

Gender and Meaningful Participation: An Intersectional Analysis of Gender in a Participatory, Small-scale Irrigation Project in Eastern Uganda

By

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Abstract

Women's participation has been identified as a necessary component of agricultural development projects, including those focused on small-scale irrigation and water management. The inclusion of women alone, however, does not address several intersectional gender and social dynamics that emerge in participatory development activities. Expanding previous work on the importance of integrating women in development and drawing on feminist critiques to extend inclusion-based strategies, this study interrogates and co-defines with Ugandan farmers what makes participation "meaningful," and for whom. Irrigation, which has been recommended as a strategic focus in responding to the challenges of dry-season, drought-impacted and flood-prone agriculture in East Africa, is central to this study due to its reliance on shared water resources and therefore highly social processes of governance and decision-making. Focused on the Horticulture Irrigation Project (HIP) in eastern Uganda, this paper particularly explores gender norms related to participatory irrigation and emphasizes the heterogeneity of farmers' experiences in this context, including differences among women associated with characteristics such as marital status, age, parental status, and other sociocultural factors that undergird farmer group dynamics. Through in-depth, semi-structured interviews, four primary themes related to gender surfaced in this research: respectability and responsibility, labor capacity and roles, vulnerability, and autonomy and ownership. The gender norms expressed through these themes operate as significant but nuanced influences on how different farmers choose or are able to participate in irrigation groups, and their perceived outcomes of that participation. This analysis of the relationships between gender and farmer participation in a Ugandan context can inform similar irrigation projects by encouraging an intersectional, site-specific approach to gender equity work that refuses to essentialize "women" and that recognizes complex power dynamics as central, practical concerns for agricultural development.

Background

In eastern Uganda, farmers are experimenting with and evaluating irrigation and water management strategies to overcome recent challenges of climate variability and to improve their agricultural livelihoods. Rainfall in the region has become sporadic and agricultural production seasons are much less predictable than in previous years, threatening the output of primarily rainfed crops that serve as a source of both income and household food consumption. Improving the accessibility and management of water resources has been recommended as a strategic focus in responding to the challenges of dry-season, drought-impacted and flood-prone agriculture (Adhikari et al., 2016). Several studies have described the potential benefits of irrigation in East Africa, which can enable farmers to intensify production, increase household income, save labor, and diversify crops—especially high-value, nutritious horticulture crops (Burney & Naylor, 2012; Pender et al., 2004; TOPS, 2017; You et al., 2011). Farmers' increasing ability to grow vegetables in the dry season creates new potential horticultural market opportunities and diversifies the foods available throughout the year. For Uganda, where 72% of the population is employed in agriculture (United Nations, 2017) and the average landholding size is 1.1 hectares (UBOS, 2010), small-scale irrigation is a way for farmers to adapt to these changing conditions and continue cultivation during the dry seasons.

The Uganda Bureau of Statistics (2010) reports that less than 1% of agricultural households practice irrigation in Uganda, despite a history of government intervention. Beginning in 1976, for example, Chinese investments established a large-scale irrigation project, called the Doho Rice Irrigation Scheme, managed by the Government of Uganda with the aim of promoting rice production. According to Angella et al. (2014), the government withdrew support for the scheme in 1994, due to budgetary constraints, and attempted an unsuccessful transfer of management of the scheme to local farmer associations. Despite recent attempts to rehabilitate it, the Doho scheme serves as a cautionary example for irrigation development practitioners about the limitations of

government-managed irrigation projects in Uganda: namely the governance challenges of requiring and enforcing user fees and collective labor agreements in top-down, large-scale, public irrigation systems. Agendas which focus overwhelmingly on large-scale private investments, Woodhouse et al. (2017) argue, also tend to ignore farmer-led initiatives towards developing irrigation, which are smaller in average size, but already widespread throughout sub Saharan Africa. The authors emphasize the value of these underreported farmer-led and farmer-managed irrigation development projects (Woodhouse et al., 2017).

Similarly, Oates et al. (2015), in a summary of the policies that have shaped irrigation performance over the last 50 years in Ethiopia, Morocco, and Mozambique, argue that a history of subpar and unsustainable private and state intervention makes it clear that local actors are extremely important—"irrigation should be a process of continual adaptation to increase resource-efficiency and improve services for users" (p. 2). They assert that attention should be greater on local institutions, farmer priorities and low-cost innovations (Oates et al., 2015). This process, with iterative innovation at its base, requires the collaborative participation of the small-scale farmers who are increasingly using irrigation to mitigate climate impacts and directly improve their livelihoods. In other words, meaningful farmer participation, rather than a top-down approach, is crucial for the development of accessible, locally-relevant, and sustainable irrigation systems.

Participatory models emerged in the 1970s and 80s to attempt to heed the call for more community involvement in variety of research and development fields. Participatory action research, community-based participatory research, and other methodologies involving research with, rather than on, communities became popularized not only in development, but also in public health and natural resource management fields (Wallerstein & Duran, 2008; Wilmsen et al., 2008). Advocating for civic participation in cycles of planning, design, implementation and assessment was a popular way for various stakeholders to pursue sustainable development while seeking improved outcomes from water projects (Ostrom, 1996; Sultana, 2009). Projects in the Philippines, Sri Lanka, Pakistan,

Senegal, Colombia, and Mexico represented just some models of farmer-engaged irrigation development during this time (Meinzen-Dick, 1997).

In irrigation, understanding meaningful farmer participation is of notable relevance because water management and use necessitate the negotiation of a shared natural resource, meaning that governance and group decision-making issues are at the fore, and power dynamics therefore arise, influencing these processes and their outcomes (Ostrom, 1996). For example, who can access water, how much, at which times, for how long, and under what degree of enforced regulation will heavily influence the benefits that farmers gain from participation in collective irrigation efforts. Challenges of achieving governance, for Ostrom (1996), include top-down rule-making, uncertainty about how to enforce collective agreements, and various forms of opportunism and conflict. These challenges can be overcome, Ostrom suggests, when local irrigation system users participate in crafting their own operational rules that are then enforced by individuals who are accountable to those users (Ostrom, 1996, p. 73). Necessarily entangled within these processes of governance, or what Ostrom calls “institutional design,” are social capital (relationships between individuals), physical capital (tools, machines, infrastructure), and human capital (skill-building and behavior changes). Participatory processes regarding resource allocation, decision-making, conflict resolution and other governance issues—in addition to the development of physical capital—are therefore crucial in crafting sustainable and equitable irrigation systems.

But what is meant by participation? Agarwal (2001) and Cornwall (2003) each offer their own framework or typology of participation through which to think about different kinds of farmer engagement. Based on work with community forestry groups in Nepal and India, Agarwal (2001) describes six types of participation: *nominal* (holding membership in a group), *passive* (attending meetings and being informed), *consultative* (being asked opinions, without guaranteed influence), *activity-specific* (undertaking specific tasks), *active* (expressing opinions freely and taking initiative) and finally, *interactive*, or *empowering*, participation (having voice and influence in group decisions)

(p. 1624). Cornwall (2003) similarly employs four modes of participation – *functional*, *instrumental*, *consultative*, and *transformative* – to distinguish “between forms of participation that work through enlistment” (the former), “and those that genuinely open up the possibilities for participants to realize their rights and exercise voice” (the latter) (p. 1327). She argues that often, broad-stroke critiques of participatory research and development fail to distinguish these different types of participation (Cornwall, 2003), disregarding the potential of participatory projects to support or enact broader social change. Both Agarwal (2001) and Cornwall (2003) are concerned with rethinking “participation” in a way that resists the gendered exclusions that have persisted in many mainstream development initiatives.

Additionally, the way that participation is understood and operationalized in water resource management is greatly influenced by space, context, changing social relationships and social norms—including gender norms. “Participation” could signal any combination of early initiative of a project, ongoing financial contribution, labor input, engagement in decision-making, basic attendance and formal membership (Sultana, 2009), all of which may shift as participants’ relationships, contexts, and lives change. Participation is essentially a question of power relationships involving representation, ownership, influence, and differing needs among various social subjectivities (Wallerstein & Duran, 2008). For this reason, it is crucial to consider the social norms and dynamics that influence and are impacted by participatory development processes, including gender in particular.

In this thesis, I first provide a brief historical overview of development approaches to women’s participation and associated feminist critiques, before introducing the theoretical foundation of intersectionality that drives the gender analysis of participation presented here. Next, I present a background on the Horticulture Irrigation Project in Uganda and an explanation of research methods. I then discuss specific intersectional gender norms relevant to rural farmers in eastern Uganda that emerged from farmer interviews, and their implications for participatory irrigation development.

Diverse farmer narratives are highlighted as examples of how these norms—especially those which impact labor, land, familial social status, and community engagement—influence access to and outcomes from participation in irrigation activities.

Women’s Participation in Development and Feminist Perspectives

In the 1970s, international development organizations began including women in development programs and policies, no longer regarding them solely as passive beneficiaries and instead incorporating them into technology, training and finance programs (Aguinaga et al., 2013, p. 42). In 1974, one year before the first World Conference on Women, in Mexico, the US Agency for International Development (USAID) established the Women in Development (WID) Office, with the goal of integrating women in their development projects around the world (USAID, 2012). The WID approach has been largely criticized, however, for failing to address gender dynamics and relationships, and instead siloing and essentializing “women’s issues” (Bezner-Kerr, 2008; Aguinaga et al., 2013). The Gender and Development (GAD) approach followed, based on the critiques of scholars who had begun to question that “women” are a homogenous social category, understanding gender more complexly as a social, relational construct that intersects with other forms of oppression and domination.

Many development approaches to gender equity in the 1970s and 80s were not driven by large, Western development organizations, but rather by scholars and activists in the “Global South.” Development Alternatives with Women for a New Era (DAWN), for example, was a network of women that developed in the 1980s and “insisted that economic development should be considered a tool for achieving human development and not vice versa” (Aguinaga et al., 2013, p. 46). This was one of several feminist critiques that regarded international development more broadly as a neoliberal project which favors “economic growth over all else” (Aguinaga et al., 2013, p. 56). The concern was that by assuming that economic change alone will empower women, development programs ignore

the role of inextricably connected social and political institutions. Postcolonial feminists carried this critique through the 1990s and articulated additional concerns about the dominant narrative of “beneficiaries” in “underdeveloped countries” waiting to be helped by the “Western saviors” of “developed countries” (Aguinada et al., 2013). Some participatory development projects, like the Horticulture Irrigation Project in Uganda (the subject of this study), attempt to push back on these narratives, in response to such critiques, through a strong focus on collaboration, farmer management, and social equity values.

Contemporary Development Approaches to Gender in Irrigation

Many of the Southern-based, postcolonial critiques have not been fully acknowledged by large development organizations overall (the United Nations, World Bank, USAID, etc.). These organizations have, however, taken up their own version of gender equity through programs of gender mainstreaming. This is because agricultural development organizations and researchers have realized that gender norms affect international and national development processes, as well as local approaches. Regarding irrigation specifically, FAO (2012) articulates generally that irrigation policy, planning and design is guided and shaped by the “common gender stereotype...that women are primarily housewives and mothers, while men are farmers and irrigators” (p. 4). Meinzen-Dick & Zwarteveen (1998) express a similar, though more complex, site-specific claim in the context of South Asia, finding that men are perceived as best qualified to represent community-level water interests while women continue to be seen as incapable of participating in meaningful ways. Agarwal (2001) in South Asia and Fikirie et al. (2016) in Ethiopia provide additional examples of how women’s participation in decision-making processes remains a challenge in development, often due to entrenched gender norms about women and men’s roles and capabilities in those contexts.

