Gender and water (in)security in agricultural production in East Africa

A. Haroon Akram-Lodhi

CGIAR GENDER Impact Platform
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Executive Summary

Evidence on gendered access to irrigation water for agricultural production is robust overall but limited in many places, while quantitative and qualitative evidence on the mechanisms whereby access to rainwater for agricultural production might be gendered is almost completely absent. Irrigation is understood to include water accessed through infrastructure such as canals and pumps, as well as harvested and stored rainwater and surface runoff that is used when rain ceases. In this light, the World Food Programme, UN Women, UNICEF and CGIAR commissioned field studies in three countries of East Africa– Ethiopia, Kenya and South Sudan– to determine whether there is gendered access to rainwater and irrigation for agricultural production.

Specifically, the policy-oriented research focused on: the gender dynamics surrounding the terms and conditions governing access to, use of and control over rain water and irrigation used for productive livelihoods in agriculture in the countryside of Ethiopia, Kenya and South Sudan; how rural institutional arrangements and climate change impacts productive water use by women, men and children in agriculture; how gender dynamics in access to water for production intersect with generational dynamics, particularly with regard to girls and boys; how gendered access to irrigation is impacted by the social norms that shape governance structures; and the policy responses needed to equitably respond to these gender challenges in ways that are also generationally equitable. In so doing, the study sought to understand local gender norms, generational relations, local governance and institutional systems, and local power structures. The analysis of three countries allowed the adoption of a comparative approach that identified how different contexts influence women's water access for agricultural production. This was done to identify entry points that improves programming, policy and strategy for key stakeholders seeking to collaboratively reconfigure the gender dynamics surrounding the productive use of water in the construction of a rural livelihood while being aware of the generational implications of such a reconfiguration.

In this light, the field studies were guided by four research questions:

1. is access to rainwater for agricultural production on land managed by women not the same as that of land managed by men because of differences in soil quality and the time allocated to soil management activities?
2. are women's resources lesser than men's, and, if so, does this hinder their ability to respond to increased rainfall variability and changes in the length of the growing season?
3. is access to water from irrigation on land managed by women not the same as that of land managed by men because of differences in soil quality and the time allocated to soil management activities?
4. do socially constructed and community-driven interpersonal gender norms between men and women produce household structures that determine water access for agricultural production?

In the absence of quantitative data, the field studies used qualitative research methodologies in the three countries in 24 villages and multi-cluster villages, of which 15 undertook rain-fed agriculture and 9 had access to irrigation.

The key findings of the field studies are that:

1. in households were men and women manage different plots of land access to water for agricultural production is not the same for women as it is for men. Women lack the time to undertake the soil fertility management activities needed to sustain or restore biomass capacity, and in many cases women's plots of land have poorer soils.
2. women's resources are not the same as men's, in households both led by men and by women, and this hinders women's ability to respond to increased rainfall variability and changes in the length of the growing season. It also means that women may need to find a source of income to meet household needs, thereby reducing the time that they can spend on soil fertility management.
3. access to irrigation for agricultural production on land managed by women is not the same as that of land managed by men in certain circumstances, and when this is the case women's agricultural productivity will be constrained to a greater degree than men's.
4. gender norms at the community and household level between men and women produce household structures that place men in positions of decision-making authority while ensuring that women are both economically and socially subordinate to them, a gendered set of rights and responsibilities that reduces women's water access for agricultural production.

1. Access to water for agricultural production is not the same for women as it is for men

In instances where plots of land managed by women have inferior soils, the infiltration rate and biomass capacity of the soil will be less than that of land retained by men. At the same time, while being socially expected to work on land retained by men, women are also expected by society to perform the unpaid care and domestic work required within the household. Only when this work is completed can women work on the plots of land for which they are responsible. In this work, women are assisted by young and adolescent girls and boys. The result of excessive demands on women's working days means that time poverty – not having enough time to do everything that is expected of one– places binding constraints on the amount of time that they could allocate to agricultural work on men's retained plots or on the plots of land that they manage. Households led by women also face time poverty. Time poverty is based upon the idea that time is a scarce resource. Time poverty means that women may not have the time to adequately and appropriately undertake soil fertility management even on good soils, let alone poorer soils, which also reduces the infiltration rate and biomass capacity of the soil. Finally, statistically women-led households have half as much irrigation capacity as households led by men. As a result, the efficacy of both rainfall and irrigation will differ for men and women.

