



What happens after technology adoption:

Gendered aspects of small-scale irrigation technology in Ethiopia, Ghana, and Tanzania

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Discussion paper: www.ifpri.org/publication/what-happens-after-technology-adoption-gendered-aspects-small-scale-irrigation
Practitioner guide: <https://agrilinks.org/post/feed-future-innovation-lab-small-scale-irrigation-ilssi-guide-integrating-gender-small-scale>



RESEARCH
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How could women benefit from scaling up small-scale irrigation?

- **Income:** High value produce, more harvests per year
- **Production:** More nutritious crops
- **Water supply:** More accessible water supply for multiple uses
- **Health risks:** Reduced burden of caring for the sick

(Domenech, 2015; Passarelli et al., under review)

Recognized gendered constraints to technology adoption

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

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

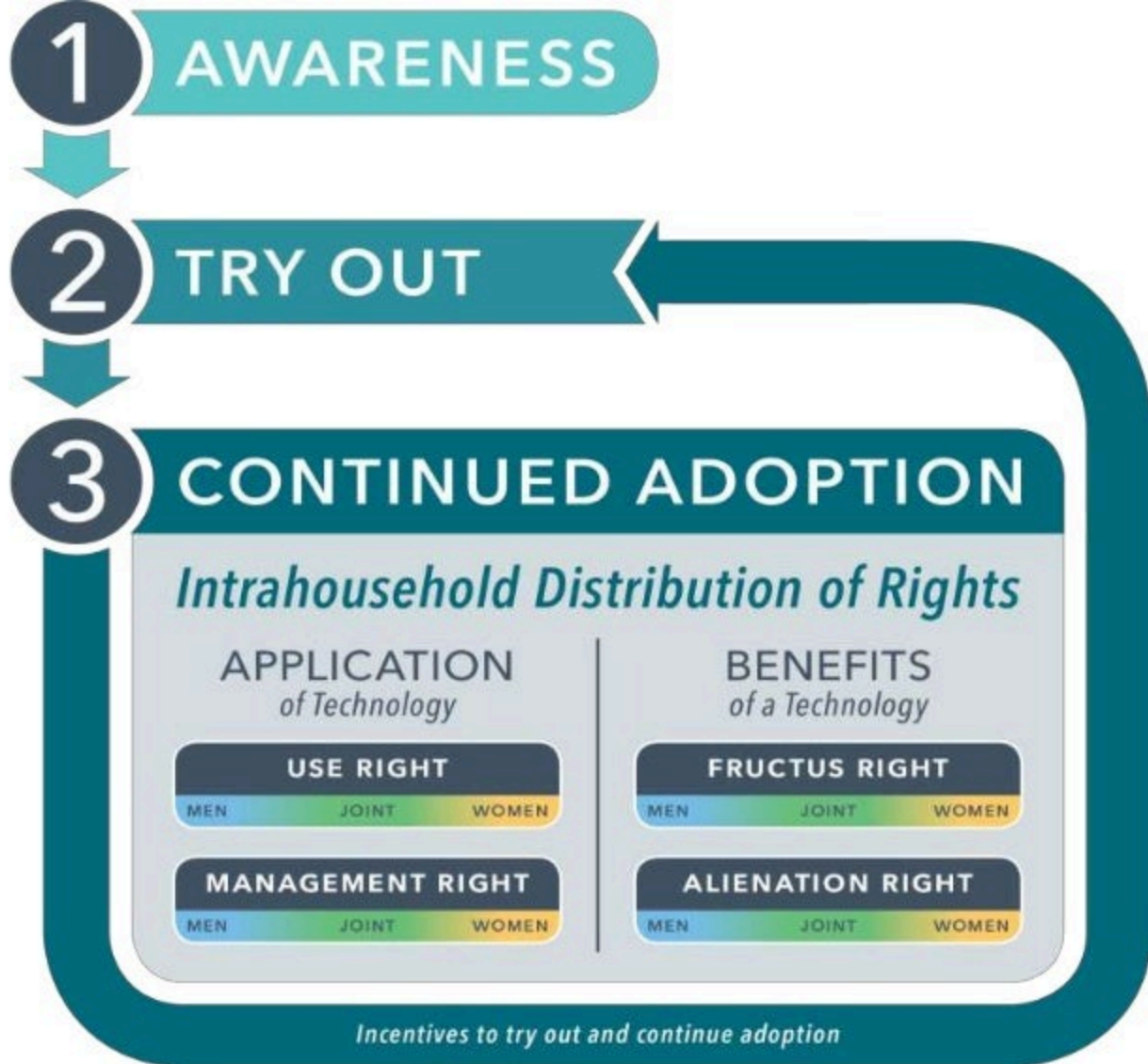
Is it enough to lift these constraints?

- Lots of attention on the gendered constraints to acquiring technology
- These constraints relate to the first two phases of technology adoption:
 - Awareness → Tryout → Continued adoption (Lindner et al. 1982; Lambrecht 2014)
- *Continued adoption*: farmers decide whether to continue using the technology, based on their perception of costs and benefits
- Are costs and benefits shared equally by household members, or does only the 'adopter' of the technology benefit?

