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CAN SMALL-SCALE IRRIGATION EMPOWER WOMEN?

PRESENTATION AUDIO TRANSCRIPT

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PRESENTERS

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Adam S.: If you're able to hear me speaking, could you – I know it works out. Okay. Thank you.

Julie MacCartee: Hi everyone. Sorry about that. We had a bit of audio issues. Sounds like you can hear us now. Were you able to hear me, Julie MacCartee, give the brief introduction? I just wanna have someone check and let me know if you could hear me. It sounds like no. It sounds like you had no audio right from the beginning. All right. I'm hearing "No intro heard." All right. That's great. We'll just start from scratch. Thank you for sitting tight, and we'll briefly move through the intro. Great. We are fully functional now. Okay. Let's go back to our opening slide.

Here we go. Good morning, afternoon, or evening everyone. On behalf of the Agrilinks team, I would like to welcome you to the October Agrilinks webinar, which aims to answer the question, "Can small-scale irrigation empower women?" We're excited to have representatives from the Feed the Future Innovation Lab for Small-Scale Irrigation on hand to discuss some new research and insights from the field. My name is Julie MacCartee, and I'm with the USAID Bureau for Food Security, and I'll be your facilitator today.

Before we get started with the content, I would just like to provide a few quick reminders. First, the chat box is your main way to communicate today. And thank you to everyone who has already introduced yourself. It's always really fun to see that we've got a global audience for these events. Throughout the webinar, we encourage you to use the chat box to network, to share links and resources, and to ask questions. We'll be holding most of the questions until the end of the webinar. But we'll also have our presenters engaging with you throughout the webinar in the chat box and attempting to answer some of your questions.

We are recording this webinar, and we'll post the recording, the transcript, and some other resources to Agrilinks within a week or two. And if you're watching the webinar right now, that means you are on the e-mail list to receive a link to the recording.

All right. A brief intro this time. We're gonna go ahead and dive into the content since we've got a lot to get through. So, to give an introduction to our speakers and to the scope of the webinar today, I would like to introduce Biniam Iyob.

Biniam is the Water and Irrigation Advisor at the USAID Bureau for Food Security, and the Activity Manager for the Feed the Future Innovation Lab for Small-Scale Irrigation. So, take it away, Biniam.

Biniam Iyob: Thank you, Julie. My role in this presentation is to briefly introduce the project and introduce the presenters who are going to delve deeper into the subject matter.

The first presenter is Claudia Ringler from the International Food Policy Research Institute. She's a Deputy Division Director of the Environment and Production Technology Division, and she is the main lead from IFPRI for the project.

We have Nicole Lefore from the International Water Management Institute. She is a senior project manager at IWMI in South Africa.

We have Elizabeth Bryan – same institution as Claudia Ringler – who is a senior research analyst, and she conducts policy-relevant research on many themes, such as sustainable agricultural production, natural resource management, and others.

We have also Sophie Theis, who's a research analyst and gender specialist at IFPRI also.

So you can read all of their bios – will be in the presentation. So you can delve deeper into their experiences. So, with that, the first thing I wanna introduce is the project, the Feed the Future Innovation Lab for Small-Scale Irrigation. So sometimes you will hear us saying ILSSI instead of the whole nomenclature because ILSSI is the acronym that we are using for this project.

As many of you know, it's part of the Feed the Future initiative, which is not only USAID, but the whole of the US government initiative: about 11 government agencies, such as USAID, State Department, USDA, MCC, and others. So, as part of this big innovation, as this initiative, this project ILSSI is a five-year innovation lab which is led by Texas A&M University as the main implementing

organization, with a wide series of research partners, including the three GCIAR centers, the International Water Management Institution, International Food Policy Research Institute, International Livestock Research Institute, as well as one university in the US, which is North Carolina A&T University.

The project also collaborates with a lot of national research and engagement partners including the University of Development Studies in Ghana, Bahir Dar University in Ethiopia, and Sokoine University of Agriculture in Tanzania.

