HOUSEHOLD SURVEY DATA

Analyzing nutrition, health and gender outcomes

PERSPECTIVES FROM HOUSEHOLD SURVEYS

ILSSI has collected detailed household surveys in Ethiopia, Ghana, and Tanzania from ILSSI intervention villages and nearby control sites

- 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 include anthropometric measures, and intra-household modules and are accompanied by community surveys & FGDs.

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RESEARCH FOCUS

1. 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)
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. What are constraints and benefits of adopting irrigation technologies? (-> Econometric Analyses)

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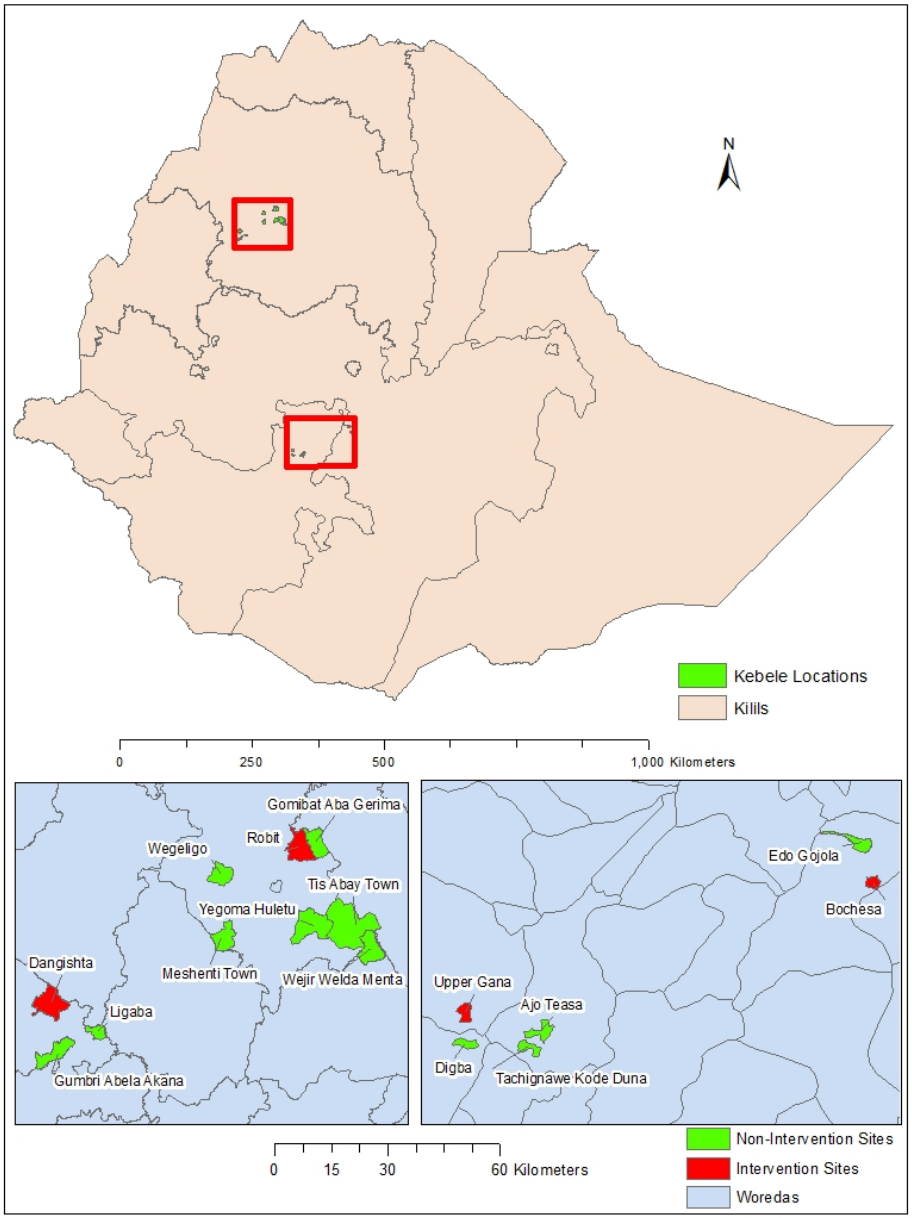
SITES IN ETHIOPIA

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, and additional 100 households under SIPS funding. A quantitative nutrition module for 368 households.



