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Gendered Property Rights in Farmer-Led Irrigation Development in Nyando Sub-County, Kenya: Myth or Reality?

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Abstract:

Gendered Property Rights are considered the decision-making powers of women over the disposition of a resource. This entails the access and control of the resource, and in this study, we use Farmer-led Irrigation Development (FLID) as the arena in which we determine whether decision-making has changed for women. FLID is an emerging form of irrigation that places the individual as the focal person in decision-making and therefore provides a rich environment for testing the true nature of Gendered Property Rights. The status of women in irrigated agriculture has received extensive coverage in current studies, with the studies showing men as having control over key resources and, therefore, having decision-making power over the same. How resources are used, what crops are planted, how the income generated is prioritized as well, and how labour is divided in the household are decisions made by men. However, gaps still exist in FLID, and this paper set out to explore how FLID has influenced Gendered Property Rights; the focus is on who has control over resources and whether there has been a shift in the everyday narrative of control being male-dominated. We use identified indicators to monitor outcomes in two different aspects: control over key resources (household assets, livestock, farming tools, and irrigation equipment) and decision-making about key issues (land, household, income generation, and water management). The study uses snowball sampling to identify 385 FLID irrigators in Nyando Sub County, Kenya, and twelve participants in 4 gender-differentiated FGDs from Ahero and Kabonyo/Kanyagwal wards. Results demonstrate that there has been a shift in the control over key resources, with the narrative moving towards joint control. Further, the study shows that joint control in key resources directly translates to joint control in decision-making and greatly increases the benefits accrued from irrigation practices. However, this gap is narrowing at a very slow pace and requires a shift in mindset as well.

Keywords: Gendered property rights, farmer-led irrigation development, decision-making, control, assets

1. Introduction

Property rights have been well documented over time, and the conversation centres on gender equality, which determines who ends up with property rights (Rabenhorst, 2011; O'Sullivan, 2017). This has been driven by access and control, with whoever holds these rights having the bargaining power and hence making all the decisions. Decision-making in irrigated agriculture in rural areas has been the domain of men, with women not owning or having access to resources (Prasad & Kumar, 2015). This has been a challenge with women lagging in terms of decision-making despite the multiplicity of their roles in the household and their large contribution to labour in irrigated agriculture. Lal & Ashok (2011), in their studies, carried out in India, argue that rural women are the major contributors to irrigated agriculture and take a multidimensional role in combining agricultural, domestic, and economic activities in a bid to improve their livelihoods and those of their families. These views have been reflected in Ethiopia (Sakketa, 2018) and Tanzania, where 75% of women are more active than men in agriculture and provide the bulk of unpaid labour with little or no participation in decision-making (Burney & Naylor, 2012). Predominantly, traditional thinking in irrigated agriculture has put women at a disadvantage, with the focus being on men as the household heads, owners of land, and the major decision-makers. In most rural areas, women neither own nor have access to these resources and form a majority of the labour force. Productive resources are governed by property rights, which are governed by the laws in place, which in turn will determine decisions on how irrigation will be carried out. In rural societies, this has been the domain of men, with them owning property and assumptions being made that women will benefit through their husbands or male relations as dictated by draconian and outdated laws governing inheritance and succession. Decision-making is predominantly in the hands of men, yet the role of women in irrigation cannot be overlooked (Kopweh, 2016; Shubhangini, 2016). The focus in developing countries has been on increasing irrigable areas and productivity and not on the extent to which gender relations will either hinder or leverage production. We have seen women's contributions to irrigated agriculture being

noted by several authors; we have also seen how they have been left out of decision-making. We, however, ask ourselves the question of whether, given the changing times and emerging forms of irrigation, things have remained the same. With this in mind, we use Gendered Property Rights as a lens through which we study Farmer Led Irrigation Development (FLID) and ask ourselves the question, "Myth or Reality?"

Given the knowledge gap, this paper asks the question, "Is the narrative of women's control over resources and decision-making different in Nyando Sub County?" As has been indicated, earlier studies suggest quite rightly that in the study of gender equality, efforts need to be channelled to areas that have not been exhaustively explored. In this regard, we investigate this question by addressing the issue of Gendered Property Rights and how this has been influenced by FLID. FLID has been defined as "a process where farmers assume a driving role in improving their water use for agriculture by bringing about changes in knowledge production, technology use, investment patterns, market linkages, and the governance of land and water" (African Union, 2020). Within this arena, the farmer operates at an individual level, which allows for flexibility in the control over irrigation. This means that the farmer makes decisions on how to carry out their irrigation practice, which will be determined by the farmer's capability and the availability of resources such as land, capital, and technology. This paper aims to contribute to the debate on Gendered Property Rights and decision-making in FLID by presenting evidence collected from two wards in Nyando Sub County, Kenya, using a qualitative and quantitative dataset.

2. Summary of Literature Review

Gendered Property Rights is a term that has been coined from aspects of gender and property rights. According to Tripathy (2010), gendered is defined as "the collective beliefs society has about behaviour relating to a specific gender that may result in stereotypes". Gender equality, on the other hand, is viewed in terms of the rights of women to participate in property use and ownership with full legal and societal protection. Property rights are a product of gender equality, which ultimately determines who ends up with the rights (Rabenhorst, 2011; O'Sullivan, 2017). This study borrows from various scholars and defines Gendered Property Rights as decision-making powers by women over the disposition of a resource and constitutes a bundle of rights that include access or use rights and control or decision-making rights (Bromley, 1992; Schlager & Ostrom, 1992). Access rights include the right to access the resource, withdraw from a resource, or exploit a resource, while control or decision-making rights include the rights of management, exclusion, alienation, and transfer rights. Grouped, these were viewed as the 'super set' of rights, which ideally denotes ownership of the resource (Schlager & Ostrom 1992, Rao S 2016). In this study, we focus on Control because this is the determinant of who has the bargaining power over the resource and is, therefore, able to make pertinent decisions such as the sale of land or the utilization of income. To gain insight into the gendered dimensions of property rights, we first look at what has been done by various scholars on the control of property rights.

Gender in agriculture has been discussed extensively, with the common consensus being that women lack control over resources, including land, capital, agricultural inputs and technology (Fletschner & Kenney, 2014). This narrative has been driven by draconian patriarchal laws, which hold assumptions that men have a right to control and ownership while women are essentially meant to follow their husbands or male relations. Shubhangini (2016), in her studies carried out in India, notes that women do the majority of the work while ownership of land, control of women's labour and decision-making are done by the men. Previous findings in SSA have also shown men selling crops grown by women and confiscating the income in a show of power (French Gates, 2014). This narrative has been shared in various studies that show women operating from a position of a lack of decision-making power. This position has been perpetrated by belief systems embedded in cultures that mainly support patriarchal systems. This has put women at a disadvantage while putting all key decision-making in the hands of men ((Kopweh, 2016; Sugden & Nepal, 2016).