The project has four components. The first component is the identifying of promising small-scale interventions. This could be from lifting technologies such as power, to scheduling drip irrigation. And second is to evaluate the potential and constraint of individual technologies, including gender. Third: identifying opportunities for scaling up. And last but not least is the capacity development and stakeholder engagement, which means they have students coming to the US to learn, in-country students getting master's degree, as well as engagement with farmers and national universities.

This slide that you see is very busy, so I won't spend too much time on it. But it's kind of an illustration how the project fits within the Feed the Future result framework. So, as we know, the Feed the Future results framework – I'll use the arrow and hopefully it works for me; if you see it, I'm pointing with the green arrow. The main goal is the sustainably reduce global poverty and hunger. And the two main objectives are inclusive agricultural sector growth and improved nutrition.

So the four project components of the project that are highlighted in yellow here around here that you see are – one of them here and others here. They fit into the results framework to help achieve the two main goals, and ultimately to sustainably reduce global poverty and hunger.

So this is my last slide before Claudia takes over. So, in general, the whole of the project has many questions, such as "How much water is available? At what quantity? And what quality? How many farmers and hospital can be supported through small-scale irrigation?" and so on. But one of the questions that the project asks is: "What difference can irrigation make in terms of income, nutrition, and for women?" And to help us answer those questions, we have

Claudia, Nicole, Elizabeth, and Sophie, who are going to take over the presentation to delve deeper into the subject matter. So, with that, I leave the floor to Claudia. Thank you.

Adam S.: There you go.

[Something funky happens at this point in the recording where bits of sentences are cut off and it seems as if words are missing or something is sped up]

Claudia Ringler: Thank you, Biniam, for this great introduction. So I'll start with an overview on what women's empowerment actually means or could mean, and why we believe agriculture water matters to women. Women's empowerment can be a somewhat ruley term for both funders and implementers. The graphic that you see here on slide can hopefully help with the terminology for all of you. It basically lays out the continuum from reach to benefit to empower. Irrigation project that aim to reach women attempt to include them in program activities such as irrigation training, on irrigation. For example, donors now also often require reporting systems with sexes-aggregated data to track how their funded activities reach women. I'm not naming any donors.

Other project aim to benefit them. Can see that in the second column here – are increasing their wellbeing, focusing for example on increasing their incomes through irrigation or on improving their health nutritional status through irrigation or other means. It does ensure that these outcomes improve at least as much for women as for men.

The third type of project – and that's where we focus on empowering – they go an extra step by strengthening the ability of women to make life choices through enhancing their decision-making power in household, communi – this can include working with community leaders and within household to change gender norms.

How about water? Water is a highly gendered topic because women have a broader set of more differentiated needs around water use, including both domestic and productive water uses. And "productive" is what we mean with agriculture. Moreover, they have differential axis too, and _____ *[something*

happening with the mic at this point, obscuring speaking] for water resources. And what we have found – and you also might have also seen very few technologies in the field have been developed with women in mind.

So, moving on on this technology challenge and issue, which is really very much at the heart of women's empowerment, what we have seen is a lot of the technologies are not priced or marketed for women; women have often limited access to credit to afford or buy these technologies. And even if they have access, they then don't have the equal access to land resources to actually apply and use those technologies.

In addition they face input supply and output constraints and have more limited access to training on such technology.

In some, I think we can see a lot of constraint on the reach and benefit side of things.

Given this situation, why should we make this extra effort to ensure that women can access, benefit from, and empower themselves through irrigation? The reason is that women's empowerment can have a very strong multiplier effect, influencing other development outcomes, such as improved nutrition and health, and many others, through a whole bunch of different pathways. And those pathways you can see on the slide. Key among these – you can see in the first column of various production, the production and the agriculture income pathway through which women can contribute to enhanced nutrition for all family members by making and taking their own agriculture production choices that improve household consumption, or by spending the income earned from agriculture on healthier food.

So if you go further down, you see two additional pathways. One is the WASH pathway, or water access pathway. So women who are involved in irrigation decisions may choose to use water in ways that improve the WASH environment.

And finally, irrigation also has the potential to enable women's empowerment by increasing the leisure time or by providing opportunities to engage more in decision-making at home and in the community.