Bringing concepts from two bodies of literature to technology adoption

1. **Gender and assets:** What does it mean for an asset to be 'jointly' owned? May be shared rights or different rights (Johnson et al. 2016)
2. **Property rights literature on 'bundles of rights':** (e.g. Alchian and Demsetz 1972; Eggertsson 1990; Schlager and Ostrom 1992)

What are property rights to irrigation technology *within the household* ?



Negotiable Intrahousehold 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
<i>Fructus</i>	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

Methods

- Qualitative data collected in 19 communities in Ethiopia, Ghana, and Tanzania in 2016
- 38 gender-separated focus group discussions (FGDs) were conducted with 375 men and women (190 women)
- Fieldwork in ILSSI pilot and control sites in each country promoting motor pumps, solar pumps, manual water-lifting technologies (e.g. rope and washer or pulley)
- In Tanzania, also included the Helen Keller International (HKI) [Enhanced Homestead Food Production](#) project promoting drip irrigation

Results: Distribution of rights (*use, management, fructus, alienation*)

- One member of the household generally does not hold exclusive rights, no matter who is the “adopter”
 - Intrahousehold dynamics likely to dominate despite technology diffusion efforts targeting women
- Men are more likely to hold more rights and higher 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

Results: Use right is most measured and least valued

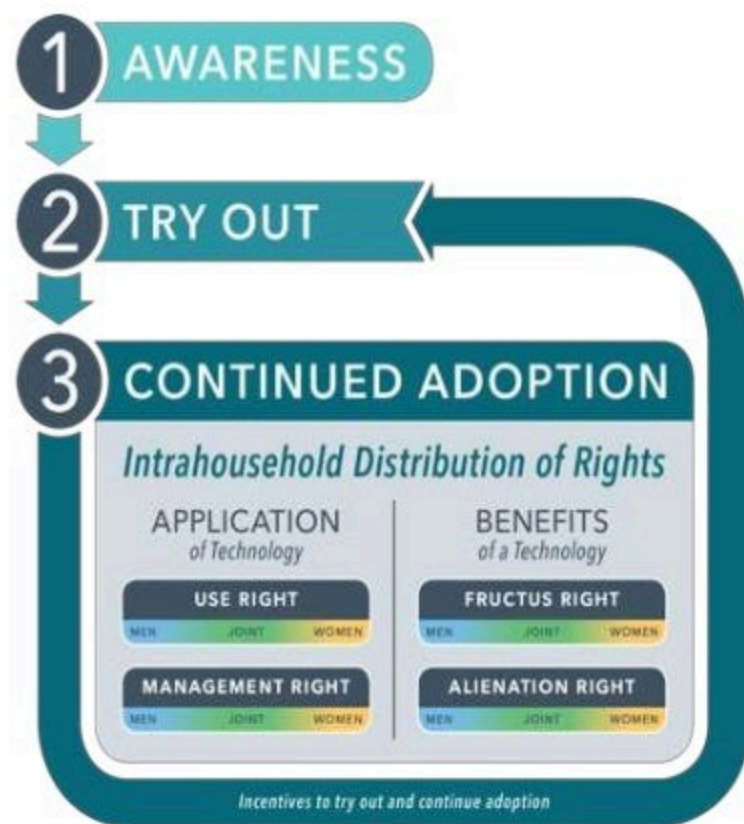
- Women who irrigate (manually) are perceived as “suffering”
 - Women in Ghana and Tanzania wanted motor pumps to reduce energy burden; in Ethiopia preferred solar for time savings
- Perception amongst men that shared workload means gender equality
 - *“Agricultural responsibilities are for both of us, 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

Results: *Fructus* rights are least measured, but 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.”
 - Whole value chain, including postharvest, affects *fructus*
- While the profits help to “*build good houses,*” women are not happy to lose *fructus* rights

Applying an intrahousehold lens to technology diffusion research and programs

- **Overlapping rights:** The person who adopts technology does not necessarily control all rights, nor are all rights shared equally within the household
- **Use and fructus rights:** use does not necessarily convey *fructus* rights
- **Strengthening *fructus* rights:** women strategize to preserve *fructus*; can be strengthened through shifts in intrahousehold relations, and/or working outside the household (e.g. collective action)
- **Expectations:** distribution of rights could affect incentives to adopt technologies and more broadly, participate in a project
- **“Female friendly” technologies** should consider women’s preferences for technology taking into account these rights



Questions for future research

- How does adoption modality affect the intrahousehold distribution of rights?
- Do different (irrigation) technologies—including their design, location, mobility, cost, and physical energy requirements—affect the distribution of rights?
- What do men and women consider a fair distribution of rights?
- What social and behavior change measures encourage shared rights to technology?
- To what extent are the technologies men and women prefer related to expectations about the distribution of rights?