2. Women's ability to respond to increased rainfall variability and changes in the length of the growing season is hindered

With men having customary use rights over land unequivocally stating that they "own" the land, and with men having almost exclusive control of cows and camels within domestic herds of livestock, access to assets is gendered. Men do not equitably share their (increasing) waged income or non-waged receipts from asset sales with women, and so, when combined with gendered access to assets, women have limited resources with which to manage the farm and their responsibilities on it, including the increased variability of rainfall and changes in the length of the growing season. Resources controlled by women are inadequate to address these challenges, which has the effect of reducing the infiltration rate and biomass capacity of the soil. The impact of this is then reinforced by the fact that women operate under a different set of information than that available to men.

3. Access to irrigation for agricultural production on land managed by women is not the same as that of land managed by men

Across Ethiopia, Kenya and South Sudan irrigation facilities are limited and by far the most important source of water for agricultural production is rainfall.

That rainfall that is harvested is not used for irrigation, but rather for household consumption. Although the field sites did not appear to demonstrate gendered access to irrigation water, quantitative data for Ethiopia and Kenya clearly demonstrate that women-led households are significantly less likely to have access to that irrigation which is available than households led by men. Thus, the primary beneficiaries of that irrigation that is available are households headed by men, which the field sites demonstrate to also be the households where men control resources.

4. Gendered sets of rights and responsibilities reduce women's water access for agricultural production

Social norms dictate that women are responsible for assisting men on the land that is controlled by men, and when men are absent for long periods because of grazing or waged work women are responsible for doing all the work on land that is controlled by men. In this work, they may be assisted by young and adolescent girls and boys, as well as exchange labour. Social norms also dictate that women are responsible for performing all necessary unpaid care and domestic work around the homestead, assisted by young and adolescent girls and boys. These social expectations must be fulfilled before women can work on the plots of land that are assigned to them to farm by their spouses.

Social norms also dictate that men have the right to decide how much of any waged income that they earn they share with the women of the household. They also have the right to decide how much of any receipts from the sale of livestock they share with the women of the household. When men are absent from the household because of the need to graze livestock at a distance or undertake waged labour, social norms assign the responsibility to grow crops on land controlled by men to the women of the household, assisted by young and adolescent girls and boys. The receipts from the sale of these crops are by right controlled by men, on whose land the crop was grown. Thus, social expectations that women work on plots of land controlled by men facilitates men's ability to work for wages away from the farm.Moreover, when women do earn money from crop sales, in South Sudan and Kenya they are not free to spend the money as they please; minor spending decisions in most cases are controlled by men. Beyond that, in almost all cases major spending decision are also controlled by men

Men's almost exclusive control of domestic herds of large livestock can result in significant absences of men from their villages, as does men's increasing recourse to waged labour. As a result of men's absence, women take an increasing responsibility for agricultural work, a responsibility that reflects the social expectation that women and young and adolescent girls and boys will work on land retained by men first, before they undertake unpaid care and domestic work, after which they can work on land that they manage. Nonetheless, in households led by men it is men that have the right to control land, livestock, crop receipts from sales of output produced on men's retained land, cash from livestock sales, and cash from waged labour. They also make major spending decisions, and in some instances minor spending decisions, independently of the needs of the household, as identified by women. Absence does not compromise their rights; mobile telephony allows men to retain decision-making authority in the household.

The result is that women are increasingly growing crops for men, such as, in parts of South Sudan, millet. Women are, in effect, a flexible source of labour, and the social acceptability of polygamy is a means of mobilizing that labour for agricultural work. In effect, men in households are the managers of the labour of the women in the household. The farming system generates resource flows to men from women's labour, in which case more women's labour is equivalent to greater resource flows to men. In this context, polygamy and the aspirations toward it sustains a farming system that reinforces men's identity and social status by facilitating the acquisition of more cows and camels using women's labour, with men grazing livestock or working for wages, both of which they control. Moreover, because of poorer soils, time poverty and lesser resources, the efficacy of rain will differ for men and women, to the detriment

of women. Consequently, women's agricultural productivity per unit of land that they manage is less than that of the land that men continue to work, resulting in higher levels of food insecurity and nutritional deficiencies within the household.

Behind this highly unequal economic structure lies the use of intimate partner violence, which is socially sanctioned. Men require that women accede to this disadvantageous set of rights and responsibilities, and this acquiescence is maintained by the pervasive use of intimate partner violence, sometimes to murderous effect. Intimate partner violence is especially consequential when used against married adolescent girls. Moreover, when intimate partner violence is pervasive, it may not be necessary to use it to obtain acquiescence; the threat of its use may be sufficient.