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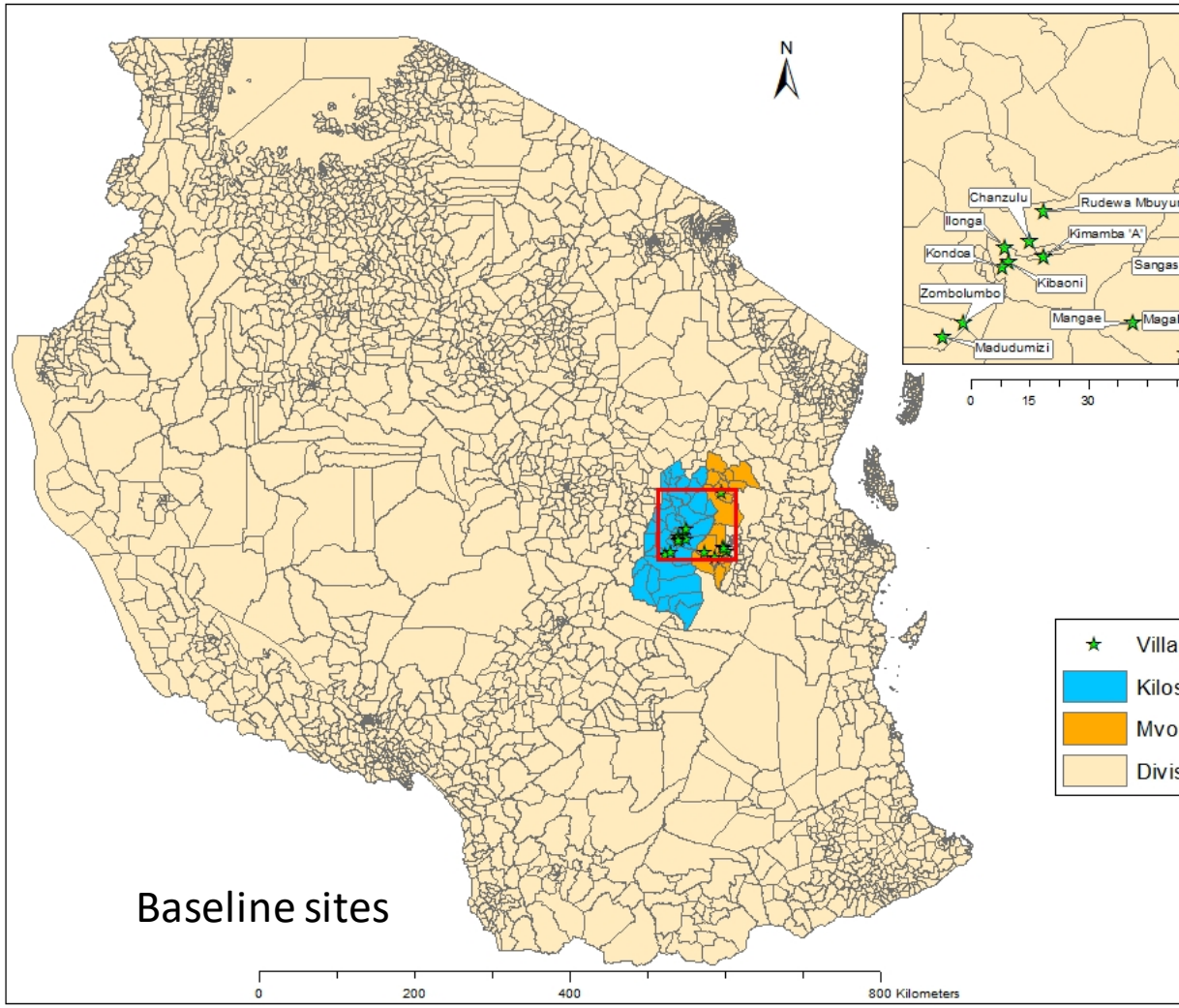
SITES IN TANZANIA

Baseline: 14 villages in Kilosa and Mvomero districts, June 24th – July 11th, 2015 (covering 1 year): 451 households

Endline: 17 villages in Kilosa , Mvomero, and Babati districts: June 26 to July 26, 2017: 540 households



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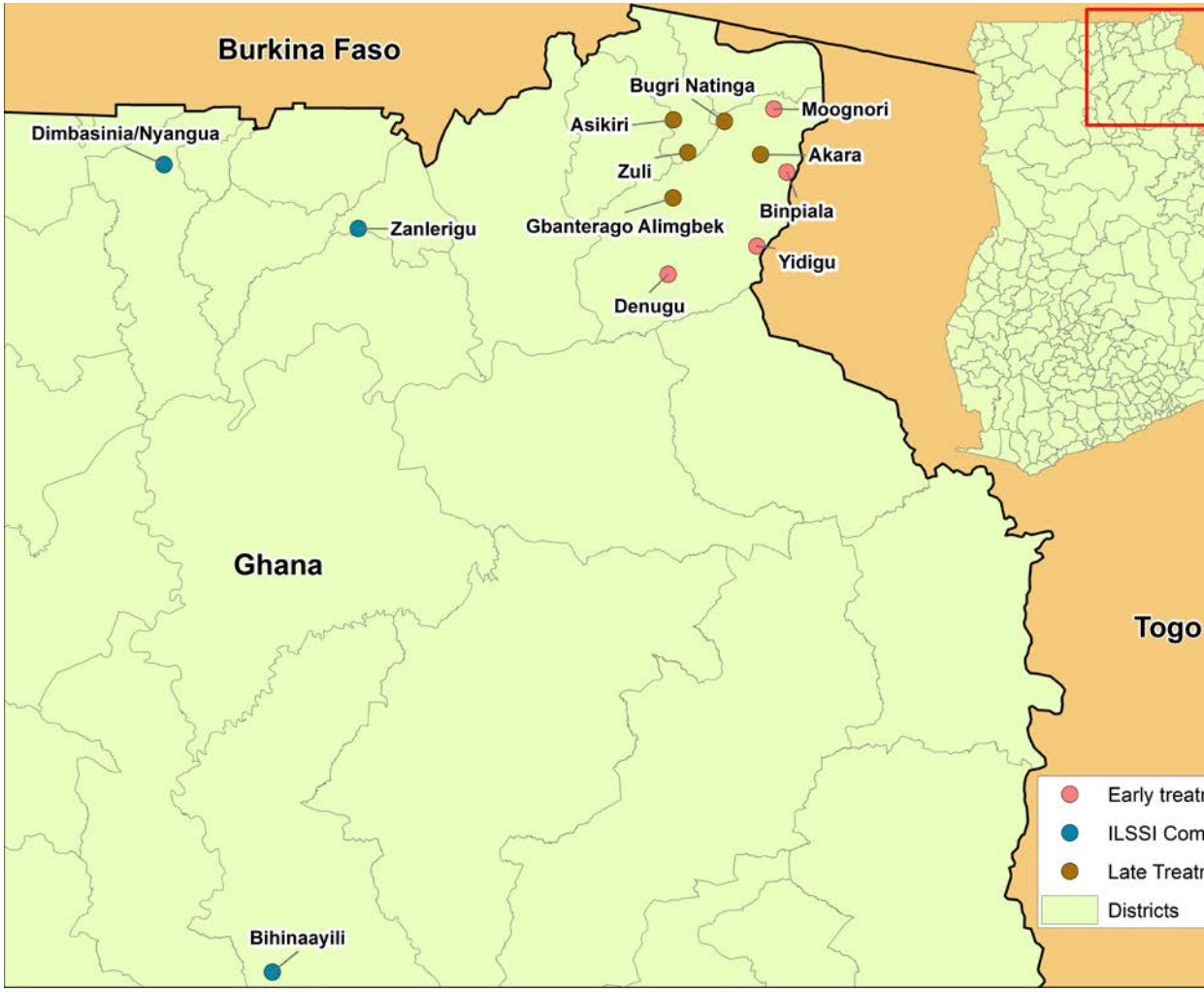
SITES IN GHANA

Baseline: 12 communities: Nov 2015 to Feb 2016: 902 households (includes WLE funding for larger household sampling)

Endline: Planned for November 2017, covering the same 902 households in the baseline.



