

AGRILINKS



Can Small-Scale Irrigation Empower Women?

Insights from the Feed the Future Innovation Lab for Small-Scale Irrigation

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Biniam Iyob, USAID Bureau for Food Security



Biniam Iyob joined the U.S. Agency for International Development's Bureau for Food Security in 2013 as a water and irrigation advisor. He is the activity manager for the Feed the Future Innovation Lab for Small-Scale Irrigation and the Cereal Systems Initiative for South Asia (CSISA). He holds various degrees including a doctorate in geography where he focused on the Nile Basin; a master's degree in remote sensing of vegetation change from Oregon State University; an MBA from the University of Mauritius; and a bachelor's degree in soil and water conservation from the University of Asmara, Eritrea.

Claudia Ringler, IFPRI



Claudia is Deputy Division Director of the Environment and Production Technology Division at IFPRI. She manages the Institute's Natural Resource Theme and co-leads its water research program and is also a flagship co-lead under the CGIAR Research Program on Water, Land and Ecosystems (WLE). Over the last two decades, Claudia's research has focused on the implications of and trade-offs between growing natural resource scarcity and water, energy and food security in developing countries. She has more than 100 publications in these areas. Claudia holds an M.A. degree in International and Development Economics from Yale University and a Ph.D. in Agricultural Economics from the Center for Development Research, University of Bonn, Germany.

Nicole Lefore, IWMI



Nicole Lefore is a Senior Project Manager (Research for Development) at the International Water Management Institute (IWMI) in South Africa. She works on research related to water and land institutions, small-scale irrigation and gender, microfinance for smallholder irrigators, approaches to community engagement, and improving extension for natural resource management. Nicole has over 20 years of experience in Africa managing projects related to agricultural development, water and land resources, policy and institutional reform, and capacity development. She holds a PhD in Government from the University of Virginia and an MSc in Development from the School for Oriental and African Studies, University of London.

Elizabeth Bryan, IFPRI



Elizabeth Bryan is a Senior Research Analyst at IFPRI where she conducts policy-relevant research on sustainable agricultural production, natural resource management, small-scale irrigation, climate change adaptation and gender. Her current work focuses on trade-offs and synergies across the intersection of climate-smart agriculture, nutrition, gender, and the environment. Prior to joining IFPRI, Elizabeth worked at the World Bank's Poverty Reduction Group and the Latin American Program of the Woodrow Wilson International Center for Scholars. She has published widely on gender and climate change adaptation in sub-Saharan Africa. Elizabeth holds an M.A. in International Development from American University.

Sophie Theis, IFPRI



Sophie Theis is a research analyst and gender specialist at IFPRI, where she manages mixed methods research and evaluations related to gender and rural livelihoods in East Africa and South Asia and advises various donor and implementing organizations on gender in rural development programs and strategies. She is interested in qualitative-quantitative (“Q-squared”) methods and facilitating knowledge exchange between researchers and practitioners. Prior to joining IFPRI, Sophie worked with the World Bank and the U.S. Department of State on agricultural policy and land governance in Latin America. She holds an M.S. and B.S. from Stanford University’s environmental policy program.

Feed the Future Innovation Lab for Small-Scale Irrigation (ILSSI): Partners



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Feed The Future Innovation Lab For Small-Scale Irrigation: Areas Of Engagement

1. Identifying promising, context appropriate, small-scale irrigation interventions (SSI), management and practices for poverty reduction and improved nutrition outcomes
2. Evaluating production, environmental, economic, nutritional, and gender impacts, trade-offs, and synergies of SSI technologies and practices in the field
3. Identifying key constraints and opportunities to improve access to and upscale SSI technologies and practices
4. Capacity development and stakeholder engagement

ILSSI CONTRIBUTION TO FEED THE FUTURE



FtF Results

SSI Innovations

Key Questions Under ILSSI

- ✓ How much water (and land) are available for irrigation?
- ✓ How many farmers/households can it support?
- ✓ How sustainable is it (now and in the future)?
- ✓ What are the bottlenecks and opportunities - technologies, social/cultural, economics, labor, population growth, water quality
- ✓ What are optimal mixes of interventions (source, storage, conveyance, use)?
- ✓ **What difference can irrigation make** in terms of income, nutrition and **for women**?
- ✓ What changes in policy, practice and investments are necessary (local, regional, national)?