The field studies thus show that the combination of a heavy burden of labour coupled with lack of control over the fruits of that labour is hugely disempowering for women in households led by men. For women, growing crops and managing livestock is not the same as controlling those crops or livestock, or indeed being able to influence how they are or are not used to bring benefit to women and children in the household. The findings around resource control and use are a function of intra-household power dynamics between men and women in households led by men, in which time and resource poverty place women in a subordinate material position to men, a position that can be maintained through the threat or use of intimate partner violence. In this light, policy, programming and project approaches that address these dynamics and their impact on water access could have an impact on gender relations and household resilience to climate change.

These findings lead to 4 policy recommendations:

1. reduce the time poverty that prevents women from increasing their agricultural productivity by drastically expanding programmes of water pan and community pond provisioning so that the capture of rainwater and surface runoff in arid and semi-arid lands can be significantly increased.
2. transform the gender relations within households that underpin the material superiority of men in households led by men by introducing programmes of gender transformative couple's interventions that both seek to reduce gender-based violence and improve household livelihoods.
3. build gender-responsive climate-responsive agricultural extension and training services that through farmer-to-farmer field schools provides evidence-based context-specific scale-specific practical, cost-effective agronomic best practices that reflect the needs of communities.
4. undertake further research into gender and access to water for agricultural production, given the lack of an evidentiary base.

Given the pervasive role of intimate partner violence in shaping the operation of households and communities led by men, strongly designed and well-implemented couples' interventions have been shown to be effective in reducing women's experiences of intimate partner violence, particularly when combined with economic livelihood improvements, such as increased access to water through community ponds and water pans. Engaging with women is crucial for assisting survivors of intimate partner violence, while engaging men within couples is key to fostering gender transformative outcomes. These outcomes create opportunities for more equitable access to rainwater and irrigation for agricultural production and, through improved water access, increased agricultural productivity of women and men.

In East Africa interventions to facilitate gender-transformative outcomes have already been undertaken, often yielding significant positive outcomes in terms of improved welfare and gender equity that, along with beneficial economic returns, suggest enhanced capabilities and competencies for men, women and children.

1.

Why understand gender and access to water for production in East Africa?

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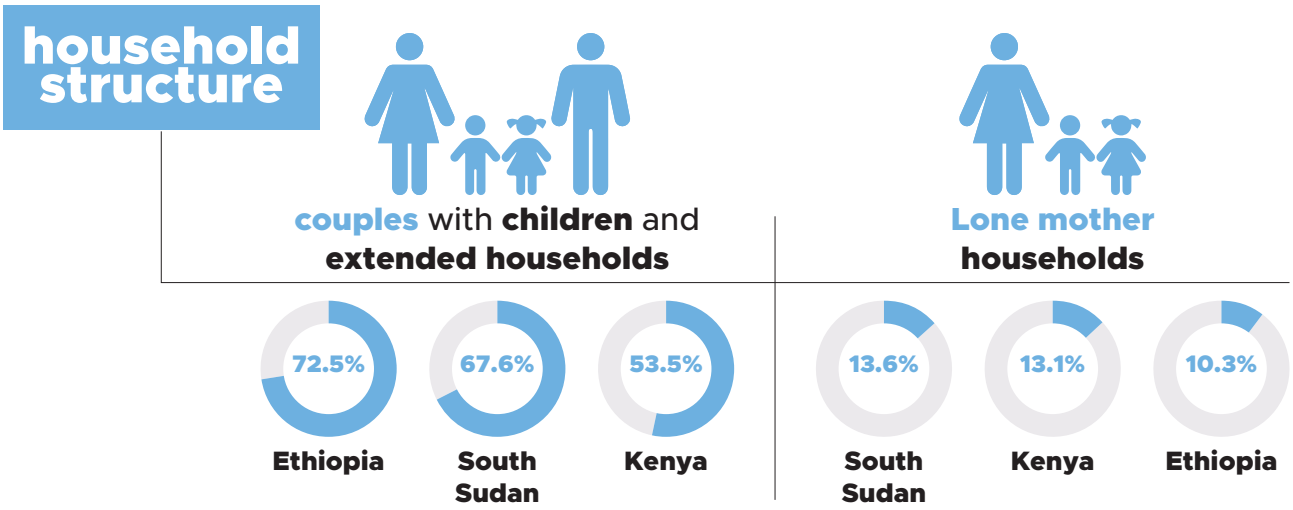
1.1 Water, gender and intersecting inequalities

In East Africa agricultural development is one of the most powerful tools to end poverty and food insecurity, as growth in the agriculture sector is far more effective in raising the incomes of the poorest relative to the non-poor. Agriculture is also crucial to economic growth in East African countries, where the labour force remains heavily engaged in farming, fishing and forestry. However, agriculture-driven growth, poverty reduction, and food security are at risk. Notwithstanding the role of conflict and the pandemic, the growing impact of climate change will cut crop yields that are already gender-differentiated. The response to this will be gendered, as women's lesser resources make them less able to respond to increased variability in rainfall and changing lengths of the growing season.