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COLLABORATION ON SURVEYS/ QUAL STUDIES

- Survey collaboration on including mechanization related module for the Appropriate Scale Mechanization Consortium under the Sustainable Intensification Innovation Lab in the ILSSI endline/SIPS-IN baseline
- Linkage to Sustainably Intensified Production Systems (SIPS) and Improved Nutrition (SIPS-IN) in collaboration with the Innovation Lab for Nutrition
- Collaboration with CGIAR Water, Land and Ecosystems (WLE) motor pump RCT in Ghana to increase sample size
- Collaboration with BMGF/CGIAR A4NH GAAP2 project on testing a project WEAI and additional qual fieldwork in Ghana
- Collaboration with HKI/CGIAR PIM on expanding Focus Group Discussions in Tanzania

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DATA ON WOMEN'S EMPOWERMENT IN AGRICULTURE INDEX

- Intra-household survey tool
- The WEAI measures women's empowerment across **5 domains of empowerment (5DE)** shown on the right as well as a **Gender Parity Index**
- WEAI is on a scale from zero to one, with higher values = greater empowerment
- ILSSI is using a modified WEAI to include more details on irrigation

TABLE I. THE FIVE DOMAINS OF EMPOWERMENT IN THE WEAI

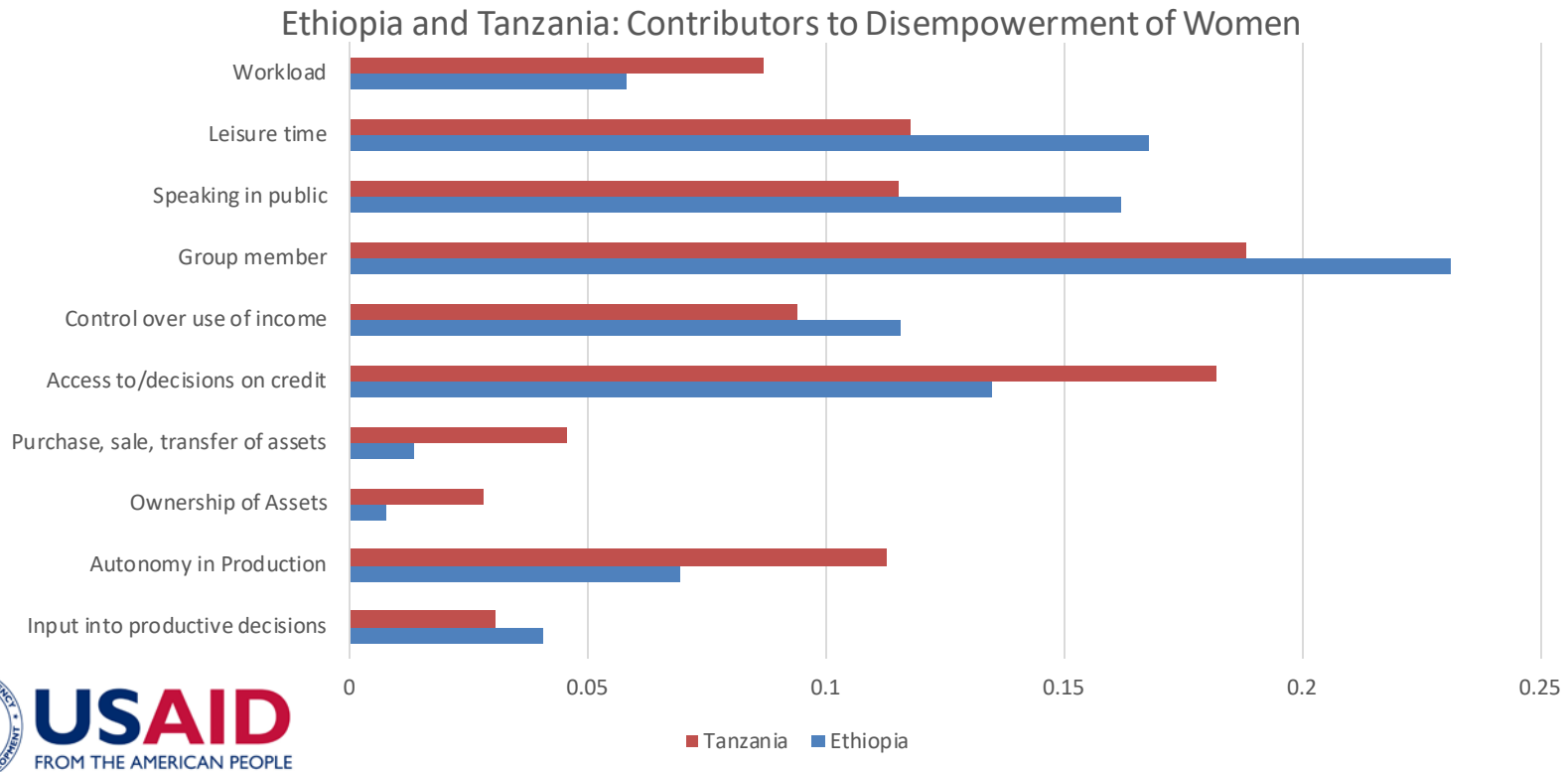
Domain	Indicator	Weight
Production decision-making	Input in productive decisions	1/10
	Autonomy in production	1/10
Access to productive resources	Ownership of assets	1/15
	Purchase, sale, or transfer of assets	1/15
	Access to and decisions on credit	1/15
Control over use of income	Control over use of income	1/5
Community leadership	Group member	1/10
	Speaking in public	1/10
Time allocation	Workload	1/10
	Leisure	1/10

Source: Alkire et al. (2013).