REACH

BENEFIT

EMPOWER

Objective	Include women in program activities	Increase women's well-being (e.g. food security, income, health)	Strengthen ability of women to make strategic life choices and to put those choices into action
Tactics	Inviting women as participants; seeking to reduce barriers to participation; implementing a quota system for participation in training events	Designing a project to consider gendered needs, preferences, and constraints to ensure that women benefit from project activities	Enhancing women's decision making power in households and communities; addressing key areas of disempowerment
Indicators	Number or proportion of women participating in a project activity, e.g. attending training, joining a group, receiving extension advice, etc.	Sex-disaggregated data for positive and negative outcome indicators, e.g. productivity, income, assets, nutrition, time use, etc.	Women's decision making power e.g. over agricultural production, income, or household food consumption; reduction of outcomes associated with disempowerment, e.g. gender-based violence, time burden

Why Does Gender Matter for Agricultural Water Management?

- Water illustrates a **gender gap** in agriculture:
 - Women have different **access to and control** over water
 - Women have **different needs and priorities** for water uses and technologies
 - “Double burden” for managing both domestic and productive water
 - Women face **constraints in adopting, using and benefitting from water technologies** (Van Koppen et al. 2013, Aseyehen et al. 2012, Njuki et al. 2014; Theis et al. 2017)
 - In many cases, water technologies and projects do not meet women’s needs and priorities and fail to address constraints