In East Africa the contribution of women to agriculture is important to household income, food security and nutrition. The work of rural women exceeds that of men and includes a higher proportion of unpaid care and domestic household responsibilities, such as food preparation and the collection of energy and water. Instances where households are led by women are not uncommon. Climate change directly impacts upon these responsibilities by reducing yields of staples, in part because of changes to the length of the growing season and increased variability of rainfall, all which impact women differently than men. At the same time, when it comes to production, women lack rights to the land they farm, including communal lands, which remain controlled by men. Lacking land rights brings with it lesser rights to any irrigation water that is available for their fields. Irrigation is understood to include water accessed through infrastructure such as canals and pumps, as well as harvested and stored rainwater and surface runoff that is used when rain ceases. The gender-biased distribution of irrigation means that women are relatively more reliant on water from rain as their principal water source for the agricultural production that they undertake even as increasingly variable rainfall and changes in the length of the growing season require a response from women that they cannot in many cases offer because of a lack of resources.

Existing research on gender and water has primarily focused on access to water supplies, sanitation, and hygiene. It has not examined the unique and specific constraints facing rural women in accessing water as a productive economic asset and as a productive economic service that can be used in agriculture.[1]



1 Das, M. B. (2017) "The rising tide: a new look at water and gender." Available: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/901081503580065581/the-rising-tide-a-new-look-at-water-and-gender (accessed on 21 April 2024).

Indeed, a detailed search has demonstrated that outside of irrigation there is almost no research on the constraints facing rural women in utilizing sources of water other than irrigation for productive use in agriculture.[2] Productive water is defined herein as "the water used for small-scale, often informal activities, whose primary purpose is improved nutrition or income generation. It … (is) therefore defined as a quantity of water over and above domestic 'basic needs' that is used for small-scale productive uses."[3] With a greater frequency of climate change-induced events in East Africa it is critical to study the distinct and unique constraints facing rural women with respect to productive water use in agriculture. In order to understand these constraints, there is a need for a corresponding understanding of how socially-constructed gender norms and the resulting power dynamics between men, women and children in East African households, communities, and in water resources planning and decision-making affect women's access to, use of and control over water for productive use in agriculture, and in so doing shape their productive activities and the lives of themselves and their children.

The productive activities of men, women and children shape and are shaped by household structure, which not only influences the time and resources available for production but also the time and resources available for unpaid care and domestic responsibilities, self-care, education and overall well-being. In terms of household structure, couples with children and extended households constituted 53.5, 67.6 and 72.5 per cent of all households in Kenya, South Sudan and Ethiopia, respectively. Lone mother households comprised 10.3, 13.1 and 13.6 per cent of all households in Ethiopia, Kenya and South Sudan, respectively.[4] The time and resources used for intra-household tasks and activities are in turn shaped by intersectional generational relations between women and children in which different types of inequalities, such as those based on age, gender, ability, socioeconomic position and other markers of social status, combine and overlap.[5] As a result, forms of inequalities are interconnected, affecting individuals or groups simultaneously and cumulatively, leading to specific and unique experiences of subordination. These overlapping identities can lead to unique experiences of domination or subordination. Thus, the extent to which girls and boys undertake intra-household unpaid care and domestic responsibilities, agricultural production, or some combination of both, can compromise the realization of their rights. However, this also will be affected by the generational expectations that are placed on children, as well as whether the child is a boy or a girl and the socioeconomic position of the child's household. These intersectionalities are cumulative. Similarly, the different inequalities that women face as wives and mothers can be compounded by socioeconomic status; an intersectional inequality that can also compromise the realization of the rights of women.

2 Over 10 months of searching only three pieces of qualitative research were found: Nyberg, Y., Jonsson, M., Ambjörnsson, E., Wetterlind, J. and Öborn, I. (2020) "Smallholders' awareness of adaptation and coping measures to deal with rainfall variability in western Kenya." *Agroecology and Sustainable Food Systems* 44 (10): 1280-1308. https://doi.org/10.1080/21683565.2020.1782305, along with a second paper by the same group; and Nico, G. and Azzarri, C. (2022) "Weather variability and extreme shocks in Africa: are female or male farmers more affected?" *IFPRI Discussion Paper* 2115. Washington, DC: International Food Policy Research Institute (IFPRI). https://doi.org/10.2499/p15738coll2.135870. It is notable that the UN High-Level Panel of Experts on Food Security and Nutrition, in their 2015 report *Water for Food Security and Nutrition*, never discuss gender and access to water for production in rainfed agriculture because the members of the Panel are global authorities and the Panel is encouraged to "think outside of the box."

