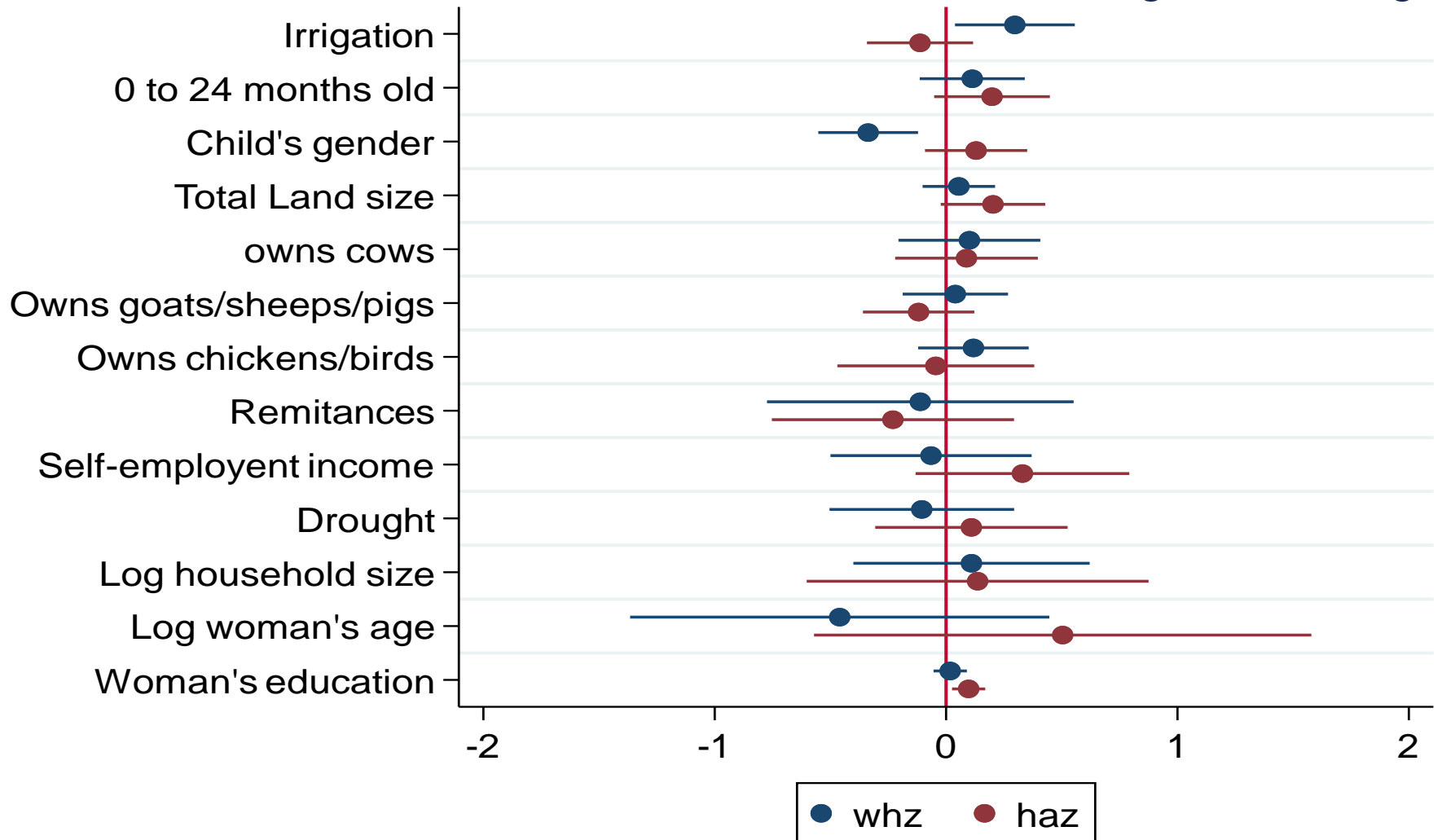




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## Effects of SSI on under-five Wasting and Stunting





## WOMEN'S ROLE IN DECISION-MAKING

- There appears to be a movement towards more women's involvement in decision-making especially on irrigated production decisions (less so on income decisions)
- Women decide on how to use income for daily expenses like food while men control decisions regarding larger expenditures
- Women report that they have more say over use of income from vegetables that they produce on plots near the home
- Women have much less access to information and training on irrigation (58% vs. 80%)—invitations to meetings and trainings are typically sent to the head of the household





## KEY MESSAGES

- Agricultural income per hectare during the dry season is two times more for irrigators compared to non-irrigators.
- Irrigation is dominated by chat, coffee, and hops/gesho. 40% and 34% of the irrigated plots during the wet and dry seasons are covered with chat.
- Pumps reduce the person-days required to irrigate a hectare of land per year by 56% and 137% for men and women, respectively.



## KEY MESSAGES

- Irrigators have higher household dietary diversity (economic access to foods) and higher women's dietary diversity (reflecting a higher probability of micronutrient adequacy of the diet), compared to non-irrigators.
- Irrigation has positive effect on the consumption of vegetables, and sugar and honey
- Irrigation has a positive effect on the consumption of Vit-A rich plant source foods (both at the household level and women's diets).
- Children in irrigating households have a 0.3 SD higher weight for height score, indicating lower acute malnutrition (wasting).







## RECOMMENDATIONS

- Irrigation is shown to have a strong effect on household's economic access to food and on nutritional outcomes of women and children. As such, it needs to be promoted on its merit to improve nutrition, in addition to its potential for higher income and yield.
- However, the highly skewed crop portfolio of irrigation in Ethiopia towards 'chat' needs more attention from policy makers and researchers on its impact on nutritional outcomes and its high water requirement.





## 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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