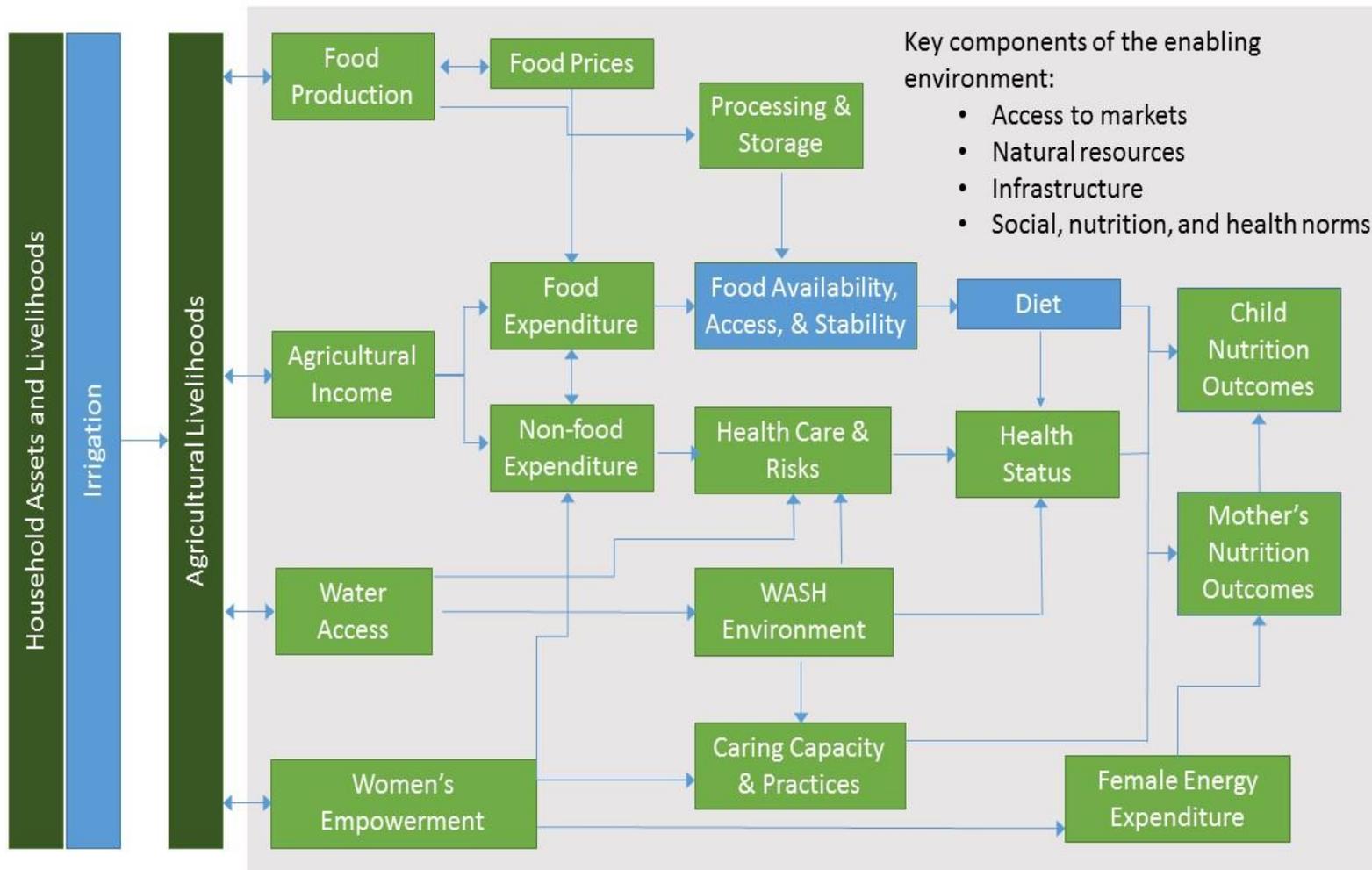
Photo Source: IWMI, Ethiopia

Gendered Constraints to Technology Adoption

- Technologies not designed, priced, or marketed for women
- No access to credit to afford to buy technology
- Limited access to and control over land that can be irrigated and water sources
- Can't reach markets to buy inputs and sell irrigated produce
- No training on irrigation and agronomic practices

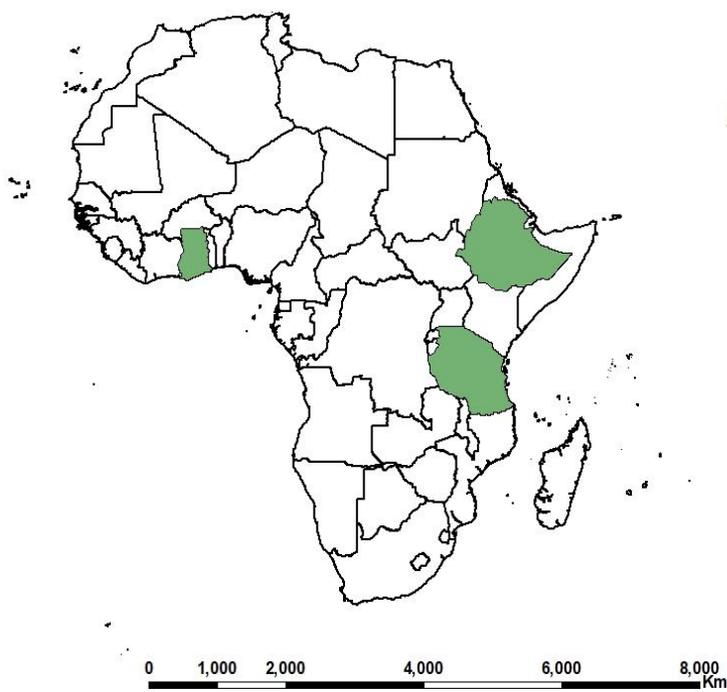
(Van Koppen et al. 2013; Ragasa et al. 2014; Njuki et al. 2014; Theis et al. 2016)

How Can Women Benefit from SSI?



Passarelli et al. (under review) adapted from Herforth and Harris, 2014

ILSSI Field Interventions



Technologies Are Feasible, Profitable, Multiple Benefits

Opportunities

- Most technologies economically feasible with high value crops
- Labor is highest cost – labor saving critical
- Technologies feasible on credit

Challenges

- Women and men farmers have unequal access to technologies, information, trainings, credit, inputs
- Women have lower access to or lose technologies to men in the household



Matching Preferences and Priorities with Technology Trade-offs

Opportunities

- Women and men farmers perceive multiple benefits, varied incentives, different priorities