3 Moriarty, P., Butterworth, J. and van Koppen, B. (2004) "Beyond domestic: case studies on poverty and productive uses of water at the household level." IRC International Water and Sanitation Centre *Technical Paper* no. 41. Available: https://www.ircwash.org/resources/beyond-domestic-case-studies-poverty-and-productive-uses-water-household-level (accessed on 21 April 2024).

4 The data is from UN Women in 2019 and is available at https://data.unwomen.org/data-portal/sdm?annex=Household%20Composition%20and%20Living%20Arrangements&finic%5B%5D=P-13&finic%5B%5D=P-15&finic%5B%5D=P-17&finic%5B%5D=P-19&finic%5B%5D=P-20&finic%5B%5D=P-34&finic%5B%5D=P-35&finic%5B%5D=P-37&flocat%5B%5D=231&flocat%5B%5D=404&flocat%5B%5D=728&tab=table (accessed on 4 February 2025).

5 Crenshaw, K. (1989) "Demarginalizing the intersection of race and sex: a black feminist critique of antidiscrimination doctrine, feminist theory and antiracist politics." University of Chicago Legal Forum 1989 (8). Available: https://chicagounbound.uchicago.edu/uclf/vol1989/iss1/8 (accessed on 26 February 2025.

Complex and intersecting social expectations and inequalities are expressed in household structure as well as resources available to women within the household. These can change as girls and boys enter adolescence, when gender divisions of labour between agricultural production and unpaid care and domestic work begin to coalesce and which is more clearly expressed in the prevalence of child marriage. In this way, gender relations shape and are shaped by generational relations: women's positions in sites of social relationships shape the lives and well-being of children. Moreover, differences in household structure and in the resources available to women means that intersecting inequalities may not be the same in households led by women compared to households led by men.

1.2 Purpose of the study

In this light, the World Food Programme, UNICEF, CGIAR and UN Women commissioned research to study, explore and explain the critical links between gender, productive water use in agriculture, rural livelihoods, and climate change in East Africa. Specifically, the policy-oriented research focused on: the gender dynamics surrounding the terms and conditions governing access to, use of and control over rain water and irrigation used for productive livelihoods in agriculture in the countryside of three countries in East Africa – Ethiopia, Kenya and South Sudan; how rural institutional arrangements and climate change impacts productive water use by women, men and children in agriculture; how gender dynamics in access to water for production intersect with generational dynamics, particularly with regard to girls and boys; how gendered access to irrigation is impacted by the social norms that shape governance structures; and the policy and programming responses needed to equitably respond to these gender challenges in ways that are also generationally equitable. In so doing, the study seeks to understand local gender norms, generational relations, local governance and institutional systems, and local power structures. The analysis of three countries allowed the adoption of a comparative approach that identified how different contexts influence women's water access for agricultural production. This was done to identify entry points that improves programming, policy and strategy for key stakeholders seeking to collaboratively reconfigure the gender dynamics surrounding the productive use of water in the construction of a rural livelihood while being aware of the generational implications of such a reconfiguration.

The study:

1. examines national and regional trends with regard to access to, use of and control over water resources for productive agricultural use;
2. conducted primary research to better understand women's water needs for productive agriculture and the specific gender dynamics that affect women's access to, usage of and control over water, and especially rainwater, for productive agricultural use, including an intergenerational perspective that examines household and community gender and generational norms, behaviours and constraints;
3. maps how these identified gender norms, behaviours and constraints shaped gender dynamics at the institutional level and in so doing impacted upon water governance norms and procedures;
4. identifies what is needed to enable and capacitate better programming, policy and strategy among key stakeholders seeking to dismantle the constraints resulting from gender dynamics; and
5. uses a regional perspective to explore entry points for gender transformative practices that addresses gender barriers to equitable and sustainable water resource access, use and control, particularly in relation to the productive use of water in agriculture.

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In so doing, the study seeks to answer four research questions:

1. is access to water for agricultural production on land managed by women the same as that of land managed by men, or is it different because of differences in soil quality and the time allocated to soil management activities?
2. are women's resources the same as men's, and, if not, does this hinder women's ability to respond to increased rainfall variability and changes in the length of the growing season?
3. is access to irrigation for agricultural production on land managed by women the same as that of land managed by men and, if not, why?
4. do socially constructed and community-driven interpersonal gender norms between men and women produce household structures that determine water access for agricultural production?