WEAI (5DE)

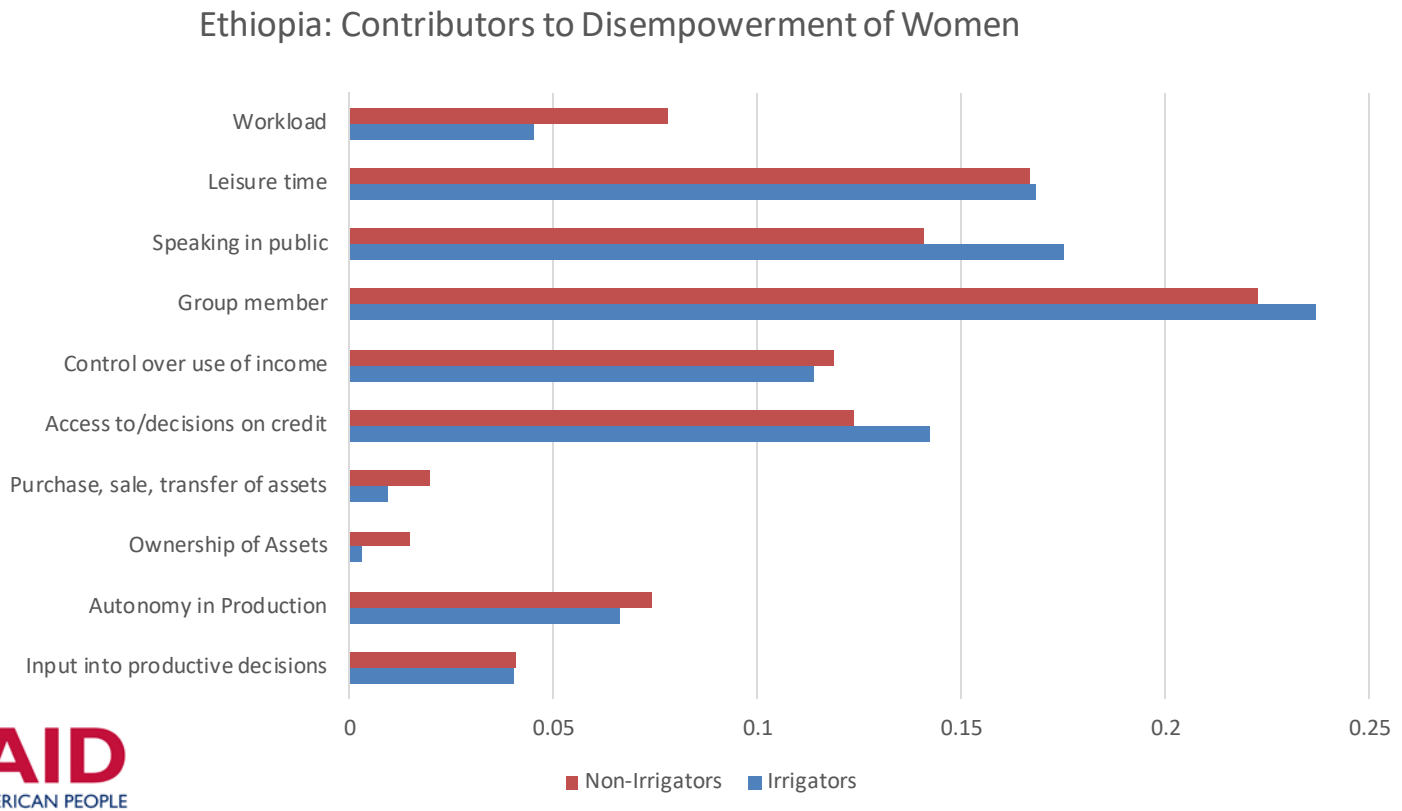
	Irrigators		Non-irrigators	
	Women	Men	Women	Men
Tanzania	0.88	0.94	0.85	0.94
Ghana	0.82	0.94	0.79	0.91
Ethiopia	0.81	0.96	0.85	0.95

ETHIOPIA & TANZANIA: CONTRIBUTORS TO DISEMPOWERMENT AMONG WOMEN



Source: IFPRI Ethiopia and Tanzania ILSSI baseline survey.

ETHIOPIA: CONTRIBUTORS TO DISEMPOWERMENT AMONG WOMEN IRRIGATORS/NON-IRRIGATORS



Source: IFPRI Ethiopia ILSSI baseline survey.

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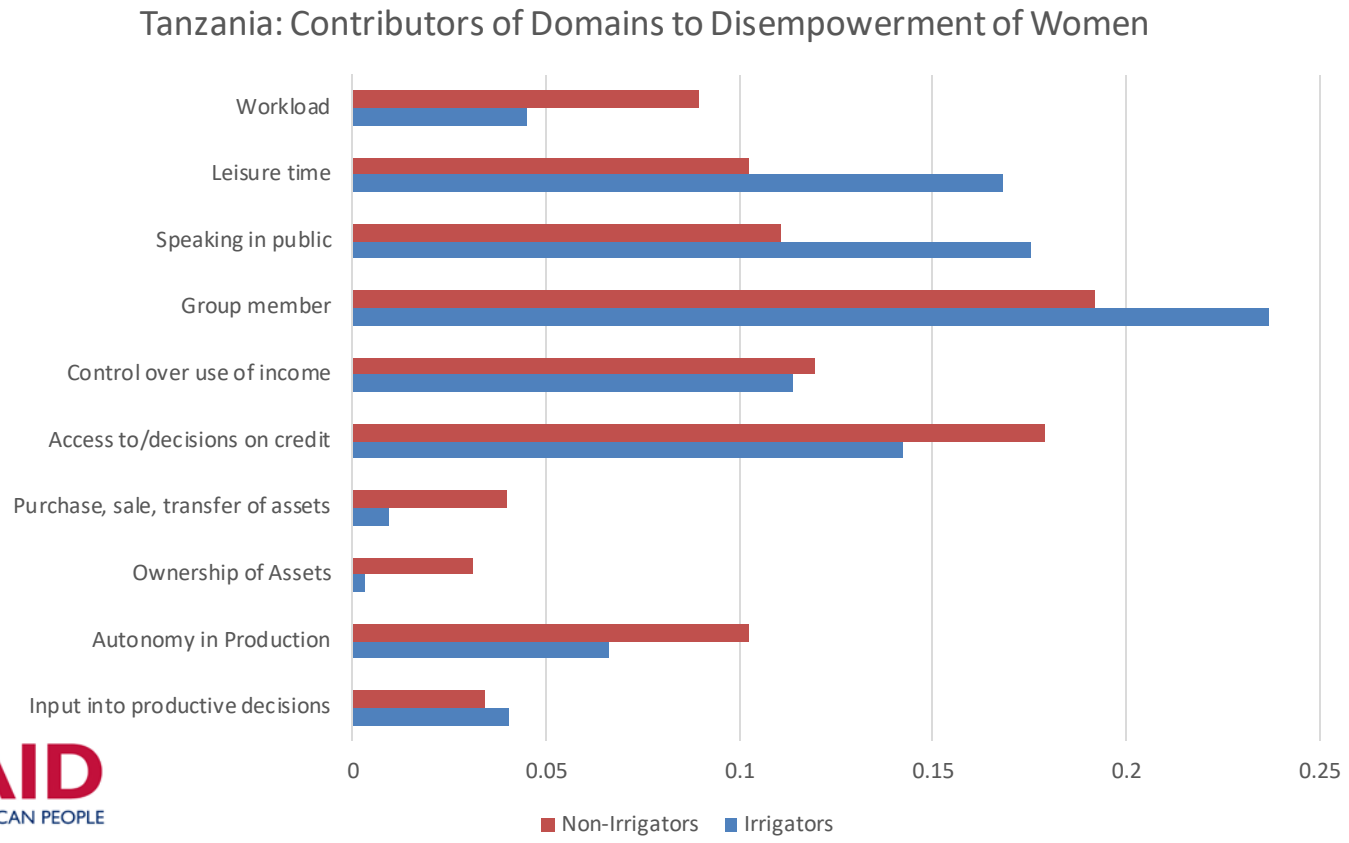
TANZANIA: CONSTRAINTS TO DISEMPOWERMENT AMONG WOMEN IRRIGATORS/NON-IRRIGATORS