Work on gender and irrigation development has also focused on describing the challenges to participation that women face in different contexts. Chancellor (2000) argues that women in southern Africa may lack the social support to express dissenting opinions or may not have the information

and resources they need to make participation in irrigation projects worthwhile. Theis et al. (2016) note that membership in water user groups is also often limited by formal (land ownership, household headship) or informal (social norms, meeting location and time of day) factors and that women may still have less decision-making power than men over crop choice, technology, and use of income from irrigated crops, even if they are participating in and benefiting from irrigation systems (Theis et al., 2016; Njuki et al., 2014; FAO, 2012). For these reasons, equal participation of women and men in water projects has been highlighted as a requirement for sustainable and effective development (FAO, 2012) and several have argued that context-specific, participatory approaches are necessary for promoting gender equity in irrigation (Theis et al., 2016; Lefore et al., 2017).

Although the importance of women's participation in irrigation development has been widely acknowledged, many programs still struggle to consistently and meaningfully engage women and marginalized groups in the planning, design, implementation and assessment stages of a project, and "women" are still often described and treated as a homogenous group. Especially in cases where women's participation in formal irrigation projects is still defined solely in terms of whether there are at least 50% women in attendance—an indicator required by the USAID, which is widely used to monitor gender equality in their funded projects around the world—the extent to which participation is meaningful to the individuals involved is unclear and difficult to determine. Feminist scholars have critiqued quantitative approaches to measuring participation and related surface-level narratives of inclusion and diversity that do little to promote meaningful change (Jackson & Pearson, 2000; Merry, 2016; Ahmed, 2017). Calling out the "the myth of female solidarity," Sultana (2009) asserts that simply adding women does not necessarily address power issues between men and women or among different women (p. 349). Age, marital status, parental status, and other socioeconomic differences all operate together to mutually constitute gendered relationships, in which some women may benefit from—and actively reproduce—status quo gender norms in a way that other women may not. Similarly, Hippert (2011) claims that the focus on the presence or absence of women, rather than the

restructuring of social relations, has been a major limitation of many gender mainstreaming development programs. The root causes of the gender inequities that influence irrigation development processes require an inquiry into the norms and cultural attitudes that impact farmers' lives, as well as broader social, political, and economic conditions that shape them.

As irrigation becomes an increasingly attractive strategy in East Africa and as the impacts of climate change disproportionately affect rural and resource-poor women (Jost et al., 2014), there is an opportunity for feminist development research that addresses the crossroads of participatory irrigation and gender in a Ugandan context. This study therefore asks: how do intersectional, local gender norms and dynamics influence meaningful participation in small-scale, participatory irrigation development in eastern Uganda? This research examines the complexities of the gendered constraints, opportunities, and outcomes of farmer engagement in an existing irrigation project with explicitly participatory aims. Working to engage feminist critiques of development by presenting farmer narratives of participation in an intersectional way while framing both the material *and* social outcomes of participation as meaningful, this study is one of few that investigates gendered participation in small-scale irrigation development in the context of Uganda.

An Intersectional Approach

The problematic “assumption of women as an already constituted and coherent group with identical interests and desires, regardless of class, ethnic or racial location,” writes Chandra Mohanty (1988), “implies a notion of gender or sexual difference... which can be applied universally and cross-culturally” (p. 64). I aim to interrogate this notion of “women” as a homogenous group throughout my exploration of the idea of participation, given that the category of “women” remains the primary target of gender and development work. I do this by using the analytical framework of intersectionality to better understand the influence of gender norms, and the social institutions that animate them, on farmer participation in irrigation in eastern Uganda. Within feminist development

literature (i.e. Wieringa 1998; Jackson, 2002; Jackson & Pearson, 2000), research and analysis that investigates this issue in the context of water in East Africa is relatively lacking. However, following GAD and postcolonial critiques of the 1980s and 90s, several authors have written about the need for intersectional approaches within broader development research and practice.

Intersectional analysis examines how social structures, relations, processes and policies shape and constrain social experiences related to intertwined forms of inequality, such as race, class and gender, among other social divisions (McCall, 2005). “Intersectionality,” writes Nash (2008), “invites scholars to come to terms with the legacy of exclusions of multiply marginalized subjects” (p. 3). The term “intersectionality” is popularly associated with Kimberley Crenshaw and black feminists in the United States (Crenshaw, 1991; Collins, 1998; Combahee River Collective, 1977) and has been taken up primarily in U.S. academic and activist spaces. In development policy and practice, intersectionality remains less used and understood as a conceptual grounding (Braun, 2011), despite the complex social systems and gendered negotiations that occur in transnational work. Deepening understanding of both intersectionality and development through interdisciplinary analysis can provide theoretical and practical insight into the opportunities and consequences of development programs (Braun, 2011). Empirically identifying and comprehending socially relevant intersections of inequality in development practice can help practitioners support farmer-led approaches to address and resist various site-specific power inequalities in their work (Grünenfelder & Schurr, 2015).

An intersectional approach is important in irrigation because, as Sultana (2009) asserts, “water management schemes that generally see communities as homogeneous entities can overlook complex realities where access to and control over water resources vary by multiple, interlocking and hierarchical systems of differentiation” (p. 347). The social relationships and negotiations involved in governance and decision-making processes, as discussed earlier, also make intersectional analysis particularly useful in the context of irrigation. Similarly, because gender intersects with so many

aspects of social difference, which are historical and site-specific, broad generalizations about the irrigation-related interests of women are nearly impossible. However, explorations of how gender shapes perceptions and experiences of men and women in specific natural resource management contexts is a worthy endeavor (Meinzen-Dick & Zwarteveen, 1998). This includes attending to the various gendered social locations of different farmers and their distinct experiences of project participation, which is precisely what this study aims to achieve. It is important to acknowledge here that most international development work reproduces binary gender assumptions, constructing “woman” and “man” as the only, antithetical signifiers of gendered difference (Jolly, 2002). Although it is beyond the scope of this research, this is an issue that is necessary for the field of development to reckon with directly—that is, how marginal gender identities and subjectivities interact with participatory projects as well, especially those targeted at “women.”

The theoretical foundation provided by intersectionality and heterogeneous understandings of “women” motivates the gender analysis of farmer participation provided in this study. The goal is to put forward specific examples of how intersectional gender norms, as situated within and constructed by social institutions, influence the ways in which different farmers engage in processes of irrigation development, and then to explore both the material and intangible outcomes of that participation.

Horticulture Irrigation Project (HIP) Background

This research builds on the existing work of the “Innovations in Dry Season Horticulture for Women and Smallholders in East Africa” project, or Horticulture Irrigation Project (HIP)¹. The Teso Women’s Development Initiative (TEWDI Uganda)², University of California, Davis, Busitema University³, farmer groups, local government agencies and scientists have partnered under HIP since

¹ <https://horticulture.ucdavis.edu/project/irrigation-uganda>

² www.tewdi.org

³ <http://www.busitema.ac.ug/>

2014 to conduct collaborative research and development activities in dry-season horticulture, with a focus on small-scale irrigation and water management. Unlike large-scale water development projects in Uganda, HIP focuses on developing small-scale, simple-to-use irrigation systems that emerge from dedicated community engagement and collaborative problem-solving with farmers as the primary stakeholders. For several years, HIP project partners have together been building, testing, and evaluating innovations at six vegetable-growing sites in eastern Uganda, continuously adapting the technologies to meet the needs and preferences of farmers.

The UC Davis project team, in collaboration with initial Ugandan partners at National Agricultural Advisory Services (NAADS), National Agricultural Research Organization (NARO), and Busitema University, selected the six project sites using a criteria list that required different types of water sources, landscape characteristics, soil type, climate, and other resource availabilities (see Appendix A). Sites include Aloet (Okubwa Village, Bukedea Subcounty, Bukedea), Atari (Ngenge Subcounty, Kween), Kabos (Bugondo Subcounty, Serere), Kyekkide (Mafubira Subcounty, Jinja), Lwasso (Lwasso Subcounty, Mbale), and Tente (Bulumbi Subcounty, Busia). The farmers at Kabos site use a small engine pump to irrigate vegetables on land adjacent to Lake Kyoga. The Lwasso site is at the base of a 200-meter cliff with various waterfalls pouring from Mount Elgon that comprise the primary water source. Farmers in Aloet are mostly landless women who were part of an already established women's group located nearby a protected spring that is suitable to channel for surface irrigation. At Kyekkide site, near the city of Jinja, individual farmers irrigate small vegetable plots on the fringe of a valley containing two permanent streams. Atari farmers are experimenting with pumping water from the nearby river. Tente, located near to the border of Kenya, is the most recent site to become involved with HIP and farmers there rely on a semi-seasonal stream. Farmers at these sites represent a variety of language and ethnic groups, including those of Lugisu (at Lwasso), Lusoga and Luganda (at Kyekkide), Lusamiya (at Tente), Sabiny (at Atari) and Ateso (at Aloet and Kabos).

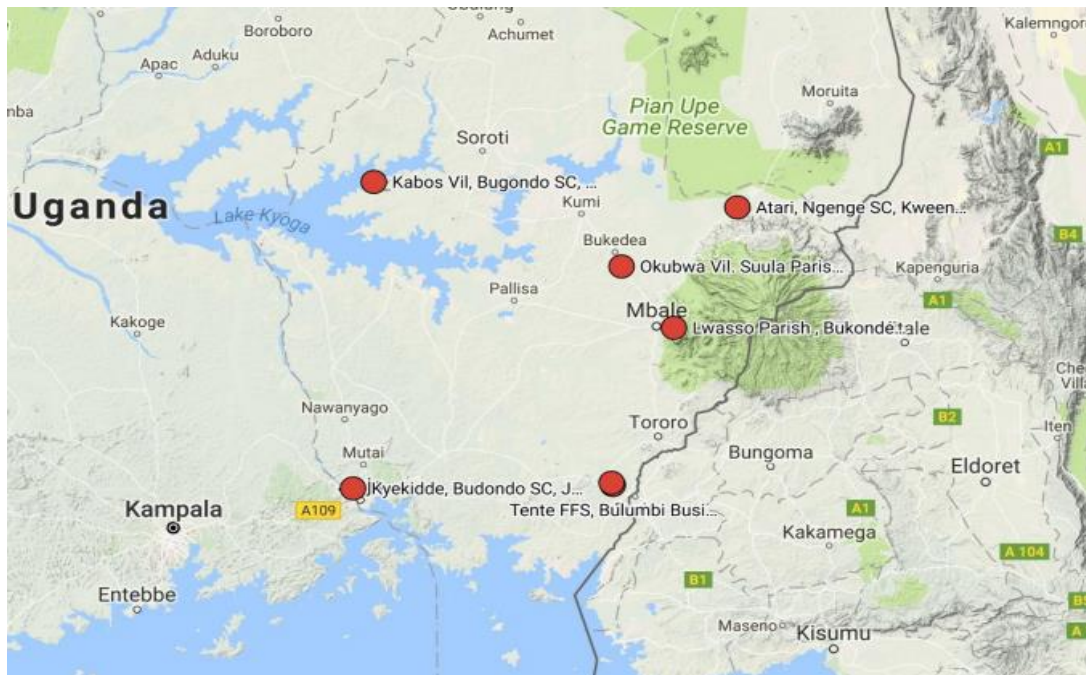


Figure 1. Map of the six HIP project sites in eastern Uganda. Sites include: Aloet (Okubwa Village, Bukedea SC, Bukedea); Atari (Ngenge SC, Kween); Kabos (Bugondo SC, Serere); Kyekidde (Mafubira SC, Jinja); Lwasso (Lwasso SC, Mbale); and Tente (Bulumbi SC, Busia)

HIP prioritizes the equitable engagement of women and men, seeking shared decision-making and equal access to the benefits of irrigated horticulture. The project team has employed a series of tactics to address many issues related to gender and participation. While 50% inclusion of women members is one such tactic, the project has a set of additional tools, which are built into the structure of its research and development activities, to confront issues of gender and power inequities. For example, there are established farmer committees that serve as liaisons between the project team, the farmer irrigation group, and site community. These committee leadership positions are held equally by women and men and at some sites these committees have provided an authoritative space for women leaders to organize. One example is a land trust to collectively pool resources for leasing land, which has been one of the major barriers to irrigation faced by women in Uganda. Additionally, project staff from TEWDI Uganda, a local NGO partner focused on women and youth empowerment, act as social advocates for marginalized farmers. They facilitate ongoing dialogues with the irrigation groups and promote fair governance, equitable decision-making, and

equal opportunities for women and men to attend and actively engage in project meetings and trainings.