1.3 Methodology

In the absence of any quantitative data and with financial and time constraints, the research used focus groups and key informants as the first source of qualitative evidence. Focus groups brought together a group of community members to discuss agricultural production, access to water for production, and gender relations using participatory semi-structured open-ended informal questions. Interview guides were prepared that paid particular attention to key factors of production, and whether access to these factors of production were gender-differentiated. Where gender-differentiated access to and control of quantities of key factors of production were identified, the causes of these gender differences was explored, as well as their relative magnitude. Participatory semi-structured research methods thus allowed the material consequences of gendered social norms and gender dynamics to be explored.

Respondents were men and women, elderly men and women, young boys and girls, and adolescent girls and boys. Most respondents were at least in part small-scale agro-pastorialists or farmers producing for the use of their household and for local markets. Many respondents supplemented their livelihood by waged work or small-scale petty trading. Focus groups consisted of women-only and men-only groups. Key informants consisted of local government officials, community leaders and development workers in each field site.

Fieldwork locations included arid, semi-arid and non-arid areas. They also targeted areas where agricultural productivity was of high potential, both without and with irrigation. Cumulatively, there were 4 sites in both Ethiopia and Kenya and 6 sites in South Sudan. Within each site in Ethiopia and Kenya 3 villages were targeted for data collection. In the South Sudanese setting 6 multi-village clusters were selected, with each site representing between 2 and 4 villages. In summary, across the 14 fieldwork sites 28 villages were used for data collection.

2.

Agriculture, gender, water and climate in East Africa

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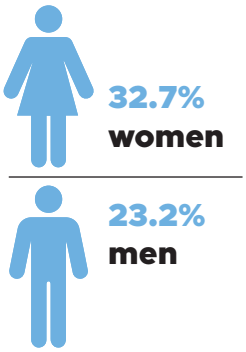
2.1 Agricultural productivity

56% of the **labour force** is **employed** in the **agriculture sector**



In East Africa, lives and livelihoods remain, to an important degree, agrarian, and access to water is a central component of those livelihoods. Two-thirds of the population live in rural areas[6] and this share is more than 40 per cent higher than that witnessed in the world. Work in agriculture is particularly important; in East Africa 56 per cent of the labour force is employed in the sector, of which 32.7 per cent are women and 23.2 per cent are men.[7] Agriculture is critical to the livelihoods of many in the East Africa region. However, the agricultural activities in which women and men work often are not commercially oriented.[8] Small-scale agriculture[9] is the key labour force activity for the livelihoods of the rural majority, with agricultural production being primarily but not exclusively for own use, and less so for the market. Small-scale agriculture is usually combined with other productive activities to create a household livelihood.

Small-scale agriculture in East Africa is not as productive as it could be. Agricultural value-added per worker for Eastern and Southern Africa is far below agricultural value-added per worker worldwide.[10]

Moreover, while global agricultural value-added per worker has been steadily rising since 1991, in Eastern and Southern Africa agricultural value-added per worker is broadly stagnant. In other words, labour productivity is low and moribund, and this impacts land productivity. For example, global cereal yields per hectare are more than double that of the Eastern and Southern African region.[11]

In many places planners, engineers, extension workers and decision-makers still fail to see women as farmers, and that as farmers women face different challenges than men farmers. As a result, policies, programmes and projects frequently overlook the knowledge, tasks, needs and requirements of women regarding access to and utilization of water for agricultural production. Increasing incomes, fostering food security and enhancing nutrition needs the relationship between agriculture, gender and water to be unpacked and better understood so that policy interventions can be better framed and more successful, for men and women and girls and boys.

6 Annex Figure A1.

7 Annex Figure A2 and the World Bank's World Development Indicators (https://databank.worldbank.org/source/world-development-indicators), which are continually updated.

8 For example, see: Minot, N., Warner, J., Dejene, S. and Zewdie, T. (2022) "Agricultural commercialization in Ethiopia: trends, drivers and impact on well-being." International Food Policy Research Institute *Discussion Paper* no 02156. Available: https://ebrary.ifpri.org/digital/api/collection/p15738coll2/id/136521/download (accessed on 3 October 2024); KilimoSTAT (2019) "Agricultural Census, 2019 - Distribution of farming households by main purpose of production and county." Available: https://statistics.kilimo.go.ke/en/1_3/ (accessed on 3 October 2024).

9 In what follows, "small-scale" is defined as when the ratio of the net selling of labour to the use of family labour is less than +1 (and can be negative). This means that the use of family labour on the farm is more than the use of hired labour or family members hiring out their labour for farm work, or that working for others on or off-farm is greater than the use of family labour on the farm.