I hope this gave you a very rough overview on both women's empowerment and agriculture water use and the various pathways that we have seen. And I'd like now to hand over to Nicole Lefore from IWMI in South Africa to talk more to us about the actual field interventions and practices.

Nicole Lefore: Thank you, Claudia. And hello to everyone across the different time zones. So, under this particular project, we have, as IWMI, and also as North Carolina A&T, we have been fielding a number of packages of technologies across three countries, which is Ethiopia, Ghana, and Tanzania. And the technologies have ranged from manual, such as rope and washer, to solar, to drip. And we've also tested some irrigation scheduling tools. And men and women farmers have tried the technologies in their own field, with guidance and some training from the project. But these were not necessarily on demonstration sites. So we're actually in the field in sort of you could say real-world conditions. The project collected gender-disaggregated data across multiple disciplines on the field studies, and we also held regular reflection meetings with men and women farmers to learn from their experience.

So I'm going to present here some of the preliminary results and lessons from the field studies. And I will try to emphasize some of the gender-related observations. So we know that small-scale irrigation is rapidly spreading across Sub-Saharan Africa. And farmers themselves are investing in technologies, especially pump. We wanted to better understand the opportunities for small-scale irrigation and the entry points that could make it more sustainable and more equitable. In past projects, we've noted that a lot of the spontaneous adoption and the adoption by farmers themselves has been predominantly amongst the highest income earners in the rural areas.

So this is what we have found over the last two to three years. So there's no significant difference between men and women farmers in terms of cost-benefit or water productivity. And most technologies are economically feasible equally for both women and men farmers. And this is particularly true when it's high-value crop. However, men and women do tend to choose to irrigate the crops. Farmers may not invest because they lack the capital to purchase the technology, but the technology is actually not the highest cost. Labor is. And this is particularly a problem for women, who often have less cash and less access family labor. Because of this, women sometimes use less water on crops, because

they don't have the labor for water application field. And this can result in lower productivity for women farmers as well as lower income.

The technologies are feasible on credit. We found a payback period of between six months to two and a half years across the various technologies, depending on the crops. Now, women do face more challenges. I wanted to provide a couple of examples here. One is that we found that women may be targeted by a project for technologies, but the technologies then go to men once they're introduced into the household. So we saw examples where we went in and provided, for example, pumps or drips specifically to women, but when we went back, the men in the household were using it and claiming it basically as their assets. And in this regard it was very much like large livestock, in that technologies are considered men's assets.

Adam S.: Sorry to interrupt you for just one moment. We just wanna make sure that we're on the correct slide. I know there's a little bit of a delay, and there's been some internet disruption. You're joining us from South Africa and just having some issues. I don't know if there's connectivity issues. But what slide do you want to have up right now? What's the title of it called?

Nicole Lefore: It should be slide 16, "The technologies that're feasible, profitable, with multiple benefits." I can't see the slides. The slides are blank on my side.

Adam S.: Okay. No problem. Like I said, everybody, this happens. Can I just have one minute? So, you just tell us – right now we are on "Technologies are feasible, profitable, with multiple benefit."

Nicole Lefore: Yeah. Okay. I will tell you when I want next slide. How's that?

Adam S.: And for all our participants, sorry, this sometimes happens when we have limited capability. But we will work through it. So, yeah, just go ahead and tell us "Next slide" and we will advance them for you. Thank you, Nicole. Sorry to interrupt.

Nicole Lefore: Another example we found in the field was that men have higher access to information about irrigation and technologies. And in Ethiopia, we did a number

of trainings on irrigation and on microfinance. So basically training people on borrowing and managing loans for irrigation. But what we found was that the extension agents and the trainers would call the participants by cell phone to inform them about the trainings, and women don't have cell phones usually within the house. So they're never informed about the meetings and trainings. So even in projects that attempt target women, unless there's a way to directly communicate with women about the meetings, trainings, demonstration days, women just simply don't get the information.