Another important aspect of HIP's focus on gender and social equity emerges in the research process. At the end of each season, project team members facilitate review sessions with mixed-gender and women-only focus groups with farmers at each of the six project sites. In these sessions, farmers give feedback about the benefits and challenges that they experienced accessing irrigation and using the system during that season.

However, even within a project dedicated to gender equity and meaningful participation, complex gender dynamics emerge and influence how different women experience their involvement with the farmer irrigation group at their site.

Research Methods

This study draws on qualitative data that I collected between the months of July and December 2017 at the HIP project sites in eastern Uganda. Because this research is focused on the ways in which ideologies of gender are entangled with irrigation practices and processes, I chose to pursue qualitative methods that allow the intersectional complexities of farmers' experiences and perceptions to arise. As Sally Merry (2016) writes, "numerical knowledge is essential, yet if it is not closely connected to more qualitative forms of knowledge, it leads to oversimplification, homogenization, and the neglect of the surrounding social structure" (p. 1). The focus on qualitative data in this research follows this logic while simultaneously acknowledging that a "purely subjective account of women's gender interests cannot suffice because subjective constructions do not stand outside of prevailing gender ideologies" (Jackson & Pearson, 2000, p. 7). Rather than shy away from those gender ideologies, this work attempts to understand them, as well as their implications for participatory irrigation development.

In this vein, I conducted 31 semi-structured interviews with 21 female and 10 male members or former members of HIP irrigation groups representing each of the six project sites. Farmers were identified through purposive sampling (Creswell, 2013) based on selection criteria that included diversity of age, gender, and level of active group participation. I based the selection of interviewees primarily on attendance lists from group meetings and seasonal feedback sessions, which TEWDI Uganda program officer Helen Acuku has collected and compiled over the last several years. Individuals' names from the past two years only were included in a sub-list, which I then edited and supplemented in some cases with the help of site coordinator input to dismiss farmers who had moved or passed away, for example. The sub-list included a total of 270 farmers. Although the list cannot capture every farmer that has ever attended a project activity (attendance may not have been taken at every meeting), the list was used as the starting point for choosing a diverse group of farmers to interview. It included 146 women, 119 men, and 5 farmers with unrecorded gender. Ages ranged from 17 to 78 with an average age of 40. Female farmers were, on average, well represented in attendance at the meetings and trainings facilitated by HIP in recent seasons:

Table 1. Percentage female represented in HIP attendance sub-list (2016-2017)

Site Name (Subcounty, District)	# of Members	# Female Members	% Female
Aloet (Okubwa Village, Bukedea SC, Bukedea)	17	15	88.2
Atari (Ngenge SC, Kween)	31	17	54.8
Kabos (Bugondo SC, Serere)	21	10	47.6
Kyekkide (Mafubira SC, Jinja)	63	26	41.3
Lwasso (Lwasso SC, Mbale)	88	50	56.8
Tente (Bulumbi SC, Busia)	50	28	56
Total	270	146	57.45

Local site coordinators or community mobilizers who are familiar and have been working with the irrigation group at each site then ranked their perception of the participation level of all farmers on the list on a scale from one to five, from very low to very high participation. For the sake of this initial process, “participation” was generally characterized and understood as a combination of the following:

- Basic attendance at meetings, trainings, and plot demonstrations
- Active engagement in group meetings and decision-making processes (i.e. expressing or vocalizing opinions; having a role in water-user governance decisions)
- Active engagement in training, set-up, and demonstrations of irrigation systems
- Use of irrigation systems on vegetable plots (i.e. contributing labor, running the system, and partaking in decisions about water use and crop type)

This understanding of participation served as a starting point for choosing interviewees, and it reflects elements from Argawal’s (2001) typology of participation and Cornwall’s (2003) four modes of participation. In some cases, the site coordinators did not know a farmer well enough to fill in age and participation rank, and for the sake of time these farmers were not included. The average farmer participation level ranking was 2.64 (2.6 for women and 2.7 for men). This suggests that women are about equally as active, on average, as men in the HIP project, from the perspective of the site coordinators who are responsible for helping to mobilize farmers for project meetings and data collection activities. Each site has a separate coordinator, of whom four are men and two are women—all Ugandan. Each coordinator has a background in agriculture and several hold appointments at their district sub-county office. Their rankings were subjective and due to time restrictions, farmer self-ranking was not compared, but these rankings provided a systematic basis from which to select interviewees.

All interviews took place in person either in a farmer’s home or just near the field site, with an attempt to maintain the maximum level of privacy. The majority of interviews were conducted in the farmers’ native language with a Ugandan translator who spoke that language—either a site

coordinator or Helen Acuku. Languages included Lugisu (at Lwasso), Lusoga and Luganda (at Kyekkide), Lusamiya (at Tente), Sabiny (at Atari) and Ateso (at Aloet and Kabos). Farmers who were comfortable chose to do their interviews in English. As much as possible, the time burden of the interview was minimized; most interviews lasted approximately one hour. I did not record the interviews, in part because of the sensitivity of the topics discussed and in an attempt to make farmers as comfortable as possible. Although I had interacted with most of the farmers during project activities in the months prior to their interview, each farmer likely approached my presence—as an African-American, female researcher affiliated with HIP and with a U.S. university—with varying degrees of comfort, trust, skepticism, excitement, opportunism or ambivalence.

During the interview, I took written notes, including quotations that were captured in English based on the translators recounting. The interview questions focused on drawing out qualitative information about:

- 1) local gender norms, such as how one's marriage status, number of children, and labor responsibilities are both perceived and experienced by different women and men (Objective 1), and
- 2) farmer perceptions about the value of irrigation group membership, attendance, and participatory activities, as well as farmers' different experiences with participating in the irrigation group (Objective 2). (See interview protocol in Appendix B).

Prior to conducting the interviews with HIP farmers, Helen Acuku and I tested and refined previous versions of the interview protocol with five unaffiliated farmers in Awoja, Soroti District, eastern Uganda to ensure clarity and suitability of the questions. These questions aimed not only to explore differences between men and women, but also between women, highlighting how intersections of gender and other social dynamics function to shape participation in irrigation development in an eastern Ugandan context. There was an explicit focus on social norms related to labor, marital status, and children because it was expected that the social institutions of labor, marriage and reproduction would provide relevant insight into site-specific challenges of participation.

I expected that in the interviews, farmers would define the “meaningfulness” of their participation in HIP based on both material outcomes (i.e. yield and crop performance, income generation or resource acquisition) and intangible outcomes (i.e. respect, knowledge, reduced marital conflict, confidence, community cooperation) that are related to their gendered positions.

Sample Description

Of the 10 men and 21 women interviewed, 74% were married. All but one farmer had children of their own and the average number of children was six. Fourteen farmers also reported having a caretaker role for others as well, such as an elderly parent or another family member’s children. The most farmers were interviewed from Tente (7), followed by Aloet (6), Atari (6), Kyekkide (5), Kabos (5), and Lwasso (2). The youngest farmer interviewed was 22 and the oldest was 66. Due to challenges locating the least active farmers and therefore lowest-ranked for participation, the majority of farmers interviewed (16) were those ranked very high or high participation, half of whom were women. Five of the six medium ranked farmers and seven of the nine lowest ranked farmers were women.

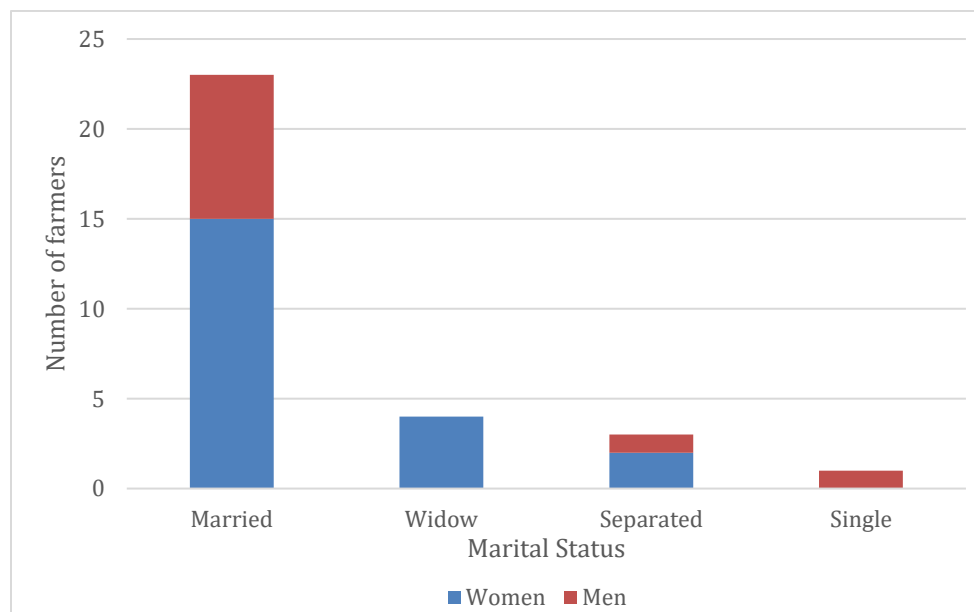


Figure 2. Number of women and men interviewed, by marital status

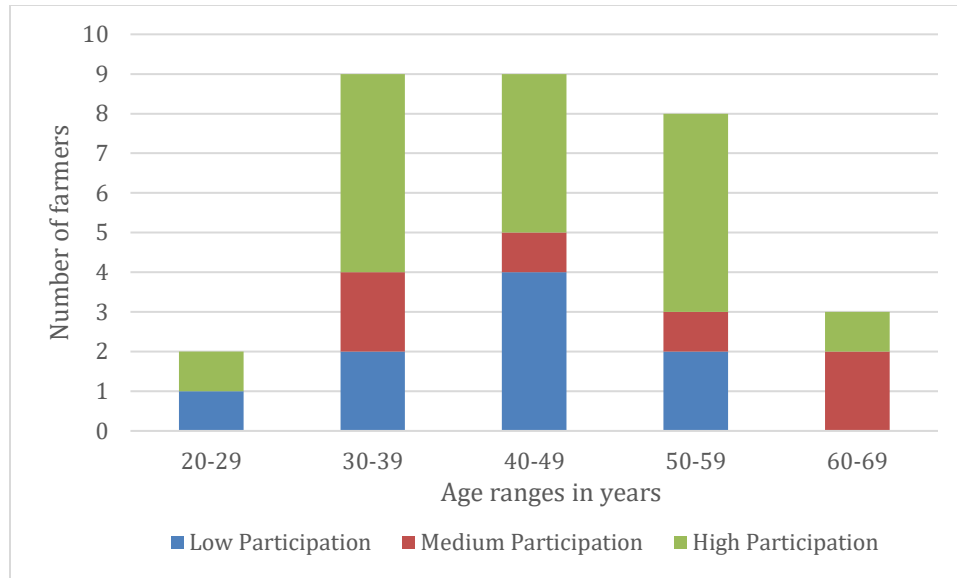


Figure 3. Participation level of farmers, by age

Data Analysis

Using a qualitative data analysis online program, Dedoose, I coded the interview notes for content. Following Grünenfelder & Schurr (2015), I employed inductive strategy to develop categories that characterized the ways in which gender norms were discussed by farmers, which were most relevant in the cultural contexts of the site locations in eastern Uganda. After an initial, general reading of the interview notes, I read them through a second time in search of themes related to three analytical categories: relevant gender norms, positive or negative experiences of farmers regarding ability to participate in the group, and finally, outcomes of participation, as deemed valuable by farmers. These themes became the basis of a coding system. On the third read-through, I coded each individual interview using this code system (see Appendix C).