In recent times, however, there have been reforms in laws that govern succession and inheritance, as well as affirmative action. This has caused a change in this narrative, with countries taking up the gender agenda. Countries like Kenya have, in their constitution, made it a law that gender be mainstreamed in all sectors, an initiative that has been taken up albeit slowly (Kenya, 2010). However, despite several steps made globally to address gender inequality, gaps in women's control over resources have closed very little in the past decade. In irrigated agriculture, whoever controls resources holds the bargaining power and makes all decisions in terms of what to plant, when to plant, and what resources to commit to irrigated agriculture. However, in the past decade, irrigators have moved away from mainstream irrigation and are now engaging in forms such as FLID. This has an individual nature and allows for flexibility in control and decision-making. In this form, irrigation is driven by the availability of resources, which provides the opportunity for irrigators to plant crops at their convenience. Decisions such as what to plant, when to plant and where to plant are determined by the irrigators' ability to provide seeds and inputs, purchase/hire/use their own land, purchase or hire irrigation equipment, provide labour as well as clear the river or source of water (Mati, 2023; Woodhouse et al., 2017).

In Nyando Sub County, mainstream irrigation has been practised since the establishment of the first scheme in 1969 at Ahero. This experienced many problems, including poor management and low production, that led to farmers seeking alternative forms of irrigation that favoured them. Additionally, Kenya, in its development agenda, has proposed the expansion of irrigation development that cannot be met by the existing schemes. Irrigation potential in Kenya has been underestimated, with only 16% of potential irrigable areas being developed. This provides a great impetus towards alternative forms to meet the needs (Irrigation, 2017; MWSandI, 2020). FLID's nature makes it a favourable choice for women because here, the irrigator's initiative informs whatever decisions will be made concerning irrigation. FLID thus presents us with a relatively new field in which we do not know how control prevails. Having identified this knowledge gap, we look at the extent to which women can make decisions about management, exclusion, and alienation of resources.

The study tracked changes regarding two specific outcomes, i.e. control over key resources and decision-making over key issues. The key resources identified were household assets, livestock, and land, which were chosen based on (Ncube et al., 2014), who determined that Sub-Saharan Africa's productive assets include land, credit, and livestock. They consider their equitable access as the region's path out of poverty and further point out the need to understand gendered differences in asset control. The key issues identified were household decision-making, income generation and division of labour, and water management. Through this, we study intends to add to the body of knowledge on the influence of FLID on Gendered Property Rights in Nyando Sub County.

3. Methodology

3.1. Study Area

The study was carried out in Nyando Sub County (Fig 1) in Kisumu County, which falls within the Lake Victoria lowlands and floodplains region. The sub-county lies between latitude 00 00' (the equator) and 00 25' South and between longitude 340 45' East and 350 21' East. It is surrounded by Lake Victoria and steep hills and borders Nandi South in Nandi County to the north, Rachuonyo sub-county to the south, Kisumu East sub-county to the west, and Kericho sub-county to the east (Government. of Kenya, 2010). Nyando Sub County has a small shoreline to the southwest that touches Lake Victoria. The sub-county covers an area of 1,168 km², including 71km² of the lake water surface. A vast lowland flat area, geographically referred to as Kano plains, stretches in the middle of the sub-county while hilly terrains stretch in the northeast and the south. Kano Plains, which lies in a depression, is part of a large lowland area that forms the floodplain of the Nyando River. It borders the Winam Gulf, a protruding part of Lake Victoria, at the end of which is Kisumu Town. The Kano Plains comprises predominantly black cotton clay soils with moderate fertility and poor drainage. The soil has good physical properties; however, crops may be adversely affected by impeded drainage during wet periods. This soil is largely used for growing sugarcane and other subsistence crops such as maize. Nyando Sub County has Nyando and Sondu Miriu Rivers and a shoreline of 11 kilometres long. Rainfall seasons have, in the past, been classified as bimodal, with the long rains falling between March to May and the short rains falling from September to December. However, with climate change, rainfall patterns have become unpredictable, with the onset of the rainy season coming early and frequent and longer dry spells (Mutua, 2012; Olang et al., 2012).

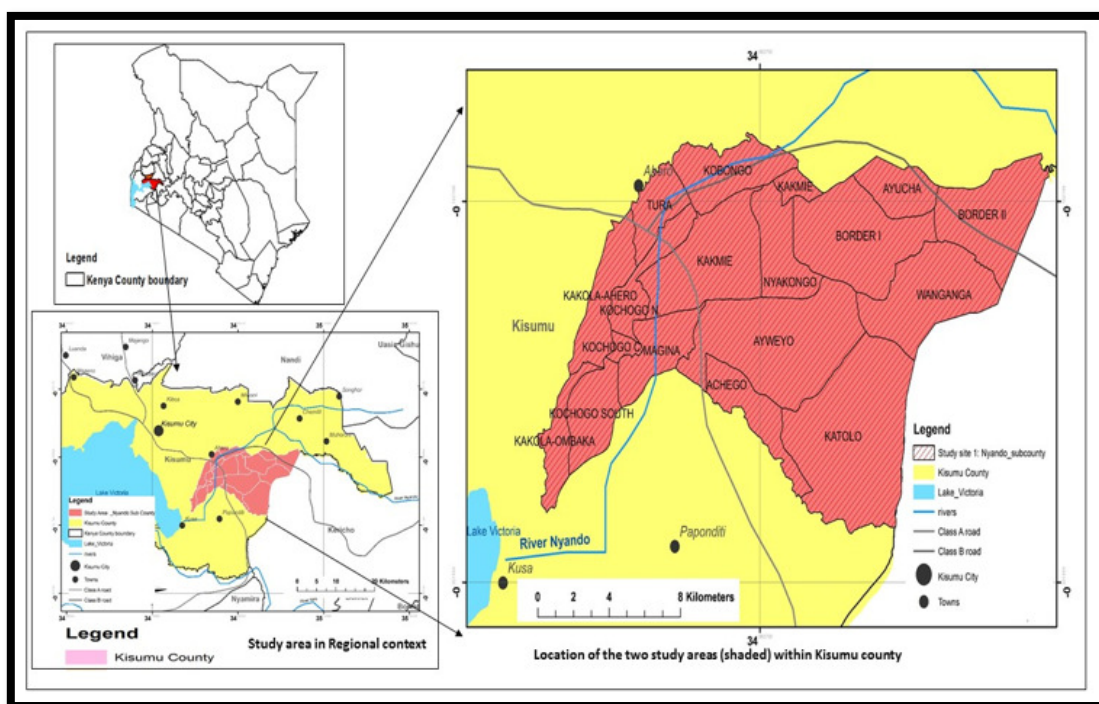


Figure 1: Map of Study Area

Source: Maseno University School of Planning and Architecture

3.2. Study Design

The study adopted a cross-sectional research design, which allowed data to be collected in multiple cases at once. The design is useful in the analysis of the current situation and allows the use of various data collection techniques for triangulation purposes (Bryman, 2016). Factoring in the need for an in-depth understanding of FLID, a mixed approach of both qualitative and quantitative methods was deemed appropriate. The study was carried out in Nyando Sub County, which is found in the lower catchment of the Nyando River basin. The area was selected because of the presence of a number of irrigation schemes and the shift of irrigators to FLID and alternative crops citing the poor performance of the schemes and low incomes from the traditionally planted rice. Two wards were selected, i.e. Ahero and Kabonyo/Kanyagwal, because of their proximity to water sources, the presence of irrigation schemes, and irrigation

practised in the area.