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CONSTRAINTS TO WOMEN'S IRRIGATION ADOPTION (TRAINING WORKSHOPS)

Key Constraints Identified:

- Technologies don't meet women's preferences (e.g. affordability, maintenance needs, fuel requirements, transportability, multiple uses)
- Less access to information (due to mobility constraints, not belonging to groups where info is disseminated, etc)
- Lack of access to and control over assets required for adoption (e.g. land)
- Exclusion from access to and decision making over collective water resources (e.g. irrigation canals)
- Limited access to credit

OPPORTUNITIES TO PROMOTE GENDER EQUALITY IN IRRIGATION (TRAINING WORKSHOPS)

Key Opportunities Identified:

- Great potential for participatory, user-centered technology design to better address women's needs and preferences
- Develop new outreach models to ensure information effectively reaches both men and women
- Facilitate access to credit on supply and demand side, providing financial literacy training for women and men, forming groups to manage and share risk
- Support women's participation in decision-making in groups (targets?)
- Targeting women with productive assets (e.g. HKI BF) or encouraging joint ownership/sharing of productive assets
- Sensitization of women's work and contributions (e.g. Send a Cow, Ethiopia)

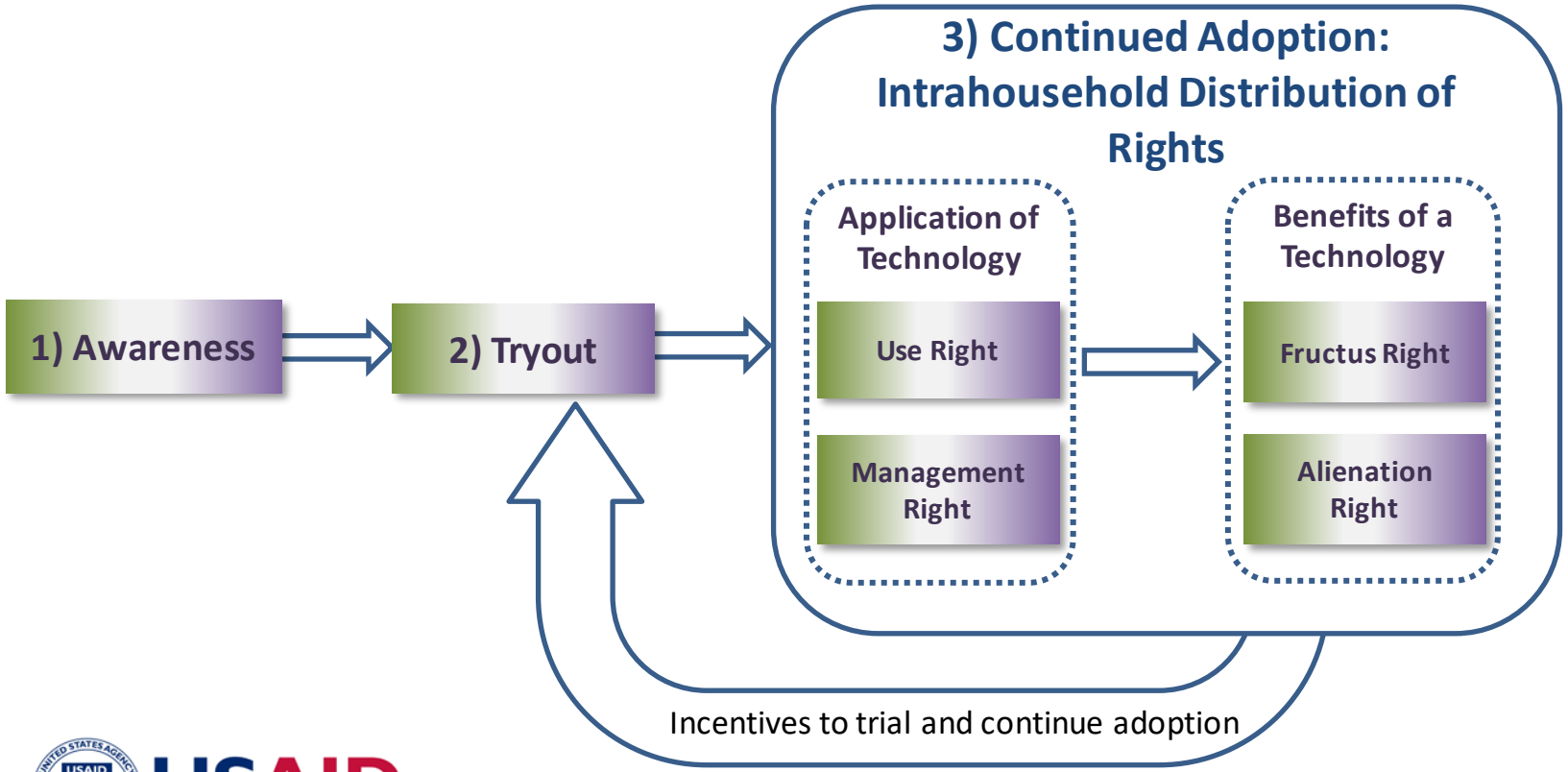
GENDER-IRRIGATION LINKAGES (FGD)