Part 1: Intersectional Gender Norms

Several themes regarding the construction of gender norms at the intersections of marital status, children, labor, and social status emerged in the farmers' articulations of gender norms in their communities. These include: respectability and responsibility, labor capacity and roles, vulnerability,

and autonomy and ownership. In this section, I describe examples of how these themes surfaced in specific conversations with farmers, with an emphasis on various women's experiences as well as men's perceptions of women and women's perceptions of other women. I also briefly situate the intersectional gender norms that constitute these themes within social institutions such as marriage and land tenure.

Respectability & Responsibility

Perceptions of respectability and responsibility have strong implications for who can participate in leadership, decision-making, and governance within irrigation groups because it determines who is considered a leader, whose voice is heard and taken seriously, and who may be consulted to resolve conflict. In response to interview questions about family structure, the theme of respectability and responsibility emerged primarily in relation to characterizations of a "good" household, definitions of economic prosperity, and understandings of individual character (an individual's choices and actions, regardless of their situation). Respectability was attributed to farmers based on their marital status and family life—the perception of whether one's home is stable, with a spouse and children. Responsibility is signaled by economic prosperity, such as the ability to manage finances, hold wealth, access land, pay school fees, or hire labor. Siu et al. (2013), in their study of masculinities and HIV treatment in Busia District, Uganda, employ the concept of respectability to mean the degree of conformity to "the moral values of institutions such as the family and church, in which one could participate in an official capacity" adding that respectability is "affirmed by proper attention to the requisites of marriage and providing for children, consistent hard work, and adequate material possessions such as a home, economic independence and education" (p. 46).

For example, women and men who are married were regarded, by all respondents across all sites, with respect. These individuals are considered honored, mature, accountable, focused, and

reliable as a consultant if there is a disagreement or decision to be made. Several farmers expressed that, generally, a married woman's opinion is valued more by their community than that of a single woman, due to her position as a "family woman." One man at Atari remarked:

When you have a family, you have a homestay, people recognize you and you are seen... you can be a leader. If you are single, you aren't a family. You have no name... an unmarried person won't have the ability to be in politics, for example, because how can you know anything?

Another woman described that married women are responsible because they are motivated to work and participate due to their duties in the family. Some farmers explicitly discussed that those with families can achieve development goals within the community because of their focused desire to improve their families' livelihood. There was a clear tie made between marriage, responsibility, and in turn, the potential to access political leadership and community development.

Farmers also had specific ideas about the role of children in determining the perception of married individuals. As one Atari woman notes, if someone is married with no kids, it is perceived negatively: this person is "just dumping in the latrine" without contributing to the community or clan. The opposite opinion was also expressed by a male farmer, noting that even if a woman produces no children, it is still acceptable if she is married. Those who are unable to reproduce may even be considered with pity. Simultaneously, age plays a role, given that the expectations of women to have children diminish as they age, describes a male farmer at Kyekkide. Those who have raised children are regarded as responsible and this suggests that their opinions may be taken more seriously in a group decision-making context than those who have not.

While most of the farmers in the irrigation groups are married or widows, there are also single or separated women involved in the HIP project, particularly at Aloet site. Two single women described their experience as extremely difficult: "It is hard, there is no man and I am alone to find food, clothing, money for school fees. I have no protection. I am mother and father." The struggle to sustain daily resources is compounded by the reality in Uganda that single women generally do not have access to their own land. Without a husband or male family member, a single woman "starts

from zero by herself.” Overall, women theoretically hold land ownership rights for approximately 16% of land in Uganda, but only 7% is land that is formally registered with the state (ICRW, 2011; Asiimwe, 2014) and land is inherited through patrilineal lines. Despite statutory rights provided by the 1988 Land Act and later, the 1995 Uganda Constitution, which “contains a non-discrimination clause that guarantees, in theory if not in practice, the women of Uganda the same rights to land as men” (Asiimwe, 2011, p. 179), women’s rightful claims to land tenure often go unregulated and unenforced. Leasing land, mentions another Aloet woman, is not as respectable as owning land. Because the typical path to owning land—a clearly crucial resource for irrigation—is through marriage, single or separated rural women struggle to obtain full control over this important asset and are therefore often relegated to a lower social status with limited agricultural resources. In addition, as renters, they do not have control over whether the cost of rental land will increase due to the installation of a relatively fixed irrigation system.

Despite the clear challenges that single and otherwise landless women face, most of the married farmers I interviewed described single women as “bad mannered”, unsettled, and unproductive. If she is divorced from a husband, a single woman may be portrayed by others as selfish and disorganized. Notably, women’s respectability was referenced in relation to promiscuity—a sexualized component of gendered difference that arose for women but not for men, who were more often painted as irresponsible if unmarried. Men’s sexuality was not judged, while single women’s promiscuity was assumed as both a threat to married women (via breaking up the “good family”) and a concern about economic productivity. Men at Atari claimed:

She may be jealous and doesn’t want to work. She wants to be cared for without working... she may be a prostitute.

A single woman who gets pregnant will have problems because she gets pregnant, she can’t work, and she needs help from other men. She may even get an STI.

Female farmers also considered single women with contempt, stating that she may encroach on a marriage. A perceived lack of economic prosperity of single women also bothered some farmers.

They insisted that single women should be encouraged to engage in productive activities because they otherwise have no sense of direction or commitments, no assets and no future. “Single woman must be prayed for,” one woman stated, “she needs advice.” One Aloet woman voiced a further distinction among different single women, claiming that education level is an important factor. She explained that an uneducated woman is a threat to married couples, whereas an educated woman may be esteemed and independent. Similarly, younger single women present a bigger threat than older women, who in turn are not respected due to being single at an older age. The only single man who was interviewed, who was also the youngest interviewee (22 years old), echoes this sentiment, commenting that others “may have more patience with you if you are young.”

I have highlighted here examples of how the issue of respectability encompasses complex intersections of gender, marital status, parental status, and age, that may impact which women are able to participate meaningfully in irrigation groups. These examples illuminate important implications for the governance and decision-making issues that are so central to irrigation—in particular, that farmers who are seen as respectable and responsible will likely hold more power in a group. For example, several interviewees stated that they would take the opinion of a married individual over that of a single individual. One woman went as far as to rank whose opinion she would listen to the most and whose would hold the least weight. For her, someone who is married would have the most valuable opinion, followed by a widow, then a single person, and finally someone who is divorced. This reflected the general sentiment that most farmers held and implies that the highly gendered notions of respectability and responsibility factor into group decision-making processes. It also illustrates the diversity of women’s experiences within the group.

Of course, not all farmers draw such hard lines around categories of identity as those examples above—some farmers explained that the level of respect they give to fellow community members depends on one’s “character.” This uncovers the complexities and intersections of lived realities and identities attributed to different individuals in the irrigation group and broader

community. For example, although widows are generally viewed with respect because they once had a spouse, their character is evaluated by others depending on how they move on from the death.

“Widows shouldn’t just isolate themselves,” one woman explained. She can join a savings group, participate in irrigation activities, and continue with her life. One widow emphasizes the significance of her lifestyle choices to the respect that she receives—she attends church and is considered settled. In part, this expectation of widows to remain connected to the community demonstrates that being a member (of any group) is viewed well and there is social value in “contributing” to the community through participation. This reflects how Siu et al. (2013), drawing on Wilson (1969), understand “respectability” as largely concerned with “morality and membership of, and active commitment to, the whole/external society” (p. 46).

Labor Capacity & Roles

Used here, labor capacity refers to the ability or perception of ability of different farmers to carry out agricultural and household work, while labor roles direct who should and who does perform such work. Narratives about labor capacity and roles referenced not only the division of labor between women and men, but also the beliefs that farmers hold about gendered duty and fulfilling their roles at a household and farm-level. They include the perceptions farmers have about capacity to learn and physical ability, including who *can* and who *does* certain activities. The social norms related to labor that are described in this section are deeply tied to gendered assumptions—for example, about the limited physical and mental capacity of women and older farmers—and these norms have many implications for participatory irrigation due to the importance of collective labor in such projects. I focus here on how gender norms and beliefs characterize certain types of acceptable labor for women and men, focusing on intersections of gender, parental status, and age that influence who participates in which labor activities.

Farmers reported that women generally do all the household chores, including collecting water for cooking, cleaning, and washing. “The man does nothing,” lamented a woman at Tente, a sentiment echoed by women at Aloet, Kabos, Kyekkide, and Atari. If they become sick, women described how their children will assist them with both chores and work on the plot. The number of children that a woman has therefore impacts the size of her support system, assuming those children are old enough and able to perform the necessary labor. A woman at Aloet stressed that women in the project are not lazy, but have more that they must accomplish, which goes unrecognized. She adds that men are not more hardworking, even if they appear to be. The concern of the “double burden” emerges here, where certain women may be expected to participate in the “productive labor” of growing irrigated crops for the family, while also maintaining the household through “reproductive labor” (Bezner-Kerr, 2008). Of course, this concept is not new, nor unique to gendered labor relations in Uganda. In this context, however, men at Atari and Aloet illustrate women’s “double burden,” by explaining that their wives sometimes do the agricultural work that men do, like carry pumps and use the ox plow, but that it would be bad for them, as men, to do work like fetching water for household use, because it is a task “for women.” Even though women may blur gendered labor divisions, those who are considered “men” strictly may not.

While many interviewees claimed that women, men, and children in the household do the same types of farm work, men mostly tend to contribute what is considered “heavy labor,” like land leveling, clearing bush, digging potato heaps, and carrying machinery. Labor divisions in this realm are not strict, however, and shared tasks may include digging furrows, planting, watering, weeding and harvesting. Additionally, in Uganda, women and men historically have held power over different types of agricultural cultivation decisions, with a distinction between “cash crops” for sale (under the control of men) and “subsistence” crops for home consumption (under the control of women) (Whyte & Kyaddondo, 2006). The notion of gendered crop choice is supported also by Fikirie et al. (2016), who find significant differences in the types of irrigated crops cultivated by male headed households

and female headed households in Ethiopia. They conclude that this differentiation “likely originate[s] from gender-based social and cultural biases that influence the allocation of responsibilities in the small-scale irrigation agricultural activities” rather than any essentialized natural preference (p. 18).

Gendered divisions of labor are often conceptualized as due to physical differences in capacity between women and men. While physicality can determine one’s ability to carry out a specific task, *perceived* labor capacity—what one *appears* to be capable of—must also be considered as inextricably tied to social expectations and not simply due to differences between gendered bodies. It is not a natural physical ability of “women” (a non-homogenous group) that prevents them from doing certain types of work, although this was a primary issue raised by farmers and a biased belief that is also prevalent among development practitioners. At Tente, the women mention that they rely on the male project assistant and other men to carry and move the water wheel pump at their site. When I asked the women if they could move the machine when a man was not present, they laughed—suggesting that this would be either impossible or inappropriate—and then stated that men’s value in the group is, in part, to provide heavy labor. The unspoken assumption here is that “men” are relatively young and able-bodied. Again, here, gender is socially constructed along with understandings of age and ability, forming the basis of a social norm about appropriate water-related labor roles. It is also worth noting that that fetching water for the household, a task in the domain of women, could also be considered “heavy labor,” (but was not referred to as such) as it requires great physical strength to carry a 20-liter jerry can full of water over a long distance—possibly more taxing than some of the activities relegated to the domain of “men’s work.”

Women also revealed that irrigation system maintenance is a job for men. For example, women at Kabos do not fix the pumps and sprinklers when they break because, as one male explained, “they think it is work for a man.” This results in only a few men at Kabos who know how to operate the pump; the other members rely on those men to use the system. The implications of this are that these women and men may be inadvertently excluded from the benefits of irrigation if they

are not using the equipment due to traditional gender roles around labor and ability. Theis et al. (2016) elaborate, “where contributing to the labor for constructing a canal or small dam is a prerequisite to receiving water from the infrastructure, women’s exclusion from the labor (whether because of their conflicting work burden or social norms) can deny them access to the benefits” (p. 3).