Okay. Next slide please. The matching preferences, priorities, with technology trade-offs. So when we compared results across technologies, we found that certain technologies have a range of benefit. And these benefits go beyond a direct cost-benefit or a project. And this can relate to incentives to adopt and continue to use a technology. And those also vary between men and women. So men tended to prioritize profit but also labor savings. And women also prioritize profit, but they really prioritize multiple use. Now, multiple use includes saving time and labor, but more generally, and not only in terms of irrigating the field.

Women particularly valued the technologies that were installed near the household that could be used for domestic purposes as well. And some technologies increased labor for women. So women, for example, didn't particularly like the motorized pumps because they were often responsible for taking the pumps into the fields and carrying hoses into the fields. But that depends on the country and context. And who carries and who's responsible for getting the technologies and managing them in the field is very local, in terms of local context.

So in a survey done, we also found that men and women both consider social benefits important in terms of which technology they want to adopt. And women noted that they like the technologies that increase status because it helps develop social networks, which come with other benefits. But men also felt that social status was an important reason for choosing the right technology to adopt. And these results about the trade-offs and the preferences of the different technologies is important for programming because these can affect the incentives to adopt and continue to use a technology even after a project closes. But it also reflects the unequal opportunities and those that need to be balanced.

So benefits might be aligned with a project's aim. For example, a rope-and-washer pump might have a lower profitability, but it serves multiple purposes. So

in some cases it might be useful to consider it in a WASH project. And in projects that aim mostly for increased income or just drastic increases in food production, then a motorized pump might make sense. So it's important to consider a matrix of benefits and trade-offs when looking at projects and programs.

We can move to the next slide. So we also tested tools for improving water management on-farm. And this is important because a lot of farmers that are adopting motorized pumps tend to over-water field. They essentially flood, as they would see happening with a monsoon. And so they consider flooding fields as appropriate for water use. But the results from our studies showed that irrigation scheduling tools can help farmers better manage when and how much water to apply to crops. And in most cases, it actually decreased water use and improved water productivity. And at the same time, it also increased yields and increased profit. We also saw a reduction in nutrient losses. So the tools – by showing when and how much water to apply, can actually reduce labor. And women perceived this tool as having potential labor-saving benefit.

And another thing that's worth noting about the irrigation tools is it can help with equitable access to water. The tools increase transparency in water distribution because it shows which farmers are overwatering and which need more water. So the tools are useful for schemes where you want to increase equitable water distribution.

However, even with the irrigation scheduling tools, it's important to note that women do face the same types of constraints. They would likely need credit to purchase the tools. They would need access to information about how to use them effectively. So while women did perceive benefits for this, and it can enhance equity, there are some constraints that have to be still be considered.

So if you could move to slide 19 on irrigated value chains. So part of analyzing the trade-offs and opportunities of technologies was looking at them in combination with different crops. And we worked with farmers to choose some of their own crops that they would produce, but we also did some where we would have consistent production of the same crops. So what we were interested in is looking the value chains that show the highest potential for profitability under irrigation. And one that we focused on with the International Livestock Research Institute was fodder. So we see fodder markets growing around peri-urban areas in Africa.

But the fodder sources are shrinking. And a cost-benefit analysis showed that irrigated fodder can be profitable for both commercial sale, which is basically just taking the fodder directly to these fodder markets, but also for improving milk production or livestock fattening. And this can be beneficial for women in particular contexts where women control fodder markets, or also where they control milk production and processing.

And in addition to that, we found that women in the field interventions tended to inter-plant or only plant leafy greens. And a cost-benefit analysis in Ghana showed that the leafy greens were actually more profitable than the typically-irrigated crops such as onion and tomato. And some men even began to shift to cropping leafy greens when they saw the women were actually making more profit. But this also points to a potential risk, because irrigation used to intensify production, and some crops then become more profitable, men may take over crops that women tend to favor. So for programming and projects, this is an important thing to watch out for: as you intensify that crop production, and you have to consider which crops that women favor and the reasons why they do so.

So, if we can move to slide 20 on microfinance. So, this is the final slide on the field intervention results before I hand over to the next presenter. And, as I said earlier, the technologies and tools can increase profits and incomes, and can have a range of other benefits. And even though the technologies are not the most expensive part, they usually require some amount up-front to purchase the technologies. So farmers need some type of credit.