10 Annex Figure A3.

11 Annex Figure A4.

2.2 Gender and agriculture

There are clear gender dimensions to agriculture in East Africa. Land is the most important rural asset. In the arid areas across the region and beyond, land is for the most part communally controlled by men who allocate use rights. Without formal title, claims of "ownership" in fact reflects heritable control rights over land. Ethiopia is different; across the country as a whole households headed by men who have individual certificates of customary use rights average 2.2 hectares of land, but the average amount of land customarily controlled by households headed by women is only 1.7 hectares.[12] Of women that controlled land, only one-half had a title deed to their land, primarily because of a lack of awareness of women about their rights. Women's ownership of assets was particularly low in pastoralist areas, where they owned far fewer livestock of much smaller size than men. Beyond customary "ownership", primarily by men, women's role in agriculture is not reflected in the management of land; women farm plot managers working the land they control or the land controlled by their spouses operate smaller aggregate quantities of land, in Ethiopia managing an average of 0.6 hectares compared to the 1 hectare controlled by men farm plot managers.[13] In Kenya women also controlled smaller quantities of land, managing an average of 0.66 hectares compared to the 0.8 hectares cultivated by men farm plot managers.[14] In this light, it is not surprising that in Kenya women were managing primary decisions on only 39 per cent of the country's plots of land;[15] in South Sudan only 13 percent of women in 5 counties realized that they had legal and constitutional rights to property ownership, including land. Households led by women tend to have smaller amounts of land under their control than households led by men.

Because of a lack of "ownership" and control of land, women's access to resources and their ability to participate in their communities are often mediated by men, and women's rights to resources are insecure. Other inequalities follow from gender biases in the distribution of access to land. This can also be witnessed in households headed by women.Women plot managers: cultivate fewer crops; use less hired labour; use fewer manufactured chemical inputs such as fertilizers and pesticides; are less likely to have access to formal credit, and the financial system more generally; and are less likely to have access to agricultural extension programmes.[16] Moreover, it has long been known that when women have access to a cash income they are expected to spend it on their family's needs, whether it be in terms of market-based food provisioning, meeting health expenses, or paying out-of-pocket household expenses.[17] Cumulatively, women's responsibilities in the household and in production are not matched by women's resources. Considering all of this, the rural economy of East Africa should be approached as a gendered structure.

12 For this and the previous sentence, see:World Bank (2019) "Ethiopia gender diagnostic report: priorities for promoting equity." Available: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/300021552881249070/ethiopia-gender-diagnostic-report-priorities-for-promoting-equity (accessed on 8 April 2024).

13 World Bank (2019) "Ethiopia gender diagnostic report: priorities for promoting equity." Available: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/300

14 "World Bank (2018) "Kenya poverty and gender assessment 2015/16: a decade of progress and the challenges ahead." Available: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/905491550155961925/kenya-poverty-and-gender-assessment-2015-2016-reflecting-on-a-decade-of-progress-and-the-road-ahead (accessed on 10 April 2024).

15 "World Bank (2018) "Kenya poverty and gender assessment 2015/16: a decade of progress and the challenges ahead." Available: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/905491550155961925/kenya-poverty-and-gender-assessment-2015-2016-reflecting-on-a-decade-of-progress-and-the-road-ahead (accessed on 10 April 2024).

16 World Bank (2019) "Ethiopia gender diagnostic report: priorities for promoting equity." Available: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/300021552881249070/ethiopia-gender-diagnostic-report-priorities-for-promoting-equity (accessed on 8 April 2024).

17 Verma, R. (2001) *Gender, Land and Livelihoods in East Africa: Through Farmer's Eyes*. Ottawa: International Development Research Center. Available: https://idrc-crdi.ca/sites/default/files/openebooks/283-x/ (accessed on 28 January 2025).

At the same time, the increasingly important role of women in agriculture fails to provide a complete picture of rural work patterns. Women have disproportionate and time-consuming responsibilities within the household because of gendered social norms. Women must access food, prepare food, fetch firewood and water, undertake an array of domestic chores, as well as perform childcare and eldercare, provide informal education, and care for the unwell. In South Sudan, for example, the heaviest responsibilities on women's time include food and meal preparation and management, collecting water and fetching firewood.[18] In Kenya rural women performed 22 per cent more total work per day than men, with just under 60 per cent of it in unpaid care and domestic work.[19] The single biggest task performed by rural women in Kenya, in terms of minutes per day, was food and meals management and preparation, and women spent twice as much time on food and meals management and preparation as they did in agriculture, forestry, fishing and mining for own final use, which is the most important element of their day engaged in productive activities.[20] These specific examples are true across the region, although there may be differences within and between households that are led by men with regard to those that are led by women because of women's responsibilities for unpaid care and domestic work. The result is that women and girls have less time to work on the land for which they are responsible for operating and less time to work on plots of land whose control is retained by their spouse. In short, rural women in East Africa are subject to time poverty – not having enough time to do everything that is expected of one -- and this impacts upon the productivity of their labour on the land that they work, the food security of the household, and the nutritional status of household members. Time is thus a scarce resource. Time poverty constraints help explain differences in land and labour productivity in households led by men as opposed to households led by women. It also helps explain women's poor educational outcomes in much of the region: adolescent girls drop out of school to care for younger siblings so that their parents can undertake farm or off-farm work.[21] With lesser education, girls are more likely to marry when they are a child and become pregnant before they are an adult.