Another underlying assumption held by male and female HIP farmers and contributing to women’s reluctance (in some cases) to master operation of more complex irrigation systems, was that women are less intelligent than men. Farmers described this as men being more experienced and women being slower to learn. For some, age also determines mental ability, as older people are understood to possess less thinking capacity as they age. This points to the significance of paying attention to the social nuances of learning processes within participatory irrigation development, including the assumed capacities of different farmers across both age and gender that determine which farmers benefit from trainings, and become “experts” and system operators.

Alongside an understanding of gendered labor norms, it is crucial to recognize the potential negative impacts that irrigation and water management schemes may have on women and the surrounding community by affecting the cost of rental land, reducing water flows for downstream users (both for irrigation and household consumption), or increasing the time necessary for work that may be considered primarily the responsibility of women, such as fetching water or weeding (Bezner Kerr, 2008; Braun, 2011; Chancellor, 2000; Woodhouse et al., 2017). In a large-scale dam project in Lesotho, for example, Braun (2011) illustrates how the labor responsibilities of women and girls who are responsible for fetching water increased by two- to four-fold due to loss of local springs after the river was dammed.

An understanding of the ways in which gender intersects with other social factors to construct site-specific labor norms may help irrigation development practitioners to better support marginalized farmers as key agents in transforming unbalanced and potentially inequitable divisions

of labor, while avoiding exacerbating inequitable divisions of labor through poorly planned irrigation systems.

Ownership & Autonomy

Dynamics of ownership and autonomy also factored into farmers' articulation of gender norms, just as gender norms were constructed through perceptions of ownership and autonomy. These dynamics were revealed through farmers' evaluations of self-sufficiency and independence in their knowledge and use of water and irrigation systems, as well as their ability to make decisions and freely engage with the group. Several men, particularly those who had been given a high participation ranking by the site coordinator, reported a confident sense of ownership over the project, asserting that it is not difficult to participate and that they could maintain the technologies on their own based on what they have learned. When asked about why he first joined the group, one highly active man at Kyekkide declared, "I didn't join the group, the group joined me."

Although HIP is committed to equitable engagement of different farmers during meetings and other activities, the issue of male domination did arise at Tente. All of the women interviewed there were married, and they provided a saying, which, loosely translated, explains that "because the men are used to dominating in the household, they will also dominate a group." Women there clearly did not feel that they had ownership over the space of group meetings and attributed this to gender norms present within the household. Agarwal (2001) finds similar issues in the context of South Asia: even when women are able to participate in meetings, they may not fully control decision-making process or have true ownership of the space. In terms of material ownership, Njuki et. al (2014) notes a similar problem—that women who purchased their own drip irrigation systems in Kenya and Tanzania still had less decision-making power than men over crop choice, technology, and use of income from irrigated crops. Further, Njuki et al. (2014) find that women would only buy the pumps if they were unmarried or had been sent by their husband to do so. This points again

towards the idea that marital status is one of several important social differences that intersects with gender to impact irrigation development processes.

In the HIP project, however, some of the men interviewed stated that they supported increased self-sufficiency for all the women. Although women less often proclaimed the same level of autonomy or ownership over the project that the men did, several women did express a level of pride in learning how to grow vegetables in a new way, using irrigation. They described an increased confidence from women's participation, especially due to the opportunity to interact with "outsiders" (irrigation group members from other sites, researchers, the project team, student engineers, and occasionally government staff). Similarly, the chairperson at Aloet, who is a 32-year old single woman, expressed the opinion that her leadership role allows her to feel that she does not have to be reliant on others. A 35-year old married woman at Kyekkide explains how she is more responsive, works harder, and gets her own money in this project, and that if men only were in the group, "the women would be left behind." These narratives show the dynamic possibilities for different women—in this case one single and one married, from distinct sites—to claim ownership or autonomy, resisting the gender norms that may suggest otherwise.

Vulnerability

Farmers indicated that those who are perceived as vulnerable can be undermined and taken advantage of through property theft and destruction of crops and technologies. For example, single women, widows, those without male children, and older farmers were described in the interviews as lacking "protection" and therefore vulnerable to physical and emotional mistreatment. Able-bodied men in the irrigation groups, as such, are expected to provide protection. In this way, notions of vulnerability of certain farmers construct an expectation, or social norm, that other farmers (men) will either pose a threat or provide protection. Intersectional gender norms are entangled with

perceptions of the vulnerability of certain farmers, as well as their precarious access to water and land resources.

For example, due to land ownership customs and policy, female widows may risk losing their land to a husband's brother or other family member, threatening her ability to continue growing and irrigating there. Echoing what several farmers in my interviews claimed, Asimwe (2011) describes the following gendered land tenure protocols in Uganda:

According to custom, females marry into the clans of their husband. In rural communities, the clan will allocate customary land to the man upon his marriage. The matrimonial home is usually built on customary land and is regarded as the husband's property until he dies, at which time ownership reverts to the clan... Even gifts to the wife and property she acquires individually are viewed as belonging to the husband. Upon customary divorce, wives are usually sent away from the home with no property... Even where widows may have the statutory right to administer the estate, access to and control of customary land is severely limited" (p. 174, 176)

The intersection of land tenure issues, gender norms, and marital status has implications here for the ability for farmers to access secure irrigable land parcels. Additionally, even where land is acquired and irrigated crops are grown, threats to particular groups of women may still be present. For example, a single woman at Aloet recounted a time when some men brought their cattle to graze on her plot, trampling the crops she had planted there. This type of disregard for her land may have been due to the assumption that by having no husband or older male children, she would not be able to retaliate or defend herself.

The perceived vulnerability of certain farmers manifests not only through land tenure issues (which have a long history, including massively disruptive British colonial land system policies in the 1900 Uganda Agreement), but also through problems of water scarcity and lack of accessibility. Pradhan (1989), referring to hill irrigation systems in Nepal, notes that the ability to physically defend oneself is a factor that limited women's possibilities to access water in times of scarcity. While this notion of physical threat is couched in essentialist assumptions of "women's" physical ability, similar to the assumptions about labor described previously, it does point toward the pertinent

reality that accessing water may be difficult for those who are considered, by fellow community members, to be vulnerable. This is because in Uganda, as in most parts of the world, including the U.S., there is a broader context of normalizing certain forms of gender-based violence that underlies this need to physically defend oneself. This normalization of gender-based violence appeared in the interview comments of a 55-year old women at Aloet:

If the husband beats his wife with a sharp object, it is acceptable for the woman to bring the issue to court and officially divorce. But one slap is normal, and she must allow this - it is no reason to get divorced.

Another woman in Aloet shared that she left her husband because he “tortured” her and that because “nature is nature,” she ended up with children for whom she is now solely responsible. It is necessary to consider how these types of gendered relationships both construct gender norms and impact the ability of different farmers, given gender, age, family structure, and other factors, to access water resources, especially in times of scarcity. It is also crucial to acknowledge where and how farmers are resisting these norms and structural inequities. Specifically, farmer perceptions of vulnerability are uniquely important for issues of irrigation governance, due to the need for farmer-led rule-enforcement and conflict resolution (Ostrom, 1996).

Part 1 of this analysis of gender issues in participatory irrigation has sought to outline four primarily themes—respectability and responsibility, labor capacity and roles, autonomy and ownership, and vulnerability—through which several intersectional gender norms have emerged. These norms include, for example, that married or widowed farmers are more respectable and responsible than single farmers, that women and older farmers have limited mental and physical capacity for labor, that “men” and “women” should do certain labor activities, that men have greater control over group meeting and project spaces, and that single women, widows, those without male children, and older farmers may be taken advantage of. Such norms, or assumptions, are directly

relevant to developing participatory, small-scale irrigation systems in eastern Uganda due to their implications for decision-making, labor, resource allocation and use, and governance.

Part 2: Gendered Access to and Outcomes of Participation

I now turn towards a discussion of participation, which in this section is framed in terms of two main conditions: 1) access (ability to participate in the first place), and 2) outcomes that incentivize or disincentivize ongoing participation. This framework adapts Meinzen-Dick & Zwartveen's (1998) presentation of dual aspects of participation in water user groups: "rules for membership, which determine eligibility to participate," and "the balance of costs and benefits to be derived from involvement, which influence individuals' decisions to participate" (p. 340).

Membership, they argue, includes both formal and informal criteria for participation, while costs and benefits encompass both material and intangible factors that influence the decision to participate. Here, it is necessary to keep in mind the intersections of various social constructions of difference that operate alongside and within gender, as investigated in the previous section through the dynamics of respectability and responsibility, labor roles and capacity, ownership and autonomy, and vulnerability. I show that local gender norms influence not only who is able to access HIP group activities due to labor, land, finance and physical capacity, but also how specific farmers' ability to participate then becomes interpreted as meaningful based on gender and other social factors.

Access to Participation

Several factors enabling or disabling access to participatory irrigation activities were identified by different farmers as they discussed what has made it easy or hard for them to participate in their group at any point. I organized these issues into sub-categories of analysis: alternate productive labor, alternate reproductive labor, availability and access to land, distance or location of plots, finance, and sickness or physical restriction.

Table 2. Issues raise by farmers in relation to ability to participate in irrigation groups, by gender.

Issue affecting access to participation in irrigation groups	% male farmers (N=10) who raised the issue as a factor for participation (either benefit or challenge)	% female farmers (N=21) who raised the issue as a factor for participation (either benefit or challenge)
Alternate productive labor	50%	14%
Alternative reproductive labor	20%	24%
Availability/access to land	10%	38%
Distance/location	0%	24%
Finance	50%	33%
Sickness/physical restriction	20%	38%

Both men and women discussed the challenge of balancing their time between the irrigation project and other labor activities. Women’s reproductive labor outside of the project, according to the 24% of the women who raised the issue, involves domestic chores such as cooking, cleaning, and childcare, as well as attending meetings at their children’s school. The 2 out of 10 men who raised this issue of alternate reproductive labor did so in reference to women’s childcare responsibilities, and only one mentioned his own labor collecting firewood for his household. One married woman described how domestic chores can interfere with her ability to participate in HIP, explaining, “the man [husband] will say, ‘you are not going to the meeting because the chores need to be done;’ he will say he is hungry.” Another woman talked about the challenge of caring for a young baby and her elderly mother, in addition to her five other children, without anyone to help—on the one hand, her mother can care for the kids while she works at the project site, but on the other hand, when her mother is sick, she is left to care for everyone in the family and must miss group activities.

Alternate productive labor also takes farmers away from participatory activities like meetings, trainings, and work days. Productive plots outside of the irrigation command area require farmers’ attention and farmers balance the trade-offs between their time investment in the project

plot versus their rainfed plots. As a 45-year old woman at Atari retorted: “Why go spend time when you risk both crops failing?” Unlike most of the responses, one female farmer had a more optimistic outlook regarding her ability to work on both plots: during dry season, she noted, there is no other work on her rice field, so participation in the irrigated vegetable plot is a worthwhile investment. She mentioned that she could use the income from vegetables to finance the inputs for her rice operation in the following season.

Wage work and other income-generating opportunities pull farmers away from project participation if they are deemed to be more lucrative than small-scale irrigated vegetables. One male farmer at Kabos, who has left the project to dedicate time to fishing and sorghum beer production, argued that it is harder in this way for men to participate than for women. Ignoring the fact that men tend to have more opportunities for income-generating work than the women at his site, he claimed that because women are expected to cook and provide food, they may fulfill their familial duties by growing vegetables on a small scale, whereas men have pressure to generate income and provide clothing, school fees, and other purchased goods. This farmer’s perception, echoed by another male farmer at Kyekkide, was that women’s proximity to the home, due to their labor expectations, gave them more access to the project in ways that men’s labor expectations do not. The specific duties – or norms – associated with women generally are further delineated by the breakdown of an assumed two-parent heterosexual household, where, for example, a single or widowed woman is required to fulfil the roles of both “mother and father,” as one farmer notes.