Now, generally we find that the lenders are increasingly positive about irrigated farming, more than they were even four to five years ago, because they also perceive that it's reducing the risk of crop losses related to weather. And we found that farmers are more likely to adopt technologies if they have access to affordable and reasonable loans. But there's an important caveat to that. Because what we also found is that households where they have a fair amount of female labor don't take out loans to purchase mechanized technologies. So essentially a household doesn't seek out to mechanize if they have enough female labor in the household.

So we also found that the group purchase of pumps could be a solution to access to credit. And a lot of projects are using this approach. But group size and

dynamics are important here. In Tanzania, where we tried the group approaches, there were a lot of problems of conflicts, and some of the people dropped out. In Ethiopia, we actually found that it went very well. And in one case there was a female that was involved in one of the groups, and she actually – the group managed very well as an intergender group, and they are going on to purchase their own pumps individually now that they have been able to accumulate enough capital themselves. However, it should be considered in terms of the dynamics in mixed group.

Generally there's a very low capacity and low liquidity in rural finance. And microfinance institutions may not even lend enough to purchase technologies. So, for example, in Ethiopia, there are cooperatives and microfinance institutions that lend up to a maximum of $75.00, but a motorized pump can be $250.00, or a solar pump over $400.00. So there are constraints in the size of the loans that cooperatives and microfinance can actually lend. But more specifically to gender, we find obviously that women have less access to credit. And this occurs at two levels, much like access to technologies and information gap. Outside the households, women may lack the requirements to get a formal loan. And at household level, the rules around how decisions are made about borrowing, loans, and managing different amounts of money can prevent women from dependency.

So I'm just going to conclude here on the farm-level research. So we find a high potential for improving livelihoods for women and men farmers with a range of benefits and incentives across technologies. But we also see a lack of equity at both household level and at other levels for women and men farmers to enter into irrigated production. And what we conclude from the field studies is that understanding those differences can help us improve the targeting in projects that operate, particularly at farm-level.

And, with that, I will hand over to the next presenter.

Elizabeth Bryan: Thanks very much, Nicole. This is Elizabeth Bryan. Thanks everyone for joining us today and for sticking with us through all the technical glitches we've had this morning. So, today I'm gonna talk about how we're examining the relationship between small-scale irrigation and women's empowerment. And one of the ways that we're doing this is by collecting and analyzing inter-household survey data in the project site that Nicole has described to you, and also including some control sites as well.

And the data that we're data that we're collecting – one of the modules is the Women's Empowerment in Agriculture Index, or WEAI, which assesses women's empowerment across five different domains. And these include production decision-making, access to productive resources, control over income, community leadership, and time allocation. And within each of these domains, there are several different indicators. And for this particular purpose, we modified the WEAI to include additional questions and response codes related specifically to irrigation.

So I'll be presenting some of the baseline data in the next slides, and soon we will also have completed a second round of this survey, including a second round of data collection for the WEAI, in all three of the countries.

So baseline results are showing us that small-scale irrigation is not always associated with women's empowerment. So here in this table you can see that women from irrigating households in Ghana and Tanzania have higher WEAI scores than women from households without irrigation. But the opposite is actually true in Ethiopia, where women from non-irrigating households have higher WEAI scores. And you can also see that in each of the countries, the factors that contribute to women's disempowerment are different. In Ethiopia, we see that community leadership is more of a challenge than it is in Ghana and Tanzania, while in Ghana and Tanzania, other issues such as credit access are more important determinants of disempowerment.

So what this suggests is that interventions such as the introduction of small-scale irrigation doesn't necessarily directly lead to women's empowerment unless these interventions are implemented in a way that considers how not only to reach and benefit women, but also to provide opportunities for women's empowerment. And Nicole already talked about how many of the constraints that women face are context-specific. So approaches and interventions that aim to facilitate women's empowerment need to keep these specific context-relevant factors in mind.

So now I wanna dig down and focus on some of the specific components of the WEAI or some specific indicators of women's empowerment. And I'm gonna focus on the questions that we added to the WEAI related to irrigation.