Two Focus Group Discussions (FGDs) were held in each of the selected wards to provide information on the gendered aspects of irrigation in FLID and to provide an in-depth understanding of decision-making in the study area. Community leadership, particularly the village elders, were used to identify irrigators to participate in the FGDs. An exclusion (farm in an irrigation scheme/out growers) and inclusion (farmers who carry out individualized irrigation on farms they own, rent or through any other arrangements) criteria were employed. The unit of analysis was the FLID farmer household. FLID is a relatively new form of irrigation, and there exists no known register of farmers involved in this form of irrigation. As a result, W.G. Cochran (1977) formula for determining the sample size for an unknown population was used to give a sample of 385. The study area was divided into grids, and a sample size of 385 was distributed within the study area. Snowball sampling was used to select households that participated in the study, with the initial participants selected from each grid.

3.3. Study Population

The study population was drawn from the two wards in Nyando Sub County, namely Ahero and Kabonyo/Kanyagwal. Since the population is unknown, the study applied the formula by (William Gemmill Cochran, 1977) to determine the sample as shown below:

$$n_0 = \frac{z^2 pq}{e^2} = \frac{(1.96)(.5)(.5)}{(.05)^2} = 385$$

Where:

n_0 =sample size;

Z= the abscissa of the normal curve;

e= desired level of precision;

p=estimated attribute that is present in the population;

q=1-p. (Assume p=.5, i.e. maximum variability, 95% confidence level and $\pm 5\%$ precision).

The sample size of 385 was distributed in the study area, as shown in table 1 below.

	Kabonyo Kanyagwal Ward	Number of Respondents	Ahero Ward	Number of Respondents
	Sub-Location		Sub-Location	
1	Kabonyo Irrigation Scheme	23	Kakola Ahero	23
2	Kapiyo	23	Tura	23
3	Upper Bwanda	23	Kakola	23
4	Kwa Kungu	22	Kakola Omaka	23
5	Central Bwanda	22	Kochogo Central	23
6	Kolal	22	Kochogo North	23
7	Anyuro	22		
8	Ogenya	22		
9	Ugwe	23		
10	Nduru	23		
11	Kadhiambo	22		

Table 1: Distribution of Respondents across the Study Area

3.4. Data Collection and Analysis

The study used primary data and secondary data. Primary data was collected through interviews, Focus Group Discussions (FGDs), and Observations. Interviews were done through direct contact with the informant using a household questionnaire, which was administered to obtain quantifiable data. FGDs were conducted differently for men and women, with 12 respondents each to provide information on gendered aspects of irrigation and an in-depth understanding of ownership of and control of resources and decision-making FLID. This was gathered using a discussion guide; in addition, access and control profiles were used to help determine power relations and interests, while image-based data was collected using photographs. Secondary data was collected by reviewing existing documents that were used to gather background information on FLID and its operations and to gain insight into Gendered Property Rights.

Thematic analysis was carried out to identify patterns or themes within the qualitative data. This was used because it is not tied to any theoretical perspective, making it flexible. This followed the six-step framework of becoming familiar with the data, generating initial codes, searching for, reviewing, and defining themes, and writing up (Braun, Clarke, Hayfield & Terry, 2019). Quantitative data was analyzed using SPSS to summarize features of the data, such as the household characteristics, distribution, educational status, and sources of income of the FLID population by gender. Descriptive statistics was used to summarize the data for the distribution of responses and central tendencies (Creswell & Creswell, 2017). Cross-tabulation was used to describe the influence of FLID on selected assets.

4. Results and Discussions

Women's rights are widely acknowledged as being essential to irrigation development. FLID is a relatively new form of irrigation, and it is yet unclear from the statistics how it will play out in this field and how it will affect Gendered Property Rights. To respond to this query, indicators were identified to monitor changes in two particular results:

- Control over key resources
- Decision-making over key issues

In the section that follows, these are described in greater detail. Assets and land were important resources, and we also recognized household decision-making, decision-making regarding revenue generation, and decision-making regarding the management of labour and water.

4.1. Control over Key Resources

4.1.1. Control over Assets

Within households, assets are considered an important means through which various outcomes can be achieved. Several assets and who has control over them were considered. These included household assets, livestock, farming tools and equipment.

4.1.1.1. Household Assets

Ownership of household assets puts almost every household owning a radio (93.2%), bicycle (73%), wheelbarrow (60.3%), TV (57.1) and 84 a mobile phone (84.4%). Based on the responses given on the issue of control, 73.6% of the irrigators responded that both husband and wife had control, while 16.3% reported that husbands had control. Further, 7.4% responded that wives had control of the assets, while 2.7% of the single respondents (singles, widows, widowers, separated and divorced) responded that they had control of household assets. Control over household assets was viewed as one of the determining factors in the balance of power. This would then determine one's ability to make decisions within the household. A chi-square test of independence performed to examine the relationship between control of household assets and FLID showed that there is a significant relationship between the two variables $X^2(3, N = 363) = 26.143, p = .000$. Further, respondents who reported increased income because of irrigation reported both husband and wife had control of household assets. Cross-tabulation was carried out to show the implications of control over household assets on FLID. This was disaggregated by gender, and 70% of the respondents believed that when both the man-husband and the wife had control over the assets, then the influence would range from high to very high (Figure 2).

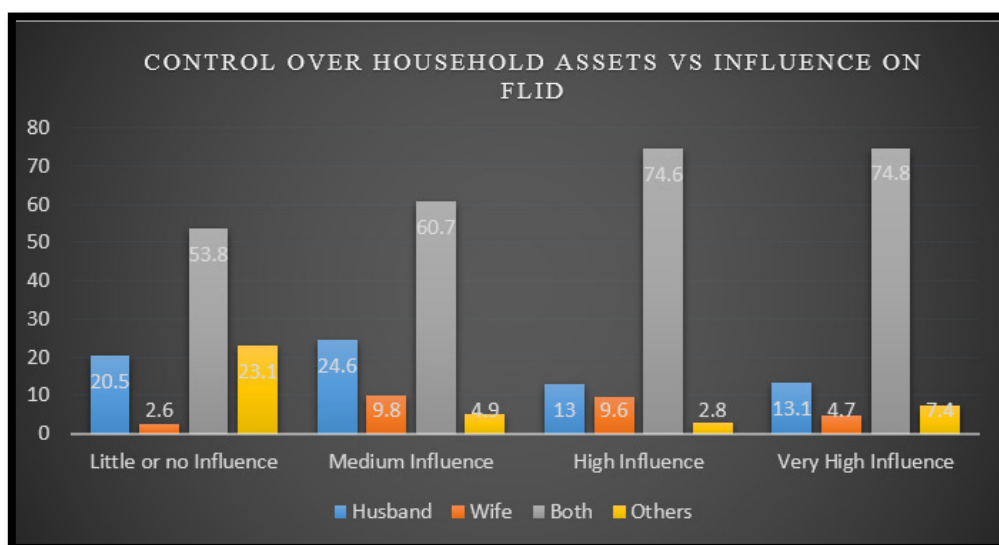


Figure 2: Distribution by Who Has Control over Household Assets VS Influence on FLID

4.1.1.2. Farming Tools and Irrigation Equipment

Ownership of irrigation equipment was disaggregated by sex, and this showed that men owned a greater proportion of equipment in the household. This included the pipes (49.1%) and water pump (37.4%) against women's ownership of pipes (15.8%) and pumps (10.4%). Control of these assets showed that 71.4% of the irrigators believed that both husband and wife had control of farming tools and equipment owned by the household. Other responses showed that 17.9% of the respondents believed husbands had control, while 8.3% believed wives had control (Figure 3). A chi-square test of independence was performed to examine the relationship between control of farming tools and equipment owned by the household and FLID. It shows that there is a significant relationship between the two variables $X^2(3, N = 370) = 29.935, p = .000$. Control over farming tools and equipment was further cross-tabulated with influence on FLID and this showed that both the husband and wife had seen joint control positively influencing their irrigation enterprise (Figure 3).