Spatial proximity to project research plots and water distribution systems was another factor influencing farmers ability to participate meaningfully in the group, and one that is closely related to land issues. Immediate proximity to a central meeting site makes it easier for a married woman and her land-owning husband at Atari, for example, to remain informed about participatory activities and meet visitors when they arrive. Location and land ownership make it convenient and beneficial to not only attend meetings, but to utilize the system when needed (although, the Atari woman also

mentioned her husband's tendency to go off drinking while she waters their plot). Some farmers, women and men who were ranked as 3 or below for participation level, expressed a feeling of injustice related to the issue of distance and location, complaining that the systems pipes do not fully reach their plot (at Kyekkide) or that those who were assigned central research plots benefit more (at Lwasso). Twenty-four percent of women and no men interviewed mentioned distance or location related to participation, and 38% of women and only 10% of men talked about land access or availability. These differences can be attributed to the gendered land tenure issues discussed previously, in which land is passed almost exclusively through patrilineal lines. The perceived inequity of land distribution within the project led some farmers to stop participating, while others have been motivated to overcome these challenges alongside the project team. This issue was addressed at Kyekkide, for example, where a centralized pipe system was completely redesigned to expand the irrigation command area, and at Aloet, where the women advocated to expand the area of shared land under rental agreement through collective finance. Despite the gender norms that deter single women from accessing land, this group of women was able to acquire this critical resource through collaborative means.

Group monetary contributions for irrigation, however, also pose a challenge to participation, when other priorities for daily food and school fees are more immediate. Namely, farmers in Kabos, Atari, and Kyekkide claimed that it is difficult to afford the cost of fuel required to operate the pumps there. The cost of renting oxen for land leveling, which is a critical land preparation activity for efficient and even use of water during irrigation at many sites, was also a deterrent for members. Access to loans or other forms of financial support may be particularly challenging for those without land or other assets, single women and widows.

Thirty-eight percent of women described barriers to participation related to sickness or physical strength. Women brought up physical limits to participation in a couple distinct ways, including temporary illness and general weakness. Despite a mid-level participation ranking from the

site coordinator, it was revealed that one 49-year old woman at Tente was in fact highly active in the group but had fallen sick for three months, during which time she was unable to participate. The nuances of family structure, gender, and age reappear here related to labor capacity, determining the context in which one falls sick and the availability of children or a spouse to help with labor activities or attend meetings on one's behalf. A 60-year old widow at Kabos detailed her struggle to participate in the labor of the irrigation group, saying that it was her weakness, but not age, that prevented her from full participation. This widow is part of a large family that can assist her with labor. Importantly, she took pride in her ability to “contribute ideas” to the group, essentially defining meaningful participation as providing thoughts and opinions rather than physically operating the pump and sprinkler system at Kabos. Her confidence in the ability to provide ideas to the group also challenges the view, which was expressed in some interviews, that older farmers and women have less mental capacity. It also encourages irrigation development practitioners to take seriously the varied ways in which different farmers choose to participate, their contributions to group cohesion and problem-solving, and the social value they gain from these engagements.

Outcomes of Participation

In addition to the issues that affect access to participation in the group, interviewees discussed the most meaningful outcomes that have come from their participation in irrigation project activities—including meetings, feedback sessions, trainings and demonstrations—and their experience using, maintaining, and making decisions about the irrigation system. I argue that these outcomes are embedded within and rely on a context of gendered social dynamics—interaction in meetings and trainings, for example—that echoes many of the intersectional gender issues discussed previously.

Several benefits and challenges, rewards and disappointments, were illuminated in various women's and men's responses regarding outcomes of participation. Forty percent of men and 43% of

women mentioned at least one drawback or disappointment of their participation, while 82% of men and 95% of women described at least one positive outcome of participation. Overall, farmers reported more positive than negative outcomes of their participation, but this is not surprising given one limitation of this study, which was that the majority of farmers interviewed had a relatively high participation rank. Most farmers who reported negative outcomes unsurprisingly included farmers with a low participation rank (3 or below), some of whom had left the project and stopped participating due to these drawbacks. That said, it is also possible that some farmers may use the space of an interview to express complaints strategically with the hope of gaining more resources from the project team, or similarly, to intentionally overpraise the project and under report dissatisfaction to maintain social relationships and resources.

The reasons that farmers joined HIP initially are varied, but similar for women and men across age, marital status and parental status. Farmers' initial desire to participate involved an expectation that their involvement in the project would result in new technologies, income, the ability to pay school fees (for those who have children), a chance to interact with and tour other communities practicing irrigation, training and new knowledge, "development" in the family, and additional assistance due to the advantage of group membership. Farmers acknowledge also that irrigation allows year-round production of vegetables, some of which have more optimal harvest schedules than their rainfed crop; one farmer mentions the advantage of growing *sukuma wiki* (a dark, leafy green) as compared to maize because with *sukuma* there is an opportunity for early and multiple harvests during one season. The expectations that farmers had going into the project begin to show which outcomes make participation meaningful to them.

Participation in group meetings is one of the most agreeably important elements of membership that farmers identified, stating that it is crucial to stay informed about project activities and decisions. Contrary to much of the development literature on gender and participation (i.e. Hippert, 2011 in Lesotho; Chancellor, 2000 in South Africa), all farmers, regardless of gender,

reported feeling free to speak up and provide their honest opinion during the meetings and feedback sessions, even when the project team members were present. This finding may point towards HIP's dedicated relationship-building and an emphasis on meaningful inclusion, in which farmers know that their ideas are welcomed and valued, or it may suggest that regardless of the project, the women at these specific sites are vocal in decision-making processes. Only two farmers admitted that sometimes they hear dissenting comments outside of the meeting space and speculated that fellow farmers may withhold ideas during a meeting, possibly due to "shyness." Given the intersectional gender norms described in previous sections, "shyness" may be interpreted here, in part, as the manifestation of a set of social relationships that makes it more difficult, or less socially acceptable, for some farmers (for example, those who may be considered less respectable) to be taken seriously in meeting spaces than other farmers. One woman noted also that she is not originally from the region where her site is located and has experienced language barriers in the meetings. Still, as a self-described married, respected, hardworking woman with kids, she has not been deterred from becoming the most active woman at Kyekkide.

The most valuable benefit from participation in HIP that farmers described was knowledge and training. HIP training activities are intentionally highly interactive and located on-site, where farmers can immediately test a new practice or technology. Project team members do their best to ensure that women and men are equally engaged in learning activities by encouraging a variety of farmers to, for example, join pipes together or learn how best to start a fuel pump. HIP trainings may also serve as an opportunity for farmers to provide opinions and feedback about various innovations, based on their first attempts to practice using them. The trainings, at their best, do not simply provide unidirectional information, but become a space of collaborative testing and learning. Demonstrations of simple sprinkler, pump, basin, canal and furrow systems, coupled with trainings on horticultural practices such as staking tomato, transplanting onion, mulching and crop spacing, were examples of the learning that farmers found to be the most valuable. A 38-year old married man at Atari

communicated a sense of pride in his self-proclaimed role as a teacher in his community, due to the experience he gained in irrigation as part of the project. “I am a winner. I am a teacher to teach others. After training, you must share that knowledge to others.” It is important that farmers were enthused about knowledge-sharing, given that ongoing training of water user associations has been determined a necessity for both the operational sustainability of irrigation systems and for community ownership (Yami, 2017).

Training, learning, and knowledge-sharing are important social aspects of irrigation, which, in the context of small-scale horticulture in eastern Uganda, unlike many other agricultural practices, usually requires several individuals to implement. Farmers must work together across differences to ensure complimentary planting and irrigation schedules. In this way, the social dimensions of knowledge-sharing processes become relevant, especially where intersectional gender norms may inform who participates in technical trainings and who does not. Farmers highlighted the social component of these participatory trainings and knowledge-sharing activities as an important aspect of their engagement in the group. Men and women considered interaction with others during the training as a meaningful part of participation. Several women conveyed that they learn from friends and that women and men together are part of that learning. One very highly active, 35-year-old woman at Kyekkide puts it this way: “We share brains in the group. You also make friends and the brain is more enlightened.” Notably, farmers at Aloet—a site where the irrigation group is composed of 88% women—did not mention the social interactions involved in their learning experience. The reason for this is unclear, but as a site with only two male members, Aloet illustrates that social cohesion does not automatically come with women’s inclusion. Further research is needed to illuminate more deeply these gendered dimensions of structures of knowledge-sharing and training within participatory irrigation processes.

While farmers found knowledge to be a meaningful outcome of their group involvement, the generation of income was not as commonly satisfying. Farmers clearly value income as an outcome

of participation, given the expectations they had in initially joining the irrigation project. However, the degree to which they felt that those expectations were met varied across gender. Four of the men were unsatisfied with the speed of measurable progress and complained that income from the irrigated vegetables produced on the project plots was not at the level expected. Women – married, single and widowed – more commonly than men discussed income as a benefit, saying that they can make money from vegetables even if it is a small amount. “Before, we would plant to eat. Now we can make money” described a woman at Kyekkide. Different women specify the uses of income, ranging from buying salt and sugar to paying school fees. The reported levels of satisfaction for women and men reasonably align with gendered labor roles within the family that cause married men to consider income meaningful only at a certain level, due to their perceived duty to provide for the household, while a lower income level is appreciated by women especially when it covers food. These various perceptions of the meaningfulness of income are also further complicated by intrahousehold dynamics that determine distinct expectations of women and men who are older, disabled or sick, or without children.

Women at several sites also valued the dietary diversity of irrigated vegetables and the availability of food due to irrigation during a recent drought. One woman at Aloet notes:

I wanted to benefit from more food and vegetables year-round and have income from off-season marketing. My expectations were met, because the drought came, and we had grown *ebo* – the *ebo* helped the group because we had food and income, while even some other farmers in the area were struggling. People from other areas came down and said they wanted to grow vegetables too because they saw the group benefiting in the drought.

The urgency of food security issues caused by farmers’ experiences of drought in eastern Uganda has motivated many to continue participating in HIP. Even a member who is no longer motivated to participate in the project due to issues she has with fellow members at her site, admits that she has seen an overall benefit of local irrigation, “because people know where to get onions and eggplant now in Kabos, so the community can purchase vegetables without having to go to Serere [the nearest

town center].” The ability for a community to produce locally is seen as meaningful, here, through the material outcome of available vegetables. However, as Whyte & Kyaddondo (2006) expand, the value of available vegetables in the community must also be viewed through the lens of how community food security has been understood in Uganda historically, through changing discourses of food and money, as “both a strategy and a concrete way of expressing a gendered social and symbolic order, a domestic ideal to which men and women (as well as politicians) generally subscribe” (Whyte & Kyaddondo, 2006). Drawing from ethnographic field work from 1969 to 2002 in the eastern district of Tororo, Whyte & Kyandoddo (2006) assert that for rural Ugandans, “producing and consuming one’s own food is also a moral act and a demonstration of social, cultural and technical capacity” (p. 173). Even as the “ideals of self-sufficiency” have become more difficult to achieve in the context of population growth, land use change, and climate change (Whyte & Kyandodoo, 2006), the meaning behind food production goes beyond strictly economic incentive. Though beyond the scope of this paper, it is also important to acknowledge that there are broader forces of globalization, agricultural trade policies, and private investments that have impacted the landscape and discourse of food security in Uganda, and East Africa more broadly.

The effect of small-scale participatory irrigation on community and familial relationships is a connection that often gets lost in the emphasis on economic outcomes of participation. Farmers emphasized this issue in a way that speaks to the power of social dynamics in what are usually otherwise considered technical projects. Even some of those who were ranked as less active commented on the notion that simply being in a group increases social interaction, cohesion and unity, and is seen as a sign of development. Farmers, male and female, respectively, remark:

Being in a group is good. It gives you courage. You may see that your neighbor is working and you say “ah! I need to clean my plot because my neighbor’s plot is clean” and you work hard because others are there working too.

When I started, I started not so interested in meetings. But now in the project, I interact more with people, including the savings group. There is more community engagement.

Widowed and single women also noted the value of community engagement, especially through interaction with visitors (i.e. project-affiliated or government staff) who have been attracted to their site. Not only the local relationship-building with staff and members of their group, but also the exposure to other farmer groups, is a meaningful element of their participation.