One thing that we find in the data is that women seem to be somewhat less involved in decision-making about irrigation in Ethiopia compared to Ghana and Tanzania. So what's interesting is that while women and men in Ethiopia, across many different questions, tended to report higher levels of joint decision-making and joint ownership of assets, when we ask about input into decisions such as those related to irrigation, which is shown here, we find that women are more likely to report having input into only some decisions. And in the next slides, you'll see: in Ghana, we see a higher percentage of women being involved in most decisions, and several are involved in all decisions related to irrigation. And in Tanzania, again, we find more women reported being involved in all or most decisions related to irrigation.

In terms of ownership of irrigation equipment, we find that men and women both tend to report that men are more likely to own irrigation equipment in Ghana and Tanzania. Although, as you can see, there seems to be some disagreement between men and women in these two countries, where men don't tend to acknowledge women's ownership, while at the same time some women are reporting that they do have ownership. So there's some sort of discrepancy there in terms of how men and women are reporting to us. In Ethiopia, both men and women report higher joint ownership of irrigation equipment. But as I mentioned, as with decision-making, it's likely that men tend to have more control over the equipment, even when they're reporting joint ownership. And Sophie's gonna talk more about this in her presentation.

While this indicator is not used in the calculation of the WEAI, we did also collect gender-disaggregated data on men's and women's access to information, including information about irrigation. And we did this because, as Nicole mentioned, we found that access to information is critical for sustained adoption of technologies and practices across many different contexts. And we find that, in these other contexts, women tend to be much more less likely to report having access to information on irrigation. And we find that here as well, in the three countries in ILSSI.

So, interestingly, we also see that both men and women in Ghana and women in Tanzania have particularly low levels of access to information relative to men and women in Ethiopia and men in Tanzania as well. So this is a real constraint across all of the countries, and for men and women, but particularly for women. And just to summarize, women's empowerment is not a guaranteed outcome of

development intervention. All interventions, including small-scale irrigation interventions, need to be intentional about how men and women are reached and how they're engaged in activities. And this needs to be done in a way that take men's and women's unique roles in agriculture within a particular context into account. And it also needs to consider the particular challenges or constraints that women may face in that context.

Ensuring that all interventions are more gender-sensitive has the potential to lead to other positive development outcomes, as Claudia showed with her earlier slide on the pathways to improved nutrition outcomes. And so this is an area that we're currently exploring through our research. And when we finalize this second round of data collection, we'll be able to observe if, in all of these sites, if there have been changes in women's empowerment that have taken place, and if so, what are the key drivers of changes?

Before we move on to Sophie's presentation, I also wanna point out that the literature and our own qualitative research shows that there are other factors, both within and outside the household, apart from the WEAI, that are particularly relevant for examining the relationship between irrigation and women's empowerment. And important factors within the community include things like the availability of natural resources like water and land, social and cultural norms such as inheritance patterns, and community infrastructure. So: is there an irrigation team available for people to tap into?

At the household level, other important factors include the type of marriage arrangement or family size or idiosyncratic shock that people may experience, such as the death of a family member. And all of these other factors are as important for women's important. But they don't fall under the five domains. These domains tend to focus more on household dynamics, on decision-making, and control over resources. But we do need to control for these additional factors in our analyses of the data, make sure that we're accounting for all of the factors that are important for empowerment in the context.

So now I'm gonna turn it over to Sophie, who's going to talk more about some of the findings from our qualitative research.

Sophie Theis: Okay. Thanks so much. So, so far in this presentation, we've focused on the unique and disproportionate barriers that women face who adopt small-scale irrigation technology. Unfortunately, these gender-based constraints to adoption are not the only force of inequality that they face. Because the majority of rural women live in households with other usually male decision-makers, there are also challenges within the household that keep women from benefiting equally from agriculture technology, including irrigation. I'll focus here in the next couple of slides on specific challenges within the household that may keep women from being reached, benefiting, or empowering themselves through small-scale irrigation.