- Women prefer technologies that save labor, multiple purpose, multiple seasons, installed near home, suitable for gardens (especially solar pumps)

Challenges

- Targeting programs to meet diverse goals/benefits
- Managing on-farm and landscape level trade-offs

Table 1: Summary of the opportunities and challenges related to each of the water lifting technologies respectively towards the control. ++, + and – represent a high, medium and low effect (modified after Schmitter et al., 2016).

	Labour saving	Yield	Water productivity	Profit	Multi-purpose use
Control	0	0	0	0	0
Rope and washer	0	0	0/+	-/0	+
Solar	++	+	-/0/+	++	++
Motorized pump & drip	-/+	++	++	-/+	-

Improved On-Farm Water Management has Added Benefits

Opportunities

- Irrigation scheduling tools can reduce labor, nutrient loss, conflict
- Improved water management can improve quality, increase yield, increase profits
- Women perceive tools as a way to improve labor use

Challenges

- Access to tools (supply)
- Access to information in packages with tools



Photo credit: Petra Schmitter, IWMI

Irrigated Value Chains Are Emerging Opportunities for Women

Opportunities

- Under-explored crops can be profitable
- Fodder demand increasing, sources shrinking - promising irrigated crop
- Seed production high potential

Challenges

- Women risk losing profitable and preferred crops to men (fodder, leafy greens)