- There is a pervasive gender gap in observed adoption rates of irrigation technologies
- Gender and technology adoption research has focused on constraints to women's awareness and ability to "try out" a technology, the first two phases of technology adoption (Lambrecht 2014), with little attention to dynamics during "continued adoption" wherein farmers decide whether to continue using tech based on experience of costs and benefits
- Prevalent assumption that these costs and benefits are shared equally by household members, but this is unlikely (e.g. Johnson et al. 2016)
- **How is the technology actually used, who benefits, and who bears the cost once it is "adopted"?**
- This will help us understand adoption incentives for *all* decision makers, and learn how to leverage technology for development outcomes of interest (e.g. food and nutritional security, women's empowerment, resilience)

APPROACH (FGD)

- We apply the property rights literature on "bundles of rights" to intrahousehold control over technology (e.g. Alchian and Demsetz 1972; Eggertsson 1990; Schlager and Ostrom 1992) to show how household members hold different "rights" and strengths of rights to a technology:
  - **Use right**: right to use specific technologies (but also entails labor burden)
  - **Management right:** right to make decisions about applying the technology (e.g. which plots/crops are irrigated)
  - **Fructus right:** right to control outputs, profits from irrigated production
  - Alienation right: right to sell, lease, give away the technology

Conceptual Framework



Men Joint Women

Methods (FGD)

- Qualitative data collected in 19 communities in Ethiopia, Ghana, and Tanzania in 2016 by skilled local facilitators trained by ILSSI researchers
- 38 gender-separated focus group discussions (FGDs) were conducted with 375 men and women
- Fieldwork in ILSSI pilot and control sites in each country; in Tanzania, also included the Helen Keller International (HKI) Enhanced Homestead Food Production project

Main Findings

- **Application:** One member of the household generally does not exclusively hold rights to use, management, fructus, and alienation, but men are more likely to hold more of these rights as well as stronger claims to these rights especially over mechanized technologies (e.g. motor pumps)
- Women have more rights over manual, labor-intensive tech on land for subsistence production & to concentrate labor on family plots and domestic work.
- Women have use rights in a "helper" role over mechanized technologies on men's or family plots but rarely have fructus rights. Men control nearly all rights to motorized pumps, but women express interest in gaining access

Main Findings

- **Benefits:** Use and management rights, while more commonly measured by technology promotion projects, do not guarantee fructus or alienation rights – and these are the rights that people value more.

1) Information asymmetry over crop sales (e.g. at a distant warehouse) reduces women's negotiating power to claim this income. "*On ownership, it's father, because he signs the sacks at the warehouse and even sells, but you won't even know of the amounts, whether he gives you a fake calculation you just have to accept."* 2) Women control income from own gardens only if income remains below certain threshold.

RECOMMENDATIONS

- Irrigation technology can be subject to “elite capture” within the household
- Women recognize that irrigation increases household food security and their own financial independence, express demand for time-saving irrigation technologies and improved water sources, but are wary of exceeding a certain threshold of income after which they lose benefit rights to their spouse. Potential loss of fructus rights is likely to influence women’s incentives to tryout certain technologies and shape a preference for small, continuous income generation under current conditions.
- Groups can help women gain and retain such rights but men’s consent is required for women’s participation in these groups – need to show how women’s participation and greater cooperation benefit the household and men
- Selling the family harvest to a distant warehouse without women’s knowledge reduces her ability to negotiate a fair budget allocation from this sale. Increasing women’s access to information of the sale would help increase women’s fructus rights over income she helped generate.

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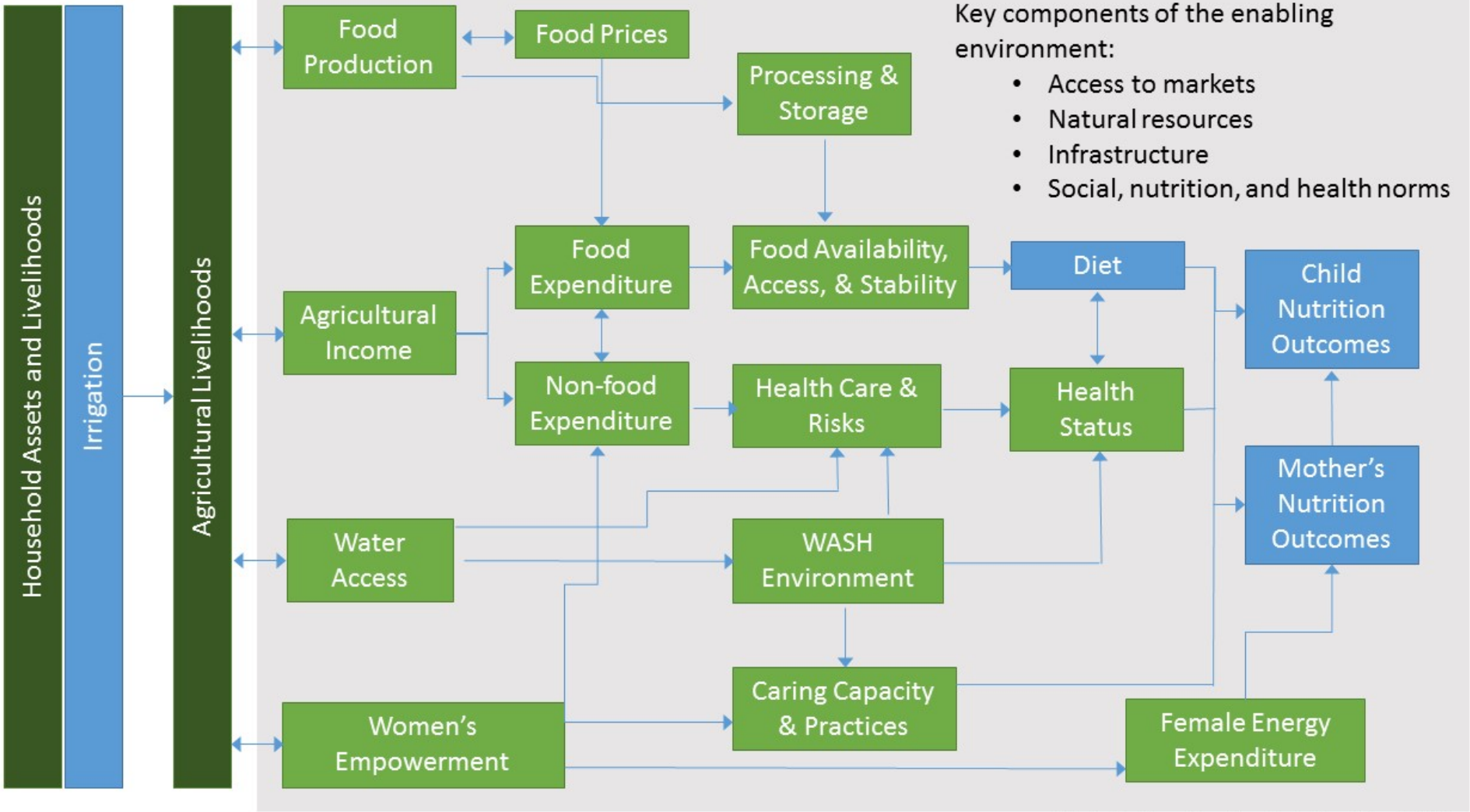
IRRIGATION-NUTRITION LINKAGES