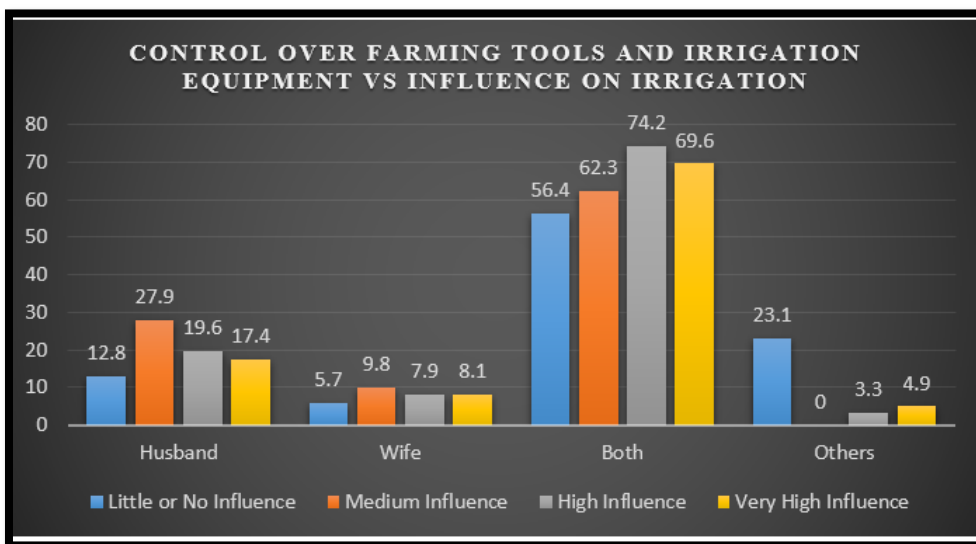


Figure 3: Distribution by Who Has Control over Farming Tools and Irrigation Equipment VS Influence on FLID

4.1.1.3. Livestock

Livestock ownership was determined, and this showed that 88.3% of the respondents owned chicken, 76.0% owned cows, and 68.9% owned goats and/or sheep. In patriarchal societies, the norm has been for livestock to be owned by men; however, among the respondents, 85.6% and 72.3% of the female and male irrigators stated that their households owned livestock, respectively. Results show that 74% of the irrigators indicate that control of livestock is by both husband and wife. A chi-square test of independence was performed to examine the relationship between gender and control of livestock. The result shows that there is a significant relationship between the two variables $\chi^2(3, N = 384) = 45.813, p = .000$. Further, we see the shift towards joint control, which has a high to very strong influence on FLID being seen (Figure 4). Discussants in an FGD indicate that livestock are normally considered disposable assets that can be sold to finance the purchase of inputs and hire land or equipment as needed. For this reason, the decision on whether to sell or not is made jointly.

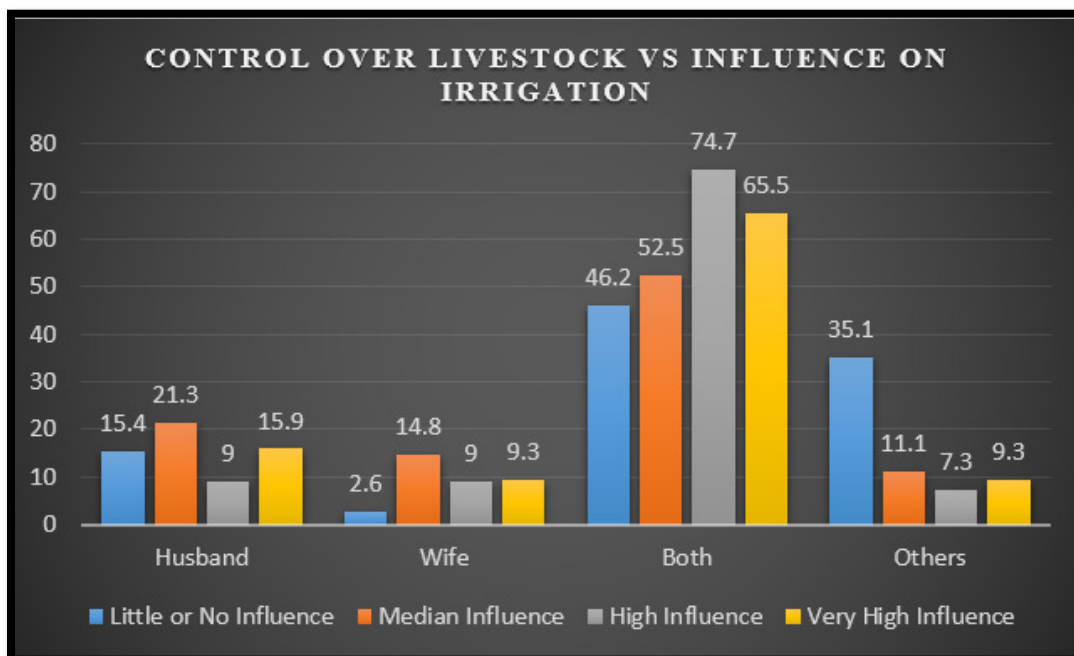


Figure 4: Distribution by Who Has Control over Livestock Owned by the Household

4.1.2. Control over Land

4.1.2.1. Land Ownership

Land was owned by 81.3% and of these, 72.8% were male, and 27.2% were female. Within each gender, a higher proportion (83.5%) of male irrigators reported owning land, compared to 76.6% of female irrigators. However, there was no significant relationship between gender and owning land. A chi-square test of independence performed to examine the relationship between ownership of land and FLID showed that there is no significant relationship between the two

variables X2 (1, N = 378) = 2.112, p = .146. Joint control was, however, held by both husband and wife as determined by 60% of the respondents, while 34% reported that husbands had control of the land owned by the household, as illustrated in figure 5. Less than a tenth of the respondents (6%) reported that the wife had control of the land owned by the household. Respondents, who were mostly single, widowed, separated, or divorced (7.8%), reported that they had control of the land. A chi-square test of independence was performed to examine the relationship between who has control of the land and FLID. It shows that there is a significant relationship between the two variables X2 (1, N = 335) = 20.193, p = .000. Cross tabulation between who has control of land and influence on FLID also shows that where there is joint control influence ranges from medium to very high (Figure 5). Despite the joint control progress, where land is concerned, is slow, with a high percentage of land is seen to be under the control of men. We cannot, however, overlook the progress that has been made. The question of the sale of land was raised as it is a very sensitive issue; discussants noted that in the past, men would sell land without the knowledge of their spouses as it was considered the man's property. However, in recent times, changes have seen this becoming an issue that must be done in agreement with one's spouse. Due to conflicts faced in the past and loss of money due to illegal sales, land buyers now engage the local administration in the purchase of land. This ensures that the land in question is sold upon the agreement of the spouse or any other persons claiming ownership of the said land. Men in Ahero and Kabonyo/Kanyagwal who participated in FGDs acknowledged that it is getting harder and harder to sell land without their wives' consent. Sales have occasionally been halted as a result of disputes. This is another aspect that demonstrates how control of land is shifting to a more joint approach.