The broad outcomes of participation in HIP that farmers articulated as meaningful included knowledge, income, food security, social interaction and community relationships. The gender and social dynamics involved in each of these outcomes—who speaks up in meetings, how knowledge becomes shared in trainings, which labor norms inform the value of income-generation, how community engagement is considered—are integral aspects of participatory irrigation development. Many of the intersectional gender issues discussed in previous sections have subtly reappeared in this exploration of participation outcomes. For example, issues of respectability are implied in questions about who vocally participates in the group and gendered labor expectations motivate specific uses of income. Additionally, while most farmers shared reasons for initially joining the group, motivations such as “school fees” and “development in the family” indicate that marital status, parental status, and general family structure are directly related to how farmers evaluate the outcomes of their participation.

The Intersectional Gender Dynamics of Participation in Participatory, Small-scale Irrigation

Gender norms—which have been expressed in this paper through perceptions of respectability and responsibility, expectations about labor capacity and roles, experiences of ownership and autonomy, and understandings of vulnerability—operate as significant and nuanced influences on how farmers choose or are able to participate in irrigation groups, and their perceived outcomes of that participation. This occurs in many ways, illustrated by the experiences and perceptions of different farmers involved in the participatory activities of the Horticulture Irrigation Project. Farmer experiences participating in HIP are not neatly divided into a binary of “men’s

experiences” and “women’s experiences.” This is illustrated in the complex ways that the social institutions of marriage, family, land tenure, and labor factor in to participatory processes, access to resources, and outcomes from participation like community engagement and knowledge.

Notions of respectability and responsibility, tied to an individual’s gender, marital status, parental status and family structure, have implications for decision-making processes in terms of which voices are taken seriously in meetings. Additionally, those who are respected and considered responsible may likely be effective in leadership positions or involved in rule-making and enforcement—governance processes that are critical for water resource management. When being part of a group is seen as a sign of “development,” participation provides a way for different individuals not only to pursue food and income-generating endeavors (ostensibly causing others to view them as responsible), but also to gain respect as someone who is contributing to the community as a whole. For single women and widows who are either scorned or pitied due to dominant ideals of family, this has uniquely positive social benefits.

Gendered perceptions about labor capacity and roles determines who participates in certain activities such as “heavy labor” and machine maintenance. Additionally, the concept of “heavy labor” is a gendered social construction, and as such, the line between water labor that is deemed to be only for women (washing, cleaning, cooking) and water labor that is considered appropriate for men (irrigation) is thin but sturdy. This leads to concerns about the “double burden” for women who struggle with dedicating time to participatory irrigation activities without being relieved of household chores. However, for some single women, widows, older women, and younger boys, the gendered norms around labor are more pliable. Gendered labor norms also factor into farmers evaluation of the outcomes of participation—in particular, the outcome of income and food—given the expectations of married, young, able-bodied men to provide purchased goods and the expectation of most able-bodied women to provide food for household consumption.

Conceptualizations of vulnerability figure into the lives of single women and widows, especially, where assumptions of weakness and defenselessness have material consequences. Women without male children or able-bodied male partners can be taken advantage of, especially in times of resource scarcity, and therefore lose some of the potential benefits they otherwise may have derived from irrigation due to crop damage, loss of land access, and gender-based violence. These effects have not been presented in this study as grounds to essentialize the physical capacity of “women” to defend themselves, but rather an opportunity to explore how intersections of gender, marital status, and land tenure policies serve to facilitate these exploitative realities.

Lastly, feelings of ownership and autonomy arise in relation to the value of knowledge and training, as well as social dynamics in group meetings. Women and men identified that knowledge about growing vegetables and using innovative irrigation technologies was a meaningful outcome of participation that increased confidence and independence. Additionally, all of the women reported being free to provide opinions to the group, although there were problems of male domination in meetings and activities at some sites. Women at Tente attributed the existence of male domination in the project to norms that have carried over from within the household. This tension may be due to a similar phenomenon that Sultana (2009) finds: although women “expressed interest in voicing their opinions and having more decision-making capacities, the majority were not willing to challenge the norms and authorities of their husbands, fathers, brothers or elders” (358). The degree to which women negotiate and resist power dynamics within their households was not a focus of this study but is a significant issue to consider.

Many of the issues I have outlined here are reflected by Theis et al. (2016), in a report of the topics discussed during a series of workshops with 150 government, nongovernment, and research stakeholders who are working on promoting gender equality in irrigation in Tanzania, Ghana and Ethiopia. The authors describe that local gender norms – such as expectations of women to attain lower education levels or learn more slowly than men, acceptability of women speaking up in front

of men, respectability of unmarried women, and socially-constructed assumptions about women's physical ability – came up as the cause of many constraints to women's access to irrigation, in the countries where they work.

Limitations

This study is a qualitative, exploratory case study, and therefore does not allow for broadly generalizable conclusions about the impact of gender norms on participation in development. Due to time constraints, I have omitted a potentially beneficial comparison between HIP farmers and farmers completely unaffiliated with the project. No clear conclusion can therefore be made about whether the gender differences noted above—ease and challenge of access, benefits and disappointments of participation—are unique to HIP, specifically. Another potential line of inquiry beyond the scope of this work is the spatial and temporal components of participation; an explicit comparison between sites with distinct geographic and watershed features could be investigated with respect to gender, in order to understand how the gender dynamics described may vary due to water source type, how downstream users are affected, and more specifically how the distance to water sources impacts various farmers. This research focuses narrowly on one growing season, rather than exploring how gendered participation may change over time, from season to season, and whether women and men's engagement with the project becomes more or less meaningful to them over several years. Also, further research could also account for the role of ethnicity, religion, and other aspects of farmers' social life that may influence and be influenced by participatory processes—cultural distinctions related to the ethnic and linguistic diversity in each HIP project site location were an element of intersectionality that I was not able to fully explore in this research.

I have framed the enabling and disabling factors that influence different farmers' participation in this project primarily in terms of what women are able to do rather than what they choose to do. Although briefly observed in the discussion of alternate labor responsibilities and in the

example of women in Aloet who advocated for additional land, the concept of women's agency is a feminist principle that has been left uninterrogated in this study. A more specific focus on choice, or comparison with non-HIP groups, may have revealed that it is undesirable for certain women and men to participate in group irrigation activities, even if participation access and outcomes were completely equitable. For example, non-participation, as a rational strategy and calculated intention, has been presented by Meinzen-Dick & Zwarteveen (1998) and Sultana (2009), who explain that some farmers in South Asia may find that drawbacks of becoming members of water user associations outweigh the benefits for them, and they choose not to participate. These authors have also noted that non-formal participation occurs in many projects, where farmers are not registered group members, but have influence on processes, social dynamics, and outcomes. This could be true of HIP farmers' family members and surrounding community members, such as landlords.

Current gendered social inequities that exist within irrigated agriculture motivate and necessitate gender equitable participatory approaches to irrigation development. The issues described in this study echo many of the gender-based challenges of unequal access to irrigable land, finance to purchase equipment for water conveyance and application, labor requirements, access to markets for irrigated crops, and time burdens found by Theis et al. (2016), but my research also suggests that these issues fall differently on various, diverse farmers. For this reason, the intersectional reality of these differences should urge participatory development practitioners and researchers to think much further than women's inclusion.

Conclusion

This study has used in-depth, semi-structured farmer interviews to understand prevalent local gender norms with respect to small-scale, participatory irrigation, and to explore aspects of gendered access and meaningful outcomes of participation for different farmers in the context of irrigated horticulture in eastern Uganda. The Horticulture Irrigation Project (HIP) is the focus of this inquiry

because it is an example of an irrigation project that enacts collaborative, farmer-driven values in its work and is dedicated to tailoring practical approaches to gender equity and participation.

Moving beyond a simple understanding of participation as solely about women's inclusion, I have explored the following question: how do local gender norms and dynamics influence meaningful participation in small-scale, participatory irrigation development in eastern Uganda? The aim has been to outline the complexities of the gendered constraints, opportunities, and outcomes of farmer engagement in an existing irrigation project with explicitly participatory aims. Four primary themes related to gender surfaced in this work: respectability and responsibility, labor capacity and roles, vulnerability, and autonomy and ownership. The gender norms expressed through these themes, which are directly related to social-historical institutions such as marriage and land tenure, operate as significant but nuanced influences on how different farmers choose or are able to participate in irrigation groups, and their perceived outcomes of that participation. These questions are particularly salient within irrigation work, where deeply social issues of governance, decision-making, and land use arise.

I argue that the gender norms identified in this research influence the modes through which different farmers in HIP participate in their irrigation groups and how they perceive outcomes of that participation. Using the concept of intersectionality, I have framed gender in irrigation development (and more broadly) as encompassing more than a singular narrative of "women," and reflecting dynamics associated with age, marital status, parental status, socio-economic status, and other social differentiations. Intersectional analysis has allowed me to present gender as deeply entangled in relationships of power, which are mediated through culturally-specific ideas of respect, labor, vulnerability and ownership.

This work has implications for practitioners who aim to make processes of participatory irrigation development more equitable, accessible, and ultimately farmer-led. By viewing gender equity work not only as a process of building women's inclusion and short-term access to resources

and by thinking more critically about the intersectional norms, institutions, and policies that create the conditions in which certain farmers are unable to participate or benefit, practitioners may discover new ways to support farmer-led innovations within irrigation and water management that meet the needs of the specific farmers involved within their specific contexts. Exploratory and collaboratively designed governance structures, leadership roles, meeting facilitation processes, and knowledge-sharing activities are some possibilities for this, each of which HIP has experimented with to some extent.

It is also crucial for practitioners to make connections between participatory processes and their role in social dynamics and social change. While development must be careful not to exacerbate existing, inequitable power dynamics, gender equity-focused participatory processes offer the potential for positive change in terms of gender and social equity more broadly. Supporting this notion, Upadhyay (2005) shows that, in the context of Nepal, not only is women's access to and control over resources improved as gender is addressed in technology adoption processes, but also that this is linked to a positive transformation of potentially harmful "traditional and rigid gender biases" (p. 10). When gender equity is considered and addressed as an integral and intersectional part of development, as both relevant for material resource acquisition but also as deeply tied to broader social change within communities, there is greater potential for a variety of farmers to harness the means of participatory development processes for their own ends.

Working to both engage feminist critiques of development while still elevating the practical needs of farmers, this study has presented farmer narratives of participation in an intersectional way and provided a diverse understanding of the meaningful outcomes of participation. Irrigation is a particularly important site within agricultural development for gender analyses such as this due to its unique reliance on shared natural resources, and in turn, functional and equitable governance. This work also adds to feminist development literature which refuses the characterization of a homogenous "Third World Woman" (Mohanty, 1988) and other unidimensional portrayals of women

(and men) in previously “colonized or semi-peripheral areas of the world” (Sinha, 2004), while simultaneously refusing to diminish the reality and power of gendered differences on farmers’ lived experiences. This work on gender and meaningful participation in Uganda can therefore inform ways to employ irrigation development as a process of transformative social change and gender equity while simultaneously working towards the specific goals of climate adaptation, sufficient and equitable resource distribution, and community-driven food security.

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Appendix A. Description of Horticulture Irrigation Project sites, by location.

SITE: KYEKIDDE

Mafubira SC, Jinja Dis.



Water: Permanent Stream
Power: 2" Petrol Pump
Conveyance: PVC & HDPE Pipe
Distribution: Drag Hose, Impact Sprinklers, and Furrows



SITE: LWASSO

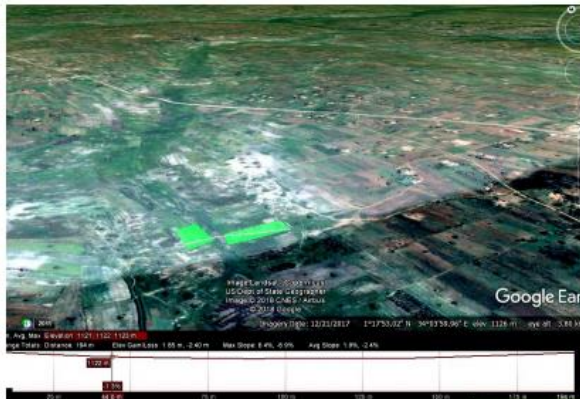
Lwasso SC, Mbale Dis.