Photo credit: Aberra Adie, ILRI

Microfinance Can Increase SSI Adoption – Lack Of Equal Access

Opportunities

- Supply: Finance providers see irrigated production as lower risk
- Demand: Farmers prefer informal or semi-formal where high cost of credit
- Group lending: Smaller groups more promising

Challenges

- Low capacity across actors
- Women have lower access
- High female labor in household reduces likelihood of investing in technologies using credit



Photo credit: One Acre Fund

Quantitative Analysis: The Women's Empowerment In Agriculture Index for SSI

Additional questions on:

- Decision-making roles on irrigated food/cash crops
- Autonomy in decision-making: types of crops to grow for irrigated vs. non-irrigated
- Productive capital includes irrigation tank/pond and irrigation equipment
- Access to information/extension on irrigation methods
- Time allocation time spent irrigating/working with equipment
- Added response options on irrigation topics for various questions on credit, savings, group membership

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).

SSI Is Not Always Associated With Women's Empowerment

COUNTRY	Irrigators	Non-irrigators	Contributors to disempowerment
	WEAI Score	WEAI Score	
Ethiopia	0.82	0.85	•Group membership
			•Leisure time
			•Speaking in public
			•Credit access
			•Control over use of income
Ghana	0.82	0.80	•Credit access
			•Workload
			•Group membership
			•Control over use of income
Tanzania	0.88	0.86	•Group membership
			•Credit access
			•Leisure time
			•Speaking in public
			•Autonomy in production

Source: IFPRI-ILSSI Survey

Decision-Making on Irrigation in Ethiopia

	Women's Responses: Ethiopia			
	How much input did you have in making decisions about...		How much input did you have in decisions on the use of income generated from...	
	Irrigated food crop farming	Irrigated cash crop farming	Irrigated food crop farming	Irrigated cash crop farming
No input	0%	2%	0%	1%
Input into very few decisions	14%	15%	13%	16%
Input into some decisions	52%	53%	51%	53%
Input into most decisions	23%	16%	23%	15%
Input into all decisions	11%	15%	13%	15%

Source: IFPRI-ILSSI Survey

Decision-Making On Irrigation In Ghana

	Women's Responses: Ghana			
	How much input did you have in making decisions about...		How much input did you have in decisions on the use of income generated from...	
	Irrigated food crop farming	Irrigated cash crop farming	Irrigated food crop farming	Irrigated cash crop farming
No input	1%	1%	2%	1%
Input into very few decisions	13%	13%	13%	14%
Input into some decisions	32%	30%	32%	30%
Input into most decisions	29%	33%	28%	31%
Input into all decisions	24%	23%	23%	24%

Source: IFPRI-ILSSI Survey

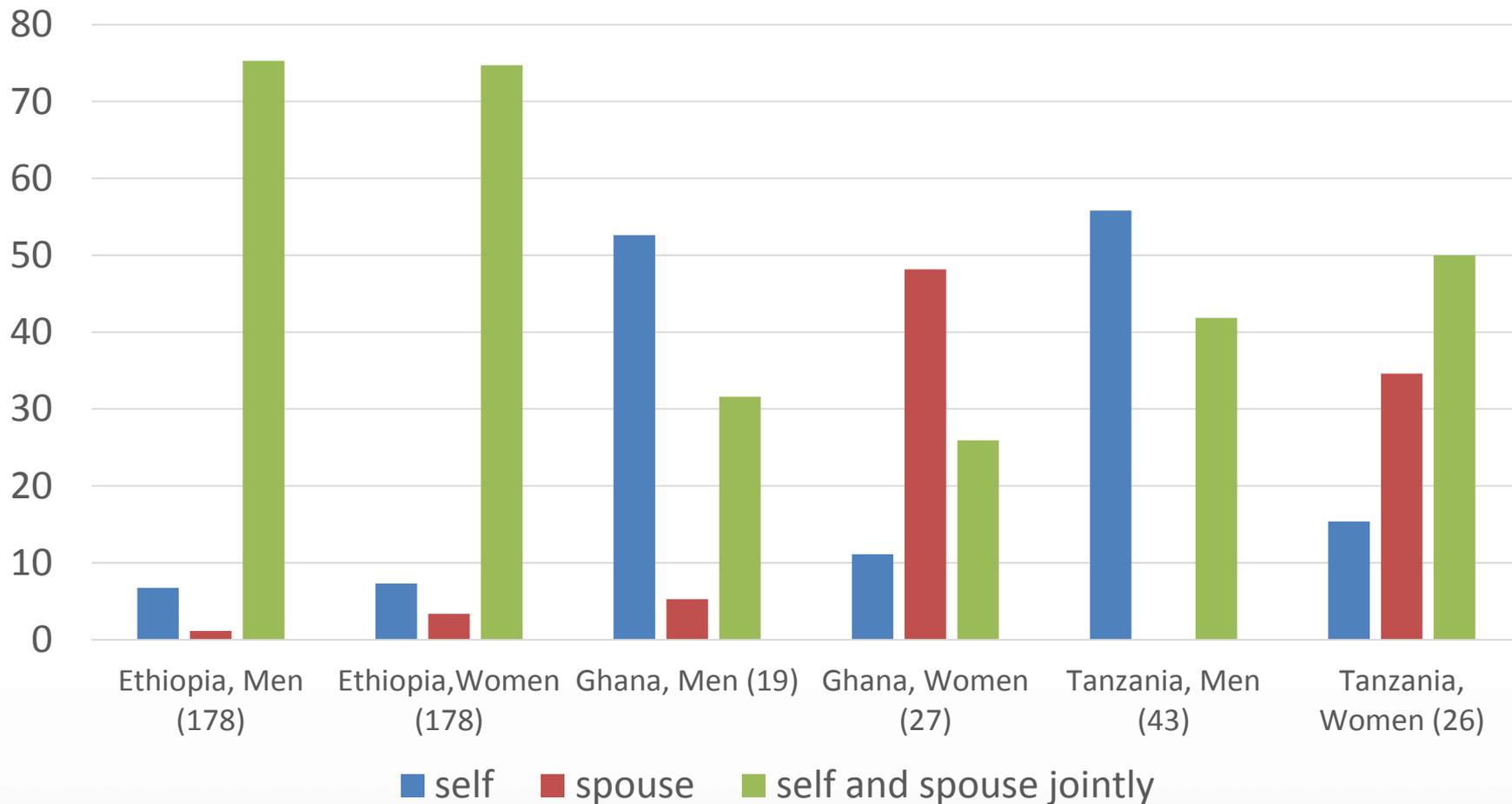
Decision-making on Irrigation in Tanzania