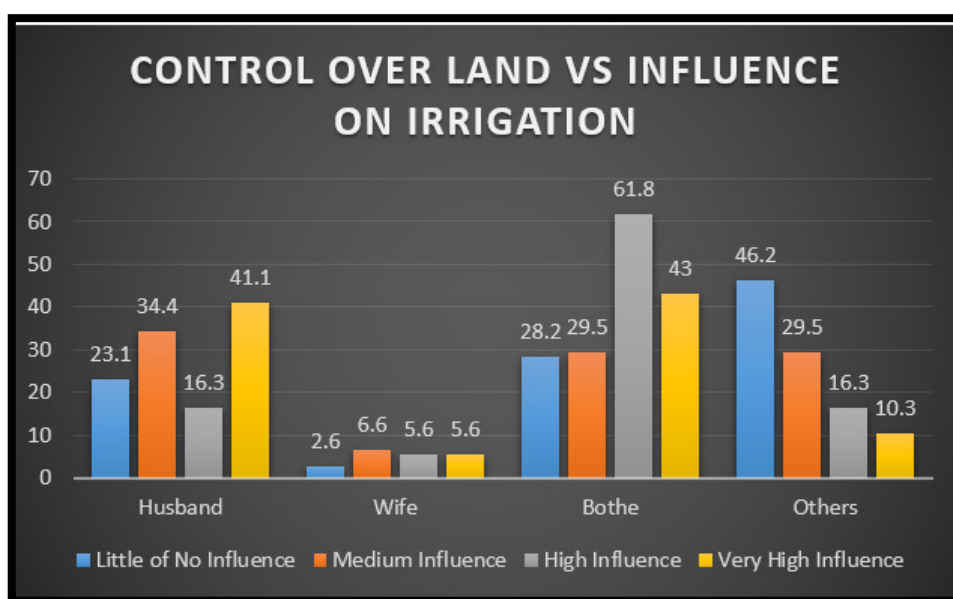


Figure 5: Distribution by Who Has Control over Land VS Influence on Irrigation

4.1.2.2. Land Ownership Status

We look at land ownership as another aspect of control, and according to data collected, 17.6% of the 26.6% of female landowners had title deeds in their possession, compared to 47.8% of the 59.5% of male landowners. To determine whether marital status had an effect on land ownership, cross-tabulation was carried out. As shown in figure 6, the findings revealed that 15.5% of the 26.6% of female landowners were single, including widowed, divorced, and separated individuals. Title deed ownership among females in the study as a percentage of the entire female population is 62.9%.

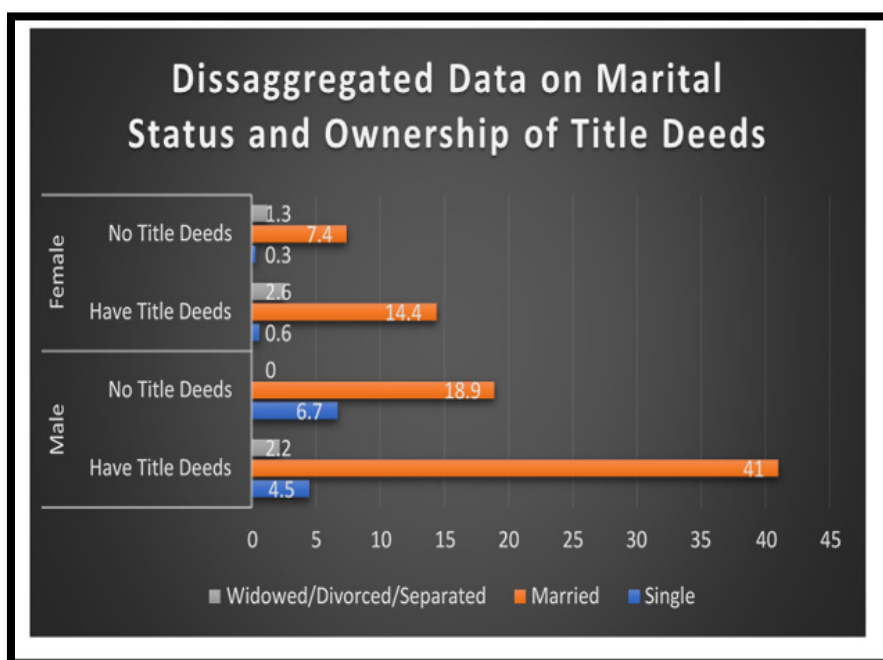


Figure 6: Disaggregated Data on Marital Status and Ownership of Title Deeds

Being an individualized form of irrigation, FLID offers flexibility in land acquisition. Here, irrigators have a variety of options available to them, including hiring or purchasing. When hiring, property suitable for irrigation is chosen, and the landowner is paid for a season or seasons as agreed upon. The advantage is that control is transferred to the person renting the land; this arrangement confers temporary property rights to the irrigators. This arrangement is perfect for women who have had trouble making decisions about their husbands' or their ancestral land. At times, however, this fails to work, as demonstrated in the study area, where some women end up renting out all of their land without taking their needs into account.

Otieno J from Nduru registers his frustration with his widowed sister-in-law: "She has rented out all her land against my advice and used the money for trivial things. Now she is forced to work for a pittance on her land." (Field Notes, 2021)

Other irrigators agreed with him, feeling that a balance was necessary when it came to land and that it was okay to rent out some of your plots as long as you retained at least one for yourself. Results from the study showed that more women (20.9%) than men rented land in the cropping seasons sampled. Additionally, the land was acquired through purchasing (5.5% and 9.6%) for women and men, respectively (figure 7). It was also noted that most of the men acquired land through inheritance, which is the norm in patriarchal societies.