Adapted by the authors from Herforth and Harris, 2014

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	Ethiopia		Tanzania		Ghana	
	Non-irrigators n=185	Irrigators n=284	Non-irrigators n=224	Irrigators n=227	Non-irrigators n=264	Irrigators n=568
	Mean	Mean	Mean	Mean	Mean	Mean
Household food insecurity access scale, 0-27 [higher means worse]	5.78	4.04	3.92	2.58	7.19	6.40
Female dietary diversity score: number of categories consumed	3.69	3.58	3.71	4.20	3.39	3.98
Household dietary diversity: number of food categories consumed	5.69	6.06	4.88	5.63	7.19	7.52

Differences statistically significant, except diff FDDS in Ethiopia

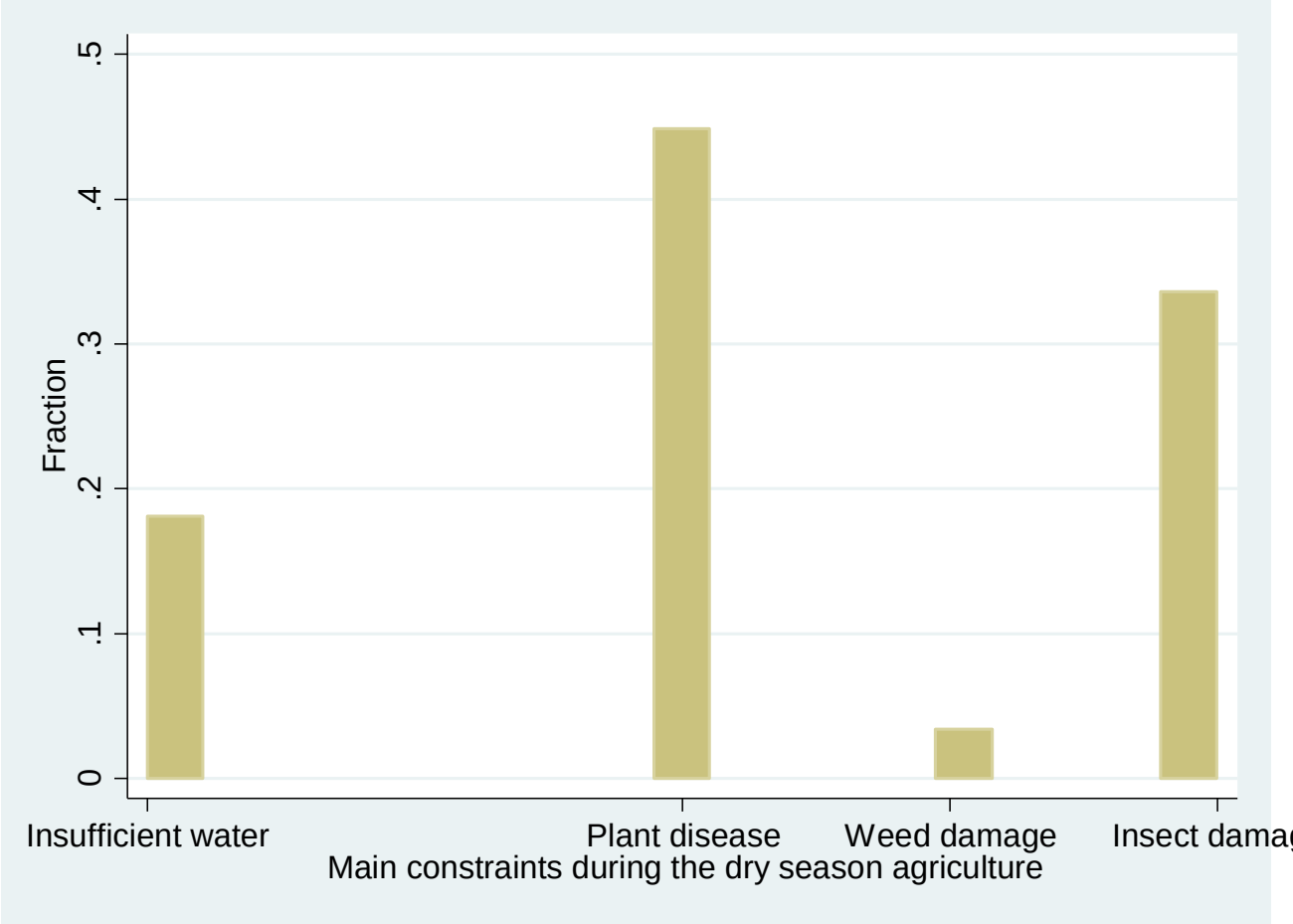
IRRIGATION-NUTRITION LINKAGES

Econometric Results using the baseline for TANZ/ETH data:

- Access to irrigation significantly improves both household income and production diversity.
- Increasing household income leads to higher dietary diversity
- Increases in production diversity do not contribute to increases in dietary diversity, once the income effect is accounted for.
- Thus, irrigation is likely to influence nutritional outcomes through an income pathway rather than through a direct production pathway.