	Women's Responses: Tanzania			
	How much input did you have in making decisions about...		How much input did you have in decisions on the use of income generated from...	
	Irrigated food crop farming	Irrigated cash crop farming	Irrigated food crop farming	Irrigated cash crop farming
No input	0%	0%	1%	0%
Input into very few decisions	9%	11%	11%	14%
Input into some decisions	23%	31%	26%	30%
Input into most decisions	30%	24%	29%	23%
Input into all decisions	37%	34%	34%	34%

Source: IFPRI-ILSSI Survey

Who Owns Irrigation Equipment?

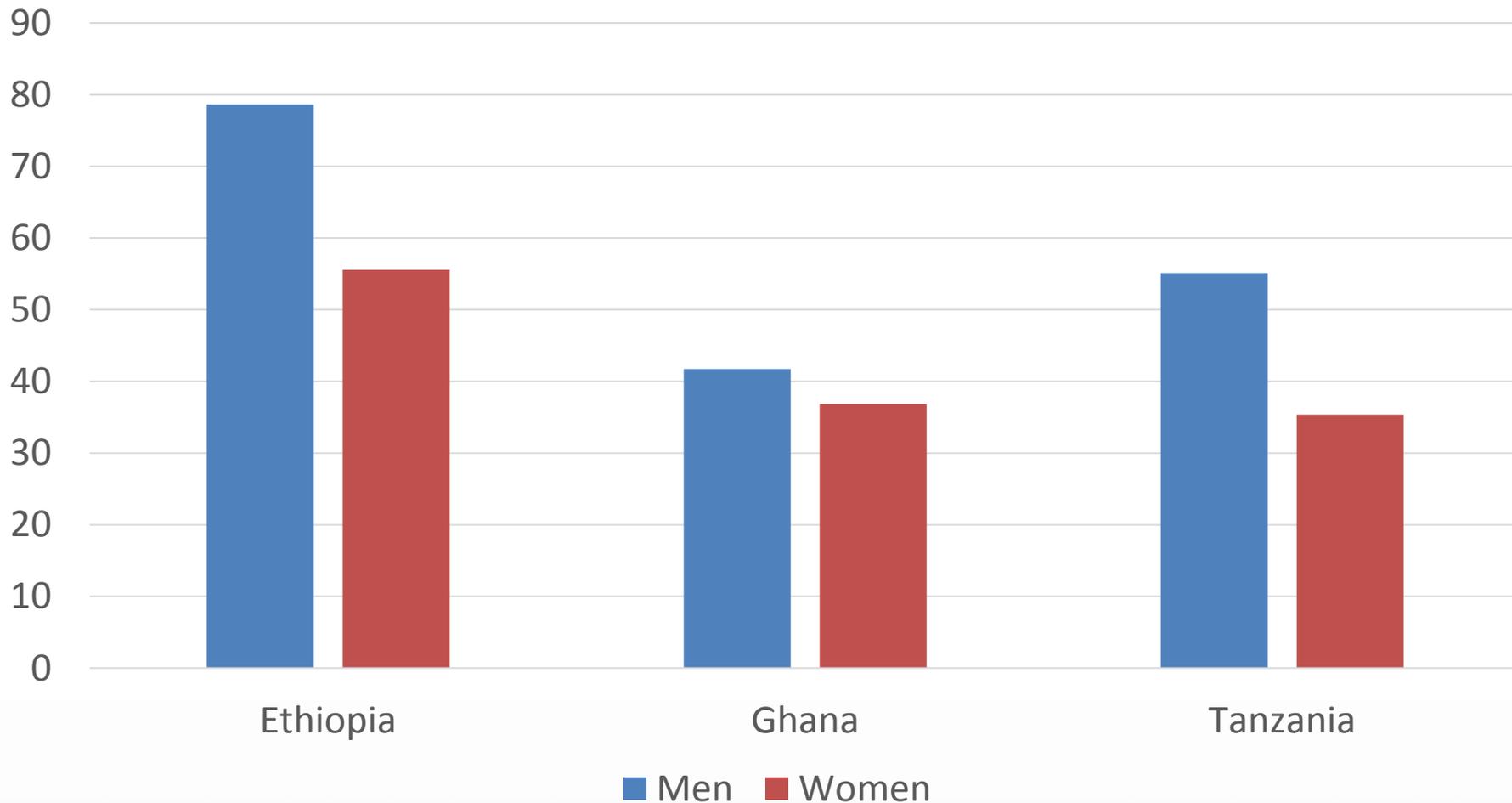
(Share of Men and Women That Reported Household Ownership Of Asset)