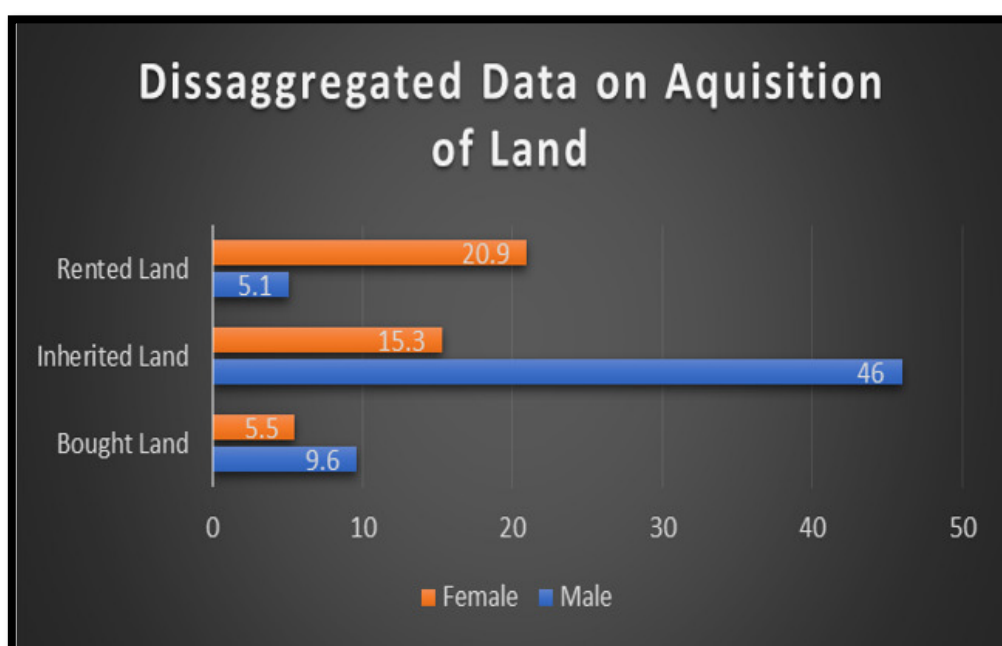


Figure 7: Disaggregated Data on Land Acquisition

Assets are noted to be crucial within the household, as they provide a means through which farmers can achieve their goals. The control of these assets is important because it determines who has the bargaining power and can make decisions. Studies carried out by different scholars give their views on the control of assets. Doss, Kovarik, Peterman, Quisumbing and Bold (2015), in their studies, found that men's and women's rights to use, control, and own assets are heavily gendered, reflecting prevailing gender norms and limiting women's capacity to invest in more lucrative livelihood choices like market-oriented agriculture. They concluded that gendered use, control, and ownership of assets have major implications for decision-making and who can participate in agricultural activities. Johnson, Kovarik, Meinzen-Dick, Njuki, & Quisumbing (2016), on the other hand, advocate for a reframing of the gender asset gap, which they say is a way of increasing women's control and, therefore, their right to decision-making.

Land ownership is still a contentious issue, with men owning a greater percentage of land. The position held by many African cultures indicates that women have been known to access land through marriage, with control being a secondary issue (Lastarria-Cornhiel, Behrman, Meinzen-Dick & Quisumbing, 2014). A study carried out by the Kenya Land Alliance on land title issuance (table 2) showed that out of the titles issued between 2013 and 2017, women had 10.3% against 85.6% for men, while in terms of acreage out of 10,129,704 ha of land titled during the same period, women held 165,253 ha (1.62%) as opposed to men who acquired 9,903,304 ha (97.76%) (Kenya Land Alliance, 2018). In the study, however, this position is slowly changing with the high percentage of women in the study area having title deeds. Ownership, especially of the land, has been known to give control to the land owner. With this shift to joint control, however, we see a change in how decisions are made. Some of these changes are attributed to the new Kenyan constitution, which requires gender mainstreaming in all sectors; this has led to nationwide campaigns on equality for women and men in matters such as this. Progress is being made, albeit slowly (Constitution of Kenya, 2010). Studies carried out in South Sumatra and Myanmar concur with these findings, demonstrating that decision-making was becoming a joint affair, with decisions such as the purchase and sale of land or major family assets and credit being made together. However, farming culture in Southeast Asia and SSA has been evolving at different rates, with men and women mostly growing different crops while women in the former are limited to post-harvest activities (Akter et al., 2016).

	Size of the Land Titled		Titles	
	Total Hectares Of Land Titled	Percentage	Number of Titles Issued	Percentage
Total land size	21,003.6	100	30,468	100
Size of land to women	1,210.88	5.77	1,825	5.99
Size of land to men	19,395.36	92.34	28,252	92.73
Joint (W/M)	259.69	1.24	254	0.83
Size of land to other entities	137.67	0.60	136	0.45

Table 2: Titles Issued in Nyando Sub-County (2013-2017)

Source: Kenya Land Alliance, 2018

As was noted, within FLID, farmers have the advantage of seeking alternative ways to acquire land for irrigation. This means that outright land ownership is no longer a factor in irrigation. Farmers are now purchasing land or hiring land for a season in what has already been termed short-season transfers. Various studies have been carried out that show these short-season transfers as attractive alternatives, especially for women, allowing them to own land (for a season) and, therefore, have control over it. This system has been labelled sharecropping by some scholars, with its main disadvantage being use rights for a period and the farmer hiring the land is, therefore, limited on what they can do on the land (Moon, Hossain, Khan, Rahman & Saha, 2020; Rahman & Othman, 2012; Yahuza & Idris, 2015; Méndez-Barrientos, Kemerink, Wester & Molle, 2018).

4.2. Decision-Making over Key Resources

4.2.1. Household Decision-Making

The household is the fundamental social unit that mostly shapes property rights. The effectiveness of this institution as a whole will depend on how the household makes decisions. This was discussed in numerous contexts within the household concerning FLID. Farmers were questioned about who made decisions on the use of income, the choice of crops to grow, the timing of planting, and whether or not to obtain credit facilities. The husband and wife made joint decisions in each of the four categories (72.9%, 67.4%, 67.4%, and 66.4%), respectively. Males in the households had more influence over decision-making than females. For instance, it was observed that 14.3% of men and 9.1% of women made decisions about how to use their income.

Discussants in FGDs held with irrigators explain the reasons behind changes in decision-making patterns. It was determined that FLID's (58.4%) biggest issue was a lack of funding for irrigation-related activities. Women (69.3%) belonged to a variety of social groups and had developed social networks that gave them access to finance through table banking and agreements for labor and inputs on credit (Table 3). This provided them with access to credit for the purchase of necessary inputs, and the men ended up benefiting. This gradually produces a change in thinking in both men and women, especially when combined with other elements like active sensitization of women's rights and the education of girls.

Benefit	N	Percent
Source of rotational labor	30	7.8
Social welfare	75	19.3
Produce Marketing	40	10.1
Table banking (acquired loans for purchase of inputs, hire of equipment, payment for other services)	238	61.7

Table 3: Benefits of Social/Informal Groups

There was also a significant relationship seen between who decides on what crops to plant and FLID $X^2(3, N = 367) = 13.585, p = .004$. Another chi-square test of independence performed examined the relationship between who decides on when to plant and FLID and also showed a significant relationship between the two variables $X^2(2, N = 365) = 13.327, p = .001$. Similarly, there was a significant relationship between who decides on whether to get credit facilities or not and FLID $X^2(2, N = 340) = 33.732^a, p = .000$. This is, however, backed up by certain factors which ensure that decision-making can be done from an informed point of view.

4.2.2. Decision-Making over Income Generation and Division of Labor

The main source of income was found to be farming, and here, a portion of the produce is sold at nearby markets while the majority of it is purchased at the farm by brokers or wholesalers. We track decision-making through tomato farming, where cartels identify tomatoes ready for harvest and control the pricing and the markets. Irrigators are compelled to sell their produce at the prices set by these brokers because of the deplorable state of the roads and a lack of transportation resources or money to do the same. The sale of produce sometimes presents challenges, and discussants in an all-male FGD indicated that sometimes female buyers use their wives to buy tomatoes at a cheaper price. The female discussants agreed with this sentiment and indicated that this was a constant source of conflict between them and their men. Income from the sale of tomatoes was further discussed in FGDs to determine how decision-making and prioritization were done (table 4). Women prioritized household needs, and this influenced their decisions, while men prioritized the acquisition of assets and development. A Chi-square test of independence was carried out to examine the relationship between who decides on the use of income and FLID. It shows that there is a significant relationship between the two variables $X^2(2, N = 367) = 15.194, p = .001$.