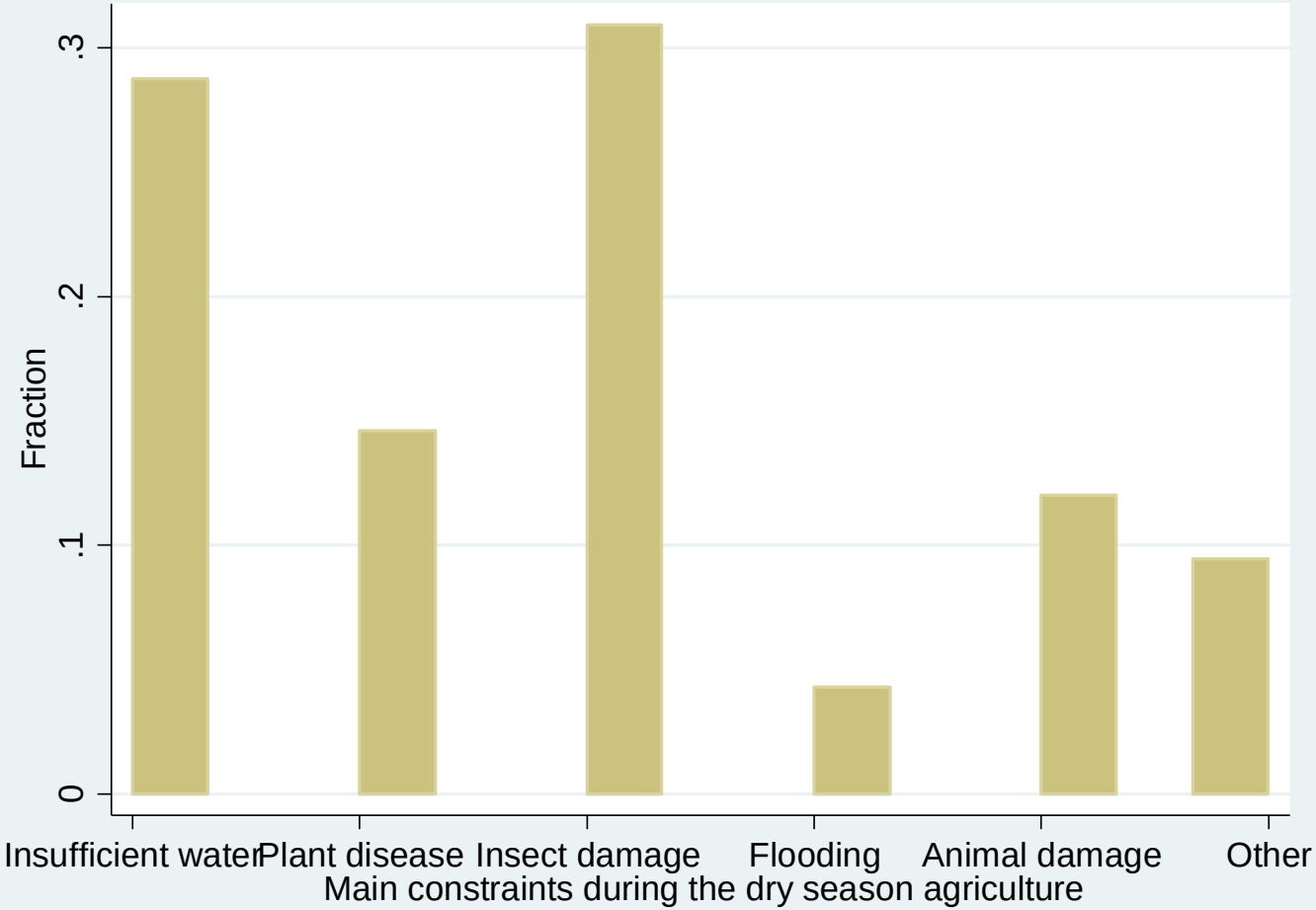
MAJOR CONSTRAINTS DURING DRY SEASON AGRICULTURE IN GHANA

- Plant disease
- Insect damage
- Insufficient water



MAJOR CONSTRAINTS DURING DRY SEASON AGRICULTURE IN TANZANIA

- Insect damage
- Insufficient water
- Plant disease
- Animal damage



MAJOR CONSTRAINTS IN IRRIGATION IN ETHIOPIA

- Irrigators are closer to markets: suggesting the need to further explore market access for produce and inputs as a constraint for adoption of irrigation technologies
- Irrigators are closer to major rivers and access surface water bodies: physical access to water as a constraint
- Irrigated plots are closer to homesteads: need to further explore the labor and managerial requirements of irrigation compared to rainfed agriculture as a potential constraint
- There is no statistically significant difference in the availability of groundwater between irrigators and non-irrigators

NEXT STEPS

- Finalizing Implementation of Tanzania Endline
- Ghana Endline
- Bryan et al. Irrigation and Gender: Women's Empowerment and Decision-Making in Water Management Practices in Ethiopia, Tanzania, and Ghana Mekonnen et al. Small Scale Irrigation and Nutrition Linkages in Ghana: Evidence from a Randomized Control Trial
- Mekonnen et al. Small Scale Irrigation, Women's Empowerment, and Women's Time Use: Evidence from an RCT in Northern Ghana
- Mekonnen et al. Small Scale Irrigation and child nutrition outcomes: Evidence from Ethiopia, Ghana, and Tanzania
- Mekonnen et al. Constraints and opportunities for adoption of small scale irrigation technologies. Evidence from East and West Africa