Source: IFPRI-ILSSI Survey

Who Has Access to Information on Irrigation?

(Share of Men and Women Who Reported Access)



Source: IFPRI-ILSSI Survey

Preliminary Conclusions

- Association between irrigation and WEAI scores is inconsistent across the three countries
- Men and women's roles and constraints in irrigated agriculture also differ
- The contributors to women's disempowerment vary although
 - Work burden/lack of leisure time, lack of group participation are common
 - Credit access was a bigger constraint in Ghana and Tanzania, while speaking in public is a bigger problem in Ethiopia
 - Access to information on irrigation is lower for women in Ghana in general compared to Ethiopia and Tanzania
- Without conscious effort to integrate gender (e.g. needs, preferences, constraints), irrigation interventions may exacerbate existing gender inequalities (e.g. disparity in leisure time)
- Outcomes (i.e. nutrition, health, and women's empowerment) are likely to be different when women have control over decisions to adopt and use irrigation (e.g. what to plant)

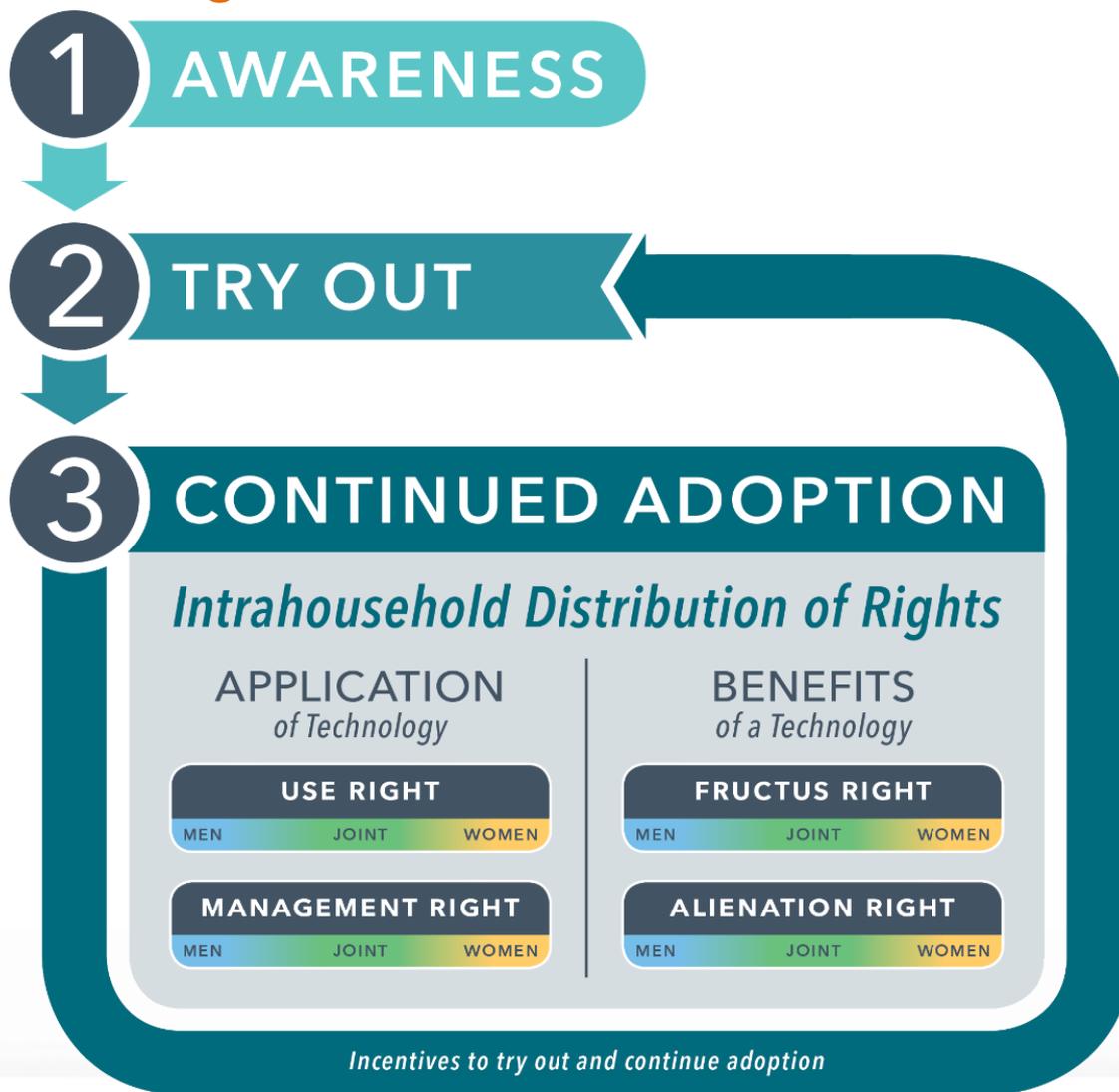
Limitations of Using the WEAI to Measure Irrigation-Empowerment Linkages: Insights From Qualitative Work

- The relationship between SSI and women's empowerment is influenced by other factors in the enabling environment at community and household level
- At the community level key factors include:
 - The natural resource base (e.g. water and land availability)
 - Social and cultural norms (religion, inheritance, expectations of men's and women's roles and responsibilities)
 - Community infrastructure (e.g. schools, dams, roads)
- At the household level:
 - Family/compound size
 - Type of marriage/marital status (polygynous, widowed)
 - Idiosyncratic shocks (e.g. deaths, illnesses)
 - Characteristics of other decision-makers (e.g. schooling of husband, presence of elders)

How Can SSI Benefit and Empower Women *After Technology Adoption?*

- Gender and technology adoption research has largely focused on constraints to acquire technology, *exogenous to the household*
- These represent constraints to the first two phases of technology adoption: “Awareness” → “Tryout” → “Continued adoption” (Lindner et al. 1982; Lambrecht 2014)
- During “continued adoption”, farmers decide whether to continue using technology, *based on how they experience costs and benefits*
 - **Do household members experience the same costs and benefits?**
 - **Does only the “adopter” of technology benefit?**
 - **Or something else?**

Intra-Household Rights Determine Benefits and Empowerment



Source: Theis et al. 2017

Negotiable Intra-household Rights to Assets/Technology

Right	Definition	Example
Use	The right to use/physically operate the asset	Carry and lay out the pipes of the pump, operate the motor, secure the water source
Management	The right to make decisions about how, when, and where to apply the technology	Decide to use the irrigation pump on family and women-managed plots of land
Fructus	The right to control outputs , profits from irrigated production	Control the proceeds from sales of the irrigated crop
Alienation	The right to sell, lease, or give away the tech	Lease out the pump to a neighbor for revenue without needing to ask for permission

Distribution of Rights

- One member of the household generally does not hold exclusive rights, *no matter who is the “adopter”*
 - Intra-household dynamics likely to dominate despite technology diffusion efforts targeting women
- Men are more likely to hold more rights and more valued rights to mechanized technologies
- Women typically have use rights in a “helper” role on men’s or family plots, but rarely fructus or management rights
- Women may have fructus rights using manual technologies on land that men allocate them, but no management right to use mechanized technology on their own plot