So let's draw on a classic definition of technology adoption as not just a single event that happens all at once, but really as a sequence of three phase, the first – nology. And then the phase of continued adoption. In continued adoption, what happens is that the farmers decide whether to keep using the technology, based on their direct personal experience of costs and benefits, rather than what others have told them to expect. And most of the constraints we've talked about so far focus on the first two phases: why women are less aware of these technologies and how to use them properly, and less able to actually purchase, try out technologies.

But gender is also important in the continued adoption phase. We don't see so much focus to this phase maybe because there are two opposing assumptions. Sometimes we see the assumption that either all household members experience the same cost and benefits related to a technology. Or, conversely, there's a different assumption that only the adopter of the technology will benefit, and no one else in the household.

This binary seemed rather unnuanced. So, through ILSSI qualitative research we conducted in 2016 in Ethiopia, Ghana, and Tanzania, we explored inter-household issues around irrigation technology further. And through this research, we ended up developing a conceptual framework to help understand the costs and benefits during continued adoption related to irrigation technology.

So this conceptual framework unpacks the continued adoption phase after the technology has been acquired and is being used by the household. So in this phase of using the technology, it highlights four rights to the technology: the use right, management, fructus, and alienation – go into these in a moment. The point here of the framework is that if we look at who within the household holds each

of these right, this is a better way to understand who's bearing the costs and benefits of the technology, rather than assuming they're shared equally by everyone, or exclusively by one person.

So here's a quick definition of each of the rights. And you can refer to our IFPRI discussion paper that's out on this for more detail. The use right – pretty clear: the right to physically operate the technology – lay out the pump, operate the motor. The management right is the right to make decisions about how, when, and where to apply the technology. For example, on men or women, plots of land. Fructus is really important, and has not gotten a lot of attention. This is the right to control the output and the profit from the technology. For example, controlling the income generated from the sale of irrigated production. And this is pretty key. We'll return to this in a second. And alienation is the right to sell, lease, give away the technology.

I'll share a few of our research findings related to what we've learned about the distribution of these rights to small-scale irrigation technology. First of all, it became very clear that these rights are rarely all held by one person in the household. There's always some kind of distribution between household members. And this has two important implications right off the bat. First, women are often much more involved in irrigation activities than we may assume. And the second thing is that if projects try to transfer irrigation technologies to women – for example giving them motor pumps directly – this may not always work because intrahousehold dynamics often reorganize who controls what's right. This is similar to how, if you reach women, for example reach them with a motor pump, that doesn't necessarily mean they benefit or empower themselves through the use of that pump.

And to investigate who holds which right, it's useful to look at the type of technologies – mechanized or manual irrigation technology – and land rights: who's controlling which plots of land. In our research overall, across the countries, men were more likely to hold rights to mechanized technologies like motor pumps. Women, in contrast, usually only held use right, but rarely fructus or management rights over motor pumps or mechanized technology. And this might strike you a little bit strange. We might assume if you use the technology, you get to control the benefits. That's sort of what works in our context. But this is not often the case for women. So it's a mistake to conflate use with some of the other rights. And I will explain why this is the case.

So, for the use right, one of our questions in this research – we asked women "How are women irrigators perceived in the community?" thinking they might be seen as innovators. Instead, women told us they're seen as suffering. They see it as hard labor for little reward. And so this reflects that the use right is just labor if it doesn't come with other rights to the technology, like fructus or management. Furthermore, a group of men in Tanzania explained that, to quote from them, "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." And of course if you're doing 50/50 agricultural work on the family plot of land plus 100 percent household chores, that does not leave a lot of time for irrigating on your own separate plot of land, which women often maintain.

So men and women both told us that women need to prioritize their labor on domestic work and on plots of land that men control before investing in their own plot. So if women are using mechanized irrigation, it's usually on men plots or on the family plots, not on plots of land that she really controls. And so women cited this time burden – needing to fulfill these other obligations – as one reason why they were not able to irrigate plots that they control.

Okay. Let's talk about the fructus rights, which, in contrast, were most valued by respondents. And it became very clear that just because you're using a technology does not at all guarantee your fructus right, the right to the profit of the technology. And this is really largely because women are using this technology only on men plots of land. So this then begs the question: why do women not control income from these jointly-managed irrigated plot, from men plot?