Priority Ranking for Income Use	Female	Male
Education	X	0
Purchase of Irrigation Equipment	0	X
Purchase of Household Goods	X	0
Building a House	X	X
Capital for Next Cropping Season	X	X
Purchase of Livestock	0	X

Table 4: Priority Ranking of Income Use

4.2.2.1. Division of Labor

Here, we examine the gendered division of labor where women's workload is high due to integration of household and farming activities. We examine how the gendered division of labor has been set up in FLID while taking into consideration the different roles, duties, opportunities, and barriers faced by male and female household members in paid and unpaid labor. It was determined that certain duties were assigned based on the nature of work due to the differences between men and women. For instance, utilizing pipes to irrigate means moving and setting up pipes from the source of water before manually applying the water to the entire farm; this is a taxing job and is reserved for men (figure 8).



Figure 8: Manual Application of Water Using Pipes

Figure 9 shows an example of an activity profile for tomato farming in the study area, showing the division of labor. It shows the involvement of both men and women in the irrigation of tomatoes, with some activities reserved for men. This includes pesticide application, which women are unable to do due to the weight of the knapsack sprayer and the harsh nature of the chemicals used.

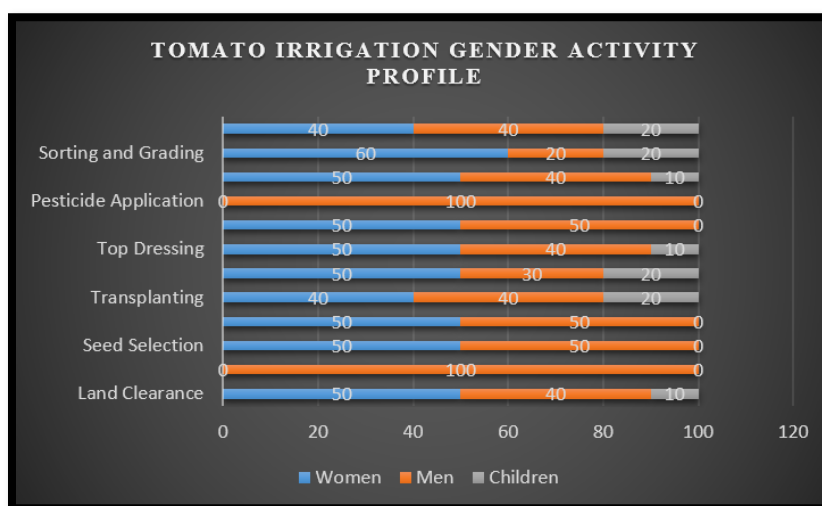


Figure 9: Tomato Irrigation Gender Activity Profile

To further demonstrate the work burden of the women, a daily activity clock was prepared, which showed that in addition to the activities specified in figure 9, women had to carry out their household chores. They ended up working 15 to 17 hours a day, as compared to men's 13 to 15 hours a day, depending on the season. Table 5 gives an example of typical activities carried out during peak seasons in Nyando Sub County. This takes into account the very high temperatures, which limit farming activities to either early morning or late afternoon.

Time	Activity	
	Women	Men
5 am to 11 am	<ul style="list-style-type: none"> • Fetching Water • Milking cows • Preparing breakfast • Taking breakfast • Feeding livestock and taking them out to pasture • Land clearing • Weeding • Planting • Fertilizer application • Harvesting • Irrigating the farms 	<ul style="list-style-type: none"> • Taking breakfast • Feeding livestock and taking them out to pasture. • Land clearing • Weeding • Planting • Fertilizer application • Harvesting • Irrigating the farms
11 am to 3 pm	<ul style="list-style-type: none"> • House cleaning • Washing clothes • Preparing lunch • Taking lunch • Post-harvest activities 	<ul style="list-style-type: none"> • Taking Lunch • Post-Harvest Activities
3 pm to 7 pm	<ul style="list-style-type: none"> • Land clearance • Sowing • Weeding • Harvesting • Irrigating farm • Collecting and feeding livestock 	<ul style="list-style-type: none"> • Land clearance • Sowing • Weeding • Pesticide/Herbicide application • Harvesting • Irrigating farm • Collecting and feeding livestock
7 pm to 10 pm	<ul style="list-style-type: none"> • Preparation of dinner • Taking dinner • Completing household chores 	<ul style="list-style-type: none"> • Taking dinner
10 pm to 5 am	<ul style="list-style-type: none"> • Sleep time 	<ul style="list-style-type: none"> • Sleep time (by 9 -10 pm)
Activity Summary	Women work 15 to 18 hours a day, combining both on-farm and off-farm activities, and no periods of rest are mentioned.	Men work 9 to 13 hours a day with periods of rest in between where they confer with fellow men.

Table 5: Activity Clock for Nyando Sub-County

Source: Data Compiled from Men's and Women's FGDs in Ahero and Kabonyo/Kanyagwal (2021)

Land clearance, weeding, harvesting, and planting of crops involves both the men and the women. Spraying the crops with herbicides and/or pesticides is a task reserved for men. In FLID, peak seasons are determined by the type of crop grown because these will have different needs. For example, crops such as kale are harvested every seven days to give room for regeneration and remain viable for up to six months, depending on the variety. Harvesting is mostly done by the women, supervised by the men who also collect the payment. This was, however, the case in instances where the men and women were farming jointly. In instances where farming was done by either, all activities involved became their responsibility. FLID is not season based and requires labor all year round. As has already been discussed, the shift that is slowly happening in decision-making means that there is consultation between both parties on how activities are to be carried out. In the study area, more men are now involved in harvest and post-harvest activities, which were reserved for women earlier and supervised by men.

4.3. Decision-Making in Water Management

Water is the main input in irrigation and requires careful management to ensure crops' water needs are met. This raises a few questions: How is this management carried out in FLID, and how does this influence gendered property rights? In irrigation management, we consider water, irrigation equipment, and infrastructure as property. We sought to determine who had rights to the water and who made decisions on water use and management. In the study area, 77.7% of women and 75.7% of men believe that water is a God-given right and they, therefore, can use water without controls or regulations. Additionally, FLID exhibits certain characteristics that would make water management challenging. To begin with, these irrigators remain unacknowledged, which means their numbers and locations remain unknown. It is difficult to monitor or control what you don't know. Secondly, FLID's nature means that irrigators are in charge of their enterprise and make decisions for the same. Thirdly, these irrigators abstract water from several different points, and because they

are unknown, they are left to their own devices when it comes to decision-making over water. Finally, because they are unacknowledged and unregistered, they are not subject to any of the mainstream irrigation institutions' regulations. This means that decision-making, for the most part, is an individual affair.

What does this mean for women? In FLID, they have been provided with flexibility that allows them to make decisions on their irrigation practices. This is because, in most cases, the availability of water will be determined by the availability of irrigation equipment and the funds to fuel and pay someone to irrigate their plants. In cases where the women irrigators divert the river for use or use buckets and basins to irrigate their crops, all that is needed is the manpower, which, in this instance, they can provide.