Use Right Is Most Measured and Least Valued

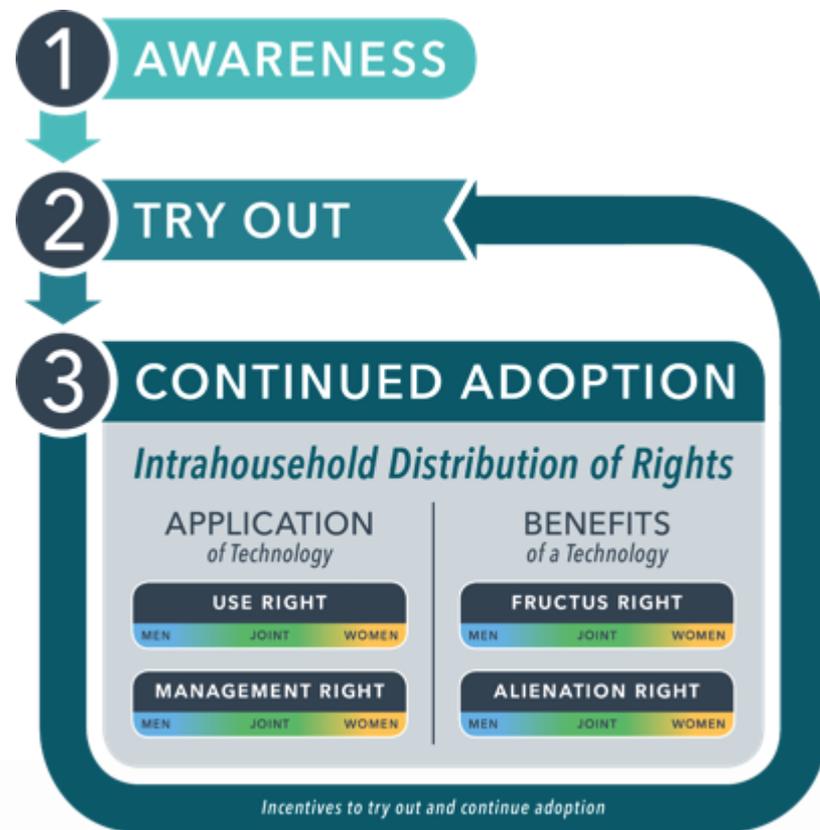
- Women who irrigate (manually) are perceived as “suffering”
 - Women in Ghana and Tanzania want motor pumps to reduce energy burden; in Ethiopia preferred solar for time savings
- Perception amongst men that shared workload means gender equality
 - *“Agricultural responsibilities are for both of us, husband and wife...the only activities which we differ are household chores, whereby when we reach home, she is the one cooking as I am resting. But in agricultural activities, the ratio is 50–50.”*
- Yet expectation that women complete family plot and domestic work prior to working on her own plot of land, leaving minimal time to invest on her own land

Fructus Rights Are Least Measured and Most Valued

- Use and management rights do not guarantee fructus or alienation rights
- Information asymmetry over the sale of irrigated produce reduces women's power to negotiate fructus rights:
 - *“On ownership, it's father [my husband], 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.”*
 - *“...you can't go daily to check them [the sacks], since you aren't the one who signed for it inside there, because his fellow men will think of me oppositely, so I just remain at home.”*
- While the profits help to “*build good houses,*” women are not happy to lose fructus rights

Applying an Intra-Household Lens to Technology Diffusion Programming

- **DO NOT** assume “adopter” controls all rights, OR that rights are shared equally
- **DO NOT** assume use rights convey fructus rights, but measure both
- **DO** investigate how expectations about distribution of rights affects incentives to adopt technology/participate in a project
- **DO** seek opportunities for time saving
- **DO** support women’s fructus rights through shifts in intrahousehold relations, and/or working outside the household (e.g. women’s groups)



TOP TAKE-AWAYS

1

Reaching women with SSI matters

SSI diffusion approaches and technologies can be designed to better meet women's preferences and fit their needs

2

But REACH is not sufficient

To avoid increasing inequalities, investigate constraints within the household for women to benefit from irrigation

3

Women can empower themselves through SSI

SSI has potential to reduce both men's and women's workload and increase income if conditions are right

4

Leverage opportunity for time savings via SSI

By meeting multiple needs and reducing labor intensity of technologies, SSI can reduce women's time burden

5

Provide access to information on technology, credit, and markets

Concerted effort is required to ensure that information, credit, etc. reach women

6

Collect sex-disaggregated data on SSI

SSI adoption almost always affects gender roles and relations. Investigate and monitor to understand program impact

Questions and Answers

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Knowledge for a Food-Secure Future

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