Water: Permanent Stream
Power: ~50m Elevated Head Tank
Conveyance: PVC & HDPE Pipe
Distribution: Drag Hose, Impact Sprinklers

SITE: ALOET

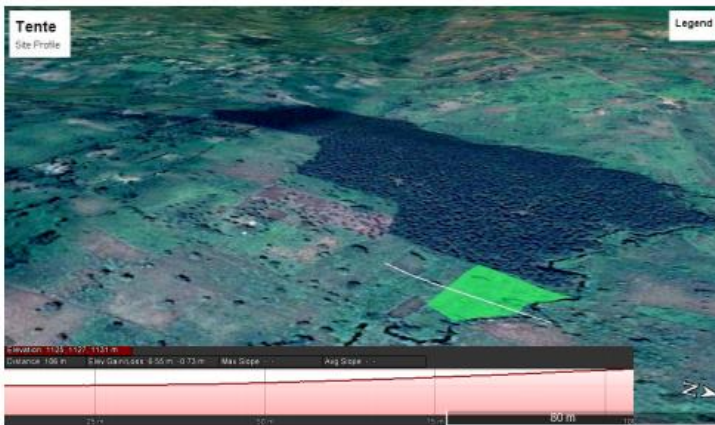
Bukedea SC, Bukedea Dis.



Water: Protected Spring
Power: ~3m elevation
Conveyance: Open Channel Flow,
 Raised Main Canal
Distribution: Furrows

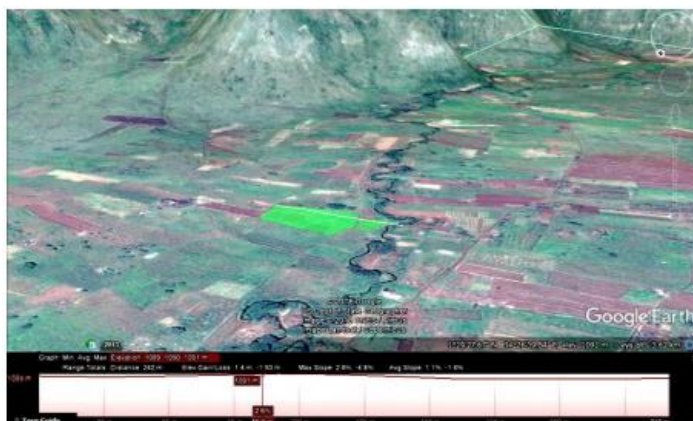
SITE: TENTE

Bulumbi SC, BusiaDis.



Water: Semi-Seasonal Stream
Power: Water Powered Spiral Pump
Conveyance: PVC pipe
Distribution: Movable Tank with
 Watering Cans





SITE: ATARI

Ngenge SC, Kween Dis.

Water: Atari River

Power: 3" Petrol Pump

Conveyance: PVC pipe & Layflat Pipe

Distribution: Furrows



SITE: KABOS

Bugondo SC, Serere Dis.



Water: Lake Kyoga

Power: 2" Petrol Pump

Conveyance: PVC & HDPE pipe, Wire-Reinforced Flexible PVC Pipe

Distribution: Raingun, Furrows, Basins

Appendix A Table. Description of climatic and landscape characteristics of first 5 irrigation innovation sites. Source: HIP project report, 2016.

Site Name (Subcounty , District)	Landscape Position (meters above sea level)	Soil Type	Average annual precipitation (mm)	Average min/max temperature (degrees C)	Average # months with <50mm rainfall	Average # months with >100mm rainfall
Aloet (Bukedea SC, Bukedea)	Valley fringe (1110)	Sandy loam to sand	1250	16/31.5	3	7
Atari (Ngenge SC, Kween)	Mid-Slope in plain (1090)	Alluvial clay loam	1186	16/31.5	3	7
Kabos (Bugondo SC, Serere)	Lake Shore (1040)	Clay loam	1480	18/33.5	3	5
Kyekkide (Mafubira SC, Jinja)	Valley bottom (1160)	Vertic / cracking clay	1317	15/29	0	7
Lwasso (Lwasso SC, Mbale)	Valley fringe to bottom (1515)	Clay loam to clay	1480	14/29	0	9

Appendix B. Interview Guide (26 Oct 2017) Horticulture Irrigation Project (HIP), Uganda

Semi-structured interviews with farmers at 6 locations in eastern Uganda. Participants are informed of the purpose of the interview and that their responses are anonymous. Estimated time per interview = 40-60 minutes. General guide to follow is below.

Objective 1: To document common gender norms in eastern Uganda that may constrain or encourage any level of participation in small-scale irrigation activities.

- Specific issues to explore: How marriage status, children, and labor/responsibilities are perceived and experienced differently by different women and men.

Objective 2: To identify farmers' experiences with and perceptions of meaningful participation in small-scale irrigation development at the six HIP sites in eastern Uganda, with a focus on gender differences.

- Specific issues to explore: importance of group membership and attendance, perceptions of participatory activities and their usefulness; perceived/experienced gender differences in the participatory process of irrigation planning, information-sharing, use and maintenance.

Gender norms & Activities Questions (Objective 1):

- 1) **Demographic:** Record name, site location, gender, age of respondent, role in the group.
- 2) Tell me about your **family**.
 - a) Are you married, single, divorced, widowed?
 - b) Do you have children? If so, how many? Girls or boys? How old are they? Are they in school? How many live at home? Are there any people that stay with you at your place?
 - c) Do you care for any other family members?
- 3) **Labor:** What crops do you grow? Describe the different plots (Individual/shared? Renting/own?)
 - a) Who else is involved in growing crops on those plots? Who helps you? Children, a spouse, community or outside labor? How much do they help? Why?
 - b) What kind of work do you do on the farm? What does your [spouse] do? Your children? Outside labor? *Follow up:* Why do you do X and your [spouse] does Y? (OR) Do (men/women/boys/girls) do different kinds of work on your farm? Why or why not?
- 4) **Water:** In general, how do your different crops get water? *If irrigated:* How often? By whom? Why is it that person's responsibility? Who does it when that person can't? *If not:* Why not irrigating?
 - a) *If irrigating joint plot:* Who decides when to irrigate and how much water to use? What happens if you disagree about when to irrigate, or how much water to use?
 - b) In addition to farm work, who does the cooking, cleaning the house, washing clothes for your household? Where do you get the water for this other household work? Who collects the water? Why?
- 5) How do you think [**marital status**] affects how you are seen in your village/area?
 - a) What do you think of women who are not married? What about men? How is it different for younger vs older women? Younger vs older men?
 - b) What about women who are widowed? Men? How is it different for younger vs older women? Younger vs older men?
 - c) What about women who are divorced? Men? How is it different for younger vs older women? Younger vs older men?
- 6) How do you think [*having or not having*] **children** affects how you are seen in your village/area? How would it be different if you had more kids? Fewer kids?
 - a) What do you think of women who do not have children? What about men?
 - b) What do you hope for your children in the future?

Participation & Group Membership Questions (Objective 2):

- 1) Tell me what you know about how this irrigation project [*or group*] started in [*site*], from when it first began up until now. (*If non-member, skip*).
- 2) Why did you first join the group?
 - a) What motivates you to be part of this group? What do you think motivates other people?
 - b) How has your family supported or not supported you in being part of the group?
 - c) What were the expectations that you had about the group or what it would be like for you to be part of the group?
 - d) Were these expectations met? How or how not?
 - e) Is there anything that makes it difficult for you to participate in this group? How?
- 3) Can you give me an example of a group activity or event in the past that was meaningful to you? What about it was meaningful? Have you ever felt that participating in the group was not worth your time?
- 4) Tell me about how it has been for you using [*the irrigation system*] in this area. (Have you used the system? How often / which seasons? What is your preferred method?)
 - a) How would your experience with using irrigation be different if you were not a member of this group?
- 5) In [*site*], when a decision needs to be made about how or when to use water from [*the shared source/system*] or what crops to grow using the [*irrigation system here*], who usually makes those decisions? Why? What is your part in those decisions? Are you satisfied with your part of the decision-making process?
- 6) How important is it to you to attend group meetings? Why?
 - a) When there are meetings, how comfortable do you feel giving your opinion to the group? Why? Do you think other members feel comfortable speaking up honestly in the meetings? Why or why not?
 - b) Imagine a situation where people in the group disagrees about something - what happens in that situation? What do you do in that situation?
 - c) The HIP project has established that the committee members and all of the meetings should include at least half women. In what ways does that requirement influence your participation in the group? Is it meaningful to you personally if there are at least half women present in a group meeting about irrigation? Why?
- 7) Can you tell me one way that the training and demonstrations about the [*irrigation system here*] have been useful to you? How would you want them adjusted to be more useful?
 - a) How do you think the training are benefitting the women of this group? The men?
 - b) Where else do you get information on irrigation or other agricultural practices? What information or training do you wish you had, but do not currently?
- 8) When the [*irrigation equipment here*] needs to be maintained, repaired or replaced, who is responsible for that? Why does this person maintain the [*equipment / channel*]?
 - a) *If machine*: Do you feel comfortable repairing [*equipment*]? Why?
 - b) Can the other [*men/women*] repair [*the equipment*]? What about the [*women/men*]?
- 9) Do you think your overall experience participating in planning or improving irrigation is shared by other [*men/women*]? How [OR] Why not? How do you think your overall experience with irrigation is different from [*men's/women's*]?

Is there anything else you'd like to add about men's or women's participation in irrigation development in [*site*]? Or any questions that you have for me? Thank you for your time answering these questions.

Appendix C: Qualitative Interview Coding Structure

Descriptor Fields:

Interview I.D.	Gender	No. of Male Children
Site	Age	Caretaker status
Date (D/M/Y)	No. of Children	Marital status
User/Non	No. of Female Children	Member status

ROUND 1: Participation

Access: These codes refer to enabling factors or barriers to participation, what makes it easy or desirable to be part of the group, and what makes it hard or undesirable to be part of the group. Being "part" of the groups can include documented membership or attendance, engagement in training, knowledge-building, problem-solving, contribution of labor, and decision-making, as well as actual use and maintenance of the irrigation system.

Sub-codes:

- Alternate Reproductive Labor
- Availability/Access to Land
- Distance/Location of Plots
- Alternate Reproductive Labor
- Finance
- Sickness/physical restriction

Outcomes: This set of codes refers to outcomes (both material and intangible) of participation, and important reasons why farmers do or do not find the group useful/beneficial to them.

Benefits of participation -

- Knowledge/training
- Income
- Food/food security
- Community relationships: includes friendship, social interaction, prestige, trust associated with group membership
- Exposure: interaction with other farmers, groups, agencies, government
- Labor Saving

Drawbacks/disappointments of participation -

- Expectations not met
- Opportunity Cost: time spent on the project activities rather than elsewhere
- Governance & equity: poor governance or perceived exclusion and inequitable resources distribution

ROUND 2: Themes of gendered social difference

- Labor & Capacity
 - A sense of gendered duty / role fulfillment
 - Perceptions of different, gendered capabilities (intelligence, physical ability, age)
- Respectability & responsibility
 - Economic prosperity - land ownership, wealth, able to afford school fees, enough labor via kids or hired workers.
 - The "good" family - married, children, a house perceived to be in order
 - "Character" - an individual's responsibility/respectability beyond their situation

- Ownership & autonomy
 - ability to move freely and participate without permission, use/operate systems, make decisions about the group or project, or to be self-sufficient
- Vulnerability
 - due to perceived lack of protection and/or domestic violence
 - resulting in theft of property, physical violence, fear of violence, damage to crops/livelihood, etc.