Water Management Aspect	Women	Men
Water Abstraction	Water is mainly abstracted using cans (4.2%), Water pumps (19.2%), Tanks (1.3%)	Water is mainly abstracted using cans (24.7%), Water pumps (52%), Tanks (1%)
Mode of delivery	Delivered through pipes (15.8%) and diverting the river/lake (34%)	Delivered through pipes (47.5%) and diverting the river/lake (47%)
Mode of application	Drip irrigation (7.5%), Overhead irrigation (2.1%), Canal irrigation (17.5%), Sprinkler irrigation (0.5%), Basin/bucket irrigation (4.2%), and Manual/flooding irrigation (16.7%)	Drip irrigation (6.7%), Overhead irrigation (3.4%), Canal irrigation (31.7%), Basin/bucket irrigation (0.8%), and Manual/flooding irrigation (53%)
Payment for water	3.4% pay for water	11.2% pay for water
Benefits of paying for water	Access to water O & M of the irrigation infrastructure	Access to water O & M of the irrigation infrastructure
Reasons for not paying for water	Water is a God-given right (26%)	Water is a God-given right (64.2%)
Consequences of not paying for water	Denied access to water (1.0), None (26.5)	Denied access to water (1.0), None (61.0)

Table 6: Disaggregated Data on Water Management

Table 6 above discusses the three aspects of water management that are acquisition, allocation, and delivery in FLID through data disaggregated by gender. Differences in water management by both men and women are minimal. Abstraction is determined by whether one owns or hires equipment; in the study area, 34.3% and 34.2% of the males owned and hired irrigation equipment, respectively, compared to the women who owned (19.5%) and hired 13.6% of irrigation equipment, respectively. Water allocation was dependent on whether one owned or hired irrigation equipment. The owners were at liberty to water as they required, while those who were hired did so, subject to the availability of funds. Those who diverted the river/or lake or used basins and/or buckets delivered water to their farms on a needs basis. The most common mode of application was either through a canal or manually. FLID has provided an avenue for women to claim rights to water sources that are either adjacent to borders or pass through their farms, giving them control over decision-making.

Decision-making is changing in the study area, an issue that contradicts what has been the norm. Several studies have been carried out that reaffirm the position that decision-making has been the domain of men, with women neither owning nor having access to resources (Prasad & Kumar, 2015). Men have been viewed as the household heads, owners of the land and major decision makers (Kopweh, 2016b), while 75% of women are more active than men in agriculture and provide the bulk of unpaid labor with little or no participation in decision making (Sakketa, 2018; Burney & Naylor, 2012). Lefore et al. (2017), in their study of sustainable and equitable growth in FLID, argue that household decision-making dynamics will be a factor as to whether women will benefit from irrigation technologies or not. It is not enough to assume that being a recipient automatically translates to beneficial use. They further note that preferences for crops to plant and the type of technology adopted need to be considered as these decisions will differ depending on the gender and the income available. These views are further reflected in studies carried out on gendered aspects of technology adoption carried out in Ethiopia, Ghana, and Tanzania, which concluded that women are disadvantaged in decision-making and access to information, technologies, and finance and are often excluded from information and extension services. They note that these power dynamics further discourage women from investing in irrigated agriculture (Theis, Lefore, Meinzen-Dick & Bryan, 2018). In their study of gender and water technologies in Ethiopia, Etissa, Dechassa, Alamirew and Alemayehu (2014) found that men decided on control over water use and technology. In Myanmar, it was noted that most agricultural roles were defined by gender and had been perpetuated by existing gender norms as well as unconscious bias. These had put women in the position of helpers engaging in manual labour, such as spreading manure and hand weeding, while the men used machinery. It was further noted that where women were given technical training, there was a shift to joint agricultural decision-making (Carnegie, Cornish, Htwe & Htwe, 2020). However, I agree with the study findings and note that some changes are being seen in decision-making. In the past, some cultural norms have influenced decision-making. These are now being seen as "dynamic and evolving" (Lambrecht, 2016), given the current state of "urbanization and outmigration" that brings together different cultures (Njuki et al., 2014). In all aspects of decision-making, scholars agree that men have played a dominant role in the household, water management, income use, and management. In the

division of labor, men have determined how the labor will be divided in the household. The study shows that a change is being seen, albeit slowly.

5. Conclusion

The available literature on gender in irrigated agriculture has consistently shown women operating from a point of lack of power in decision-making. In this study, we sought to answer the question of whether FLID being an individualized form of irrigation, had any influence on Gendered Property Rights. This was analyzed through control over key resources and decision-making over key issues. As we know, control is crucial in that it gives one bargaining power, and whoever has this power is then able to make decisions. So, the question remains: What is women's position in control of and decision-making over key resources? Is the narrative different where FLID is concerned, or has the position of women remained the same? Gendered Property Rights remain at the centre of this new paradigm governing irrigation development in the study area. This study contributes to the understanding of the Gendered Property Rights gap in FLID by presenting empirical evidence from NSC. The results reveal trends that contradict the conventional narratives. Decision-making was reported in studies in Sub-Saharan Africa. We established that there has been a shift in control over assets such as household, livestock, and irrigation equipment. This matter played out in two ways; first, with control becoming a joint affair, decision-making has also become a joint affair. This means that men are involving women more in decision-making, having discovered that their involvement yields better results. For example, decisions such as what to plant and how to use generated income cannot be made in isolation. Additionally, issues such as labour arrangements that are mostly supplemented by family due to the challenges faced in the acquisition of capital require the input of both in the household. As such, it was important for married couples to agree on what to plant and, therefore, organize labor accordingly. In addition, women belonged to several groups (merry-go-rounds) and were normally able to get short-term loans through table banking. Getting the participation of the women, therefore, was easier when they had been involved in the initial decision-making. It is important to note that these changes experienced in control and decision-making are not restricted to women but extend to men, who also see their women as valuable and have begun to recognize their input in decision-making. These changes are, however, proceeding at a slow pace and are mostly prominent among the younger population. Those older than 45 years have been socialized in earlier cultures that put men as decision-makers, with women being reduced to the position of helpers with no voice, and changing their belief system is a challenge. These were the women who were not easily accepting of the changes in society and believed that all decisions should be made by the males. This was held for women over that age who were widowed and deferred to their male relations for decision-making while holding the belief of prescribed roles for both men and women.

Secondly, in FLID, individuals are responsible for their practice. This means that since the women can access alternative ways of acquiring productive resources, they are also in charge of their irrigation enterprise and make all decisions related to it. FLID, therefore, influences Gendered Property Rights positively because those who practice it can experience flexibility in how they will carry out their activities. This then shows that there has been a shift in decision-making. The extent may not be known, but it is progressively occurring, especially with the youth getting involved in FLID. For change to adequately take place, there must be a change in the attitude of both the men and the women; the women need to realize that it is important to involve themselves in decision-making as this impacts their lives, while the men need to realize that working in partnership with their women will be more beneficial. Does this then answer our question of whether Gendered Property Rights are a myth or reality? To the extent of this study, it does, and it is becoming clear that Gendered Property Rights are a reality and are taking place progressively within the FLID domain.

6. Recommendations

There is a need to support FLID given its flexibility that allows women to be able to fully participate in irrigation and have a voice in decisions that directly affect them. FLID is showing a high success rate in terms of irrigation development, and its characteristics make it a favourable form of irrigation that will enable women to increase their control over assets and therefore have bargaining power. In Kenya, FLID is relatively new, and its extent has not been mapped. Gendered Property Rights have also not been considered, and for this reason, there is a need for targeted assessment so as to explore the extent to which it influences property relations. Additionally, since it has not been recognized, it misses out on any opportunities afforded to mainstream irrigation forms, such as subsidies, capacity building, and access to information. It is, therefore, necessary for a deliberate effort to be made towards progressive development in property rights as seen through a gendered lens. Data and information on Gendered Property Rights is minimal as research has not been focused on this aspect. There is a need for research on this component of FLID as well as other components to advise policy and other actors in both the irrigation and Gender space.

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