There's obviously a number of different reasons. I'll highlight one challenge that emerged from our research, which happened with commercializing irrigated produce, with irrigated rice paddy in Tanzania. Men started selling this irrigated rice paddy to warehouses at a distance from the community, and women described how information has asymmetry – their lack of knowledge of what's going on in these warehouses compromised their fructus rights that they used to have over this.

Some quotes from women. On ownership: "It's my husband, because he signs the fax at the warehouse and even sells. But you won't know of the amount, whether he gives you a fake calculation. You just have to accept. Can't go daily to check them 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." So even though women acknowledged that the profits helped them to build good houses, they were not happy to lose their fructus rights over a crop that they equally helped to produce with their labor. And they were told not to complain because they were provided for.

So, please do read our paper for more detail. But here's a few ways we can try to apply the framework and address constraints within the household in our effort to diffuse small-scale irrigation technology inclusively. Okay. First of all, there're some dos and do-nots, starting out with the do-not.

Do not assume the adopter controls all the rights to a technology or that the rights are shared equally. Investigate these four rights, the use, management, fructus, alienation, and then you'll be able to better heed the cost and benefits borne out within the household. Second: do not assume that use rights convey fructus rights. It's easier to measure who's using a technology, who received the technology. But people really value the fructus rights, and those don't get measured as much. Both are important to measure, so you can get at labor and control over income.

Okay. More constructive, positive advice. Do investigate how expectation about the distribution of rights affect incentives, especially for women, to adopt technology or participate in a project. As you can see in the graphic framework, there's an arrow that goes from number three over to "Try out," indicating that women know if they're not gonna get fructus right, that might seriously reduce their enthusiasm for participating in your project.

Do seek opportunities for time saving. This is a huge issue for women, especially when it doesn't come with what they consider an adequate payoff. And do support, most importantly, women's fructus right. You can do this either through shift in intra-household relations. There's lots of programs working on household dialogues, trying to shift gender relations within the household, and/or working outside the household. Like helping women acquire land in women's groups, separate from their own homestead. And the type of technology and land rights matter.

Okay. So now we'll pull back and show our concluding slide, with a few top takeaways from the ILSSI gender work that we've presented so far. And we're looking forward to discussion on this.

All right. I think these are gonna fly in. Number one, reaching women – so, going back to the reach, benefit, empower concept that Claudia mentioned, reaching women with small-scale irrigation definitely matters. There's a big gap right now. And we've shared here a few approaches to diffusion and to the design of technology, credit, that can better meet women's needs, and actually reach them. That's not even effectively happening right now. But reaching women is not sufficient, is not the same as benefiting or empowering. If we were only to measure women's technology adoption or use of technology, that's just measuring if we've reached them. But as I've just discussed, there are many constraints within the household for women to actually benefit from irrigation technologies.

But there is a lot of potential for small-scale irrigation, designed and disseminated properly, to reduce women and men's workload and really increase income and resilience. And this can be the basis for empowerment, and is definitely worth experimenting and learning more from each other going forward with programming. To do so, we definitely need to leverage opportunities for time savings via small-scale irrigation. This doesn't happen automatically with every time of technology and crop. The irrigation scheduling that Nicole mentioned is one example. Or technologies that meet women's multiple uses of water can really.

Number five: to help overcome constraints to awareness, we do need to provide women equal access to information on technology. The awareness gap is definitely present. And how they can invest in these technologies productively. And this might mean that they're doing so jointly with their husband. It might mean independently. That's sort of context-specific. We're agnostic on that.

Number six, finally: small-scale irrigation almost always affect gender roles and relations. I hope this is – this is probably the most important thing we want to communicate with this presentation: that gender roles and relations will almost always be affected by small-scale irrigation. So let's pay attention to this. We need to collect sexes-aggregated data if we want to understand technology's impact on different. And we need to involve men and women in the design of technologies and diffusion approaches from the beginning.

So, thanks. That's all I have here.

[End of Audio]