Men's control of land and other assets mean that they play a key role in structuring rural women's lives. However, it is unfortunately all too often the case that men's structuring of rural women's lives is predicated upon the use of coercive force in East Africa. In Ethiopia in 2018 26.5 per cent of women aged between 15 and 49 reported that they had been subject to physical and/or sexual violence by a current or former intimate partner in the previous 12 months.[22] In Ethiopia 54 per cent of girls are married by the time they are 18 and 14 per cent of girls are married by the time they are 15,[23] because of which there is a high rate of early pregnancy and, as noted, a lower rate of school completion. Similarly, in Kenya in 2018 22.8 per cent of women aged between 15 and 49 reported that they had been subject to physical and/or sexual violence by a current or former intimate partner in the previous 12 months.[24] In Kenya 15 per cent of girls are married by the time they are 18 and 2 per cent of girls are married by the time they are 15. Finally, in South Sudan in 2018 26.7 per cent of women aged between 15 and 49 reported that they had been subject to

18 African Development Bank (2023) "South Sudan country gender profile: building resilience through humanitarian and development interventions." Available: https://www.afdb.org/en/documents/south-sudan-country-gender-profile-january-2023 (accessed on 15 April 2024).

19 Kenya National Bureau of Statistics (2023) *Kenya Time Use Report: Based on 2021 Kenya Continuous Household Survey*. Available: https://www.knbs.or.ke/2021-kenya-time-use-report/ (accessed on 11 April 2024).

20 Kenya National Bureau of Statistics (2023) *Kenya Time Use Report: Based on 2021 Kenya Continuous Household Survey*. Available: https://www.knbs.or.ke/2021-kenya-time-use-report/ (accessed on 11 April 2024).

21 World Bank (2023) "South Sudan economic monitor: investing in humans." Available: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099120423132018969/p50055601fc6510f80883704c40310b0c39 (accessed on 15 April 2024).

22 The data in this and the following three sentences is from UN Women, is continually updated, and can be found at https://data.unwomen.org/country/ethiopia.

23 Data for the incidence of child marriage in the three countries comes from Unicef, is continually updated, and can be found at https://data.unicef.org/topic/child-protection/child-marriage/#data. The reference years are 2022 for Kenya, 2016 for Ethiopia, and 2010 for South Sudan.

24 The data in this and the following three sentences is from UN Women, is continually updated, and can be found at https://data.unwomen.org/country/kenya.

physical and/or sexual violence by a current or former intimate partner in the previous 12 months.[25] In South Sudan 61 per cent of girls are married by the time they are 18 and 9 per cent of girls are married by the time they are 15. Moreover, across the region polygamy is rife, which has strong negative connotations for girls and women in relation to men.

2.3 Agriculture productivity and agricultural growth

There is a strong correlation between poverty reduction and agricultural growth. For example, in Ethiopia between 2005 and 2016 poverty fell fastest in those regions of the country that had the strongest agricultural growth.[26] Similarly, in Kenya counties and provinces with higher farm productivity have lower poverty rates.[27] With higher productivity, farm households producing for own use can increase their consumption or start selling their agricultural surplus onto the market. The correlation between greater marketing of output and lower poverty is strong in Kenya, with only 26 per cent of farm households that market their surplus being poor, as compared to 38 per cent of households producing solely for own consumption.[28] Moreover, higher productivity can reduce food prices in local product markets or can increase agricultural wages in local labour markets.

Agricultural growth relies on three key agricultural inputs in East Africa: land, labour and water. The interaction of these inputs is critical to increasing agricultural productivity and reducing poverty. However, it has already been demonstrated that labour productivity is stagnant, and that land productivity is disappointing. This suggests that improving access to water might be a way of offsetting the impact of climate change on agricultural yields and hence on poverty, food insecurity and undernutrition. Certainly, among inputs access to timely, adequate amounts of water, whether rain-fed or irrigated, is the most important, or "leading," input, because it contributes the most significantly to agricultural crop productivity. However, to do this, water's interaction with land and labour must also be optimized.

2.4 Agriculture, water and gender

The microbial diversity of a piece of land is a function of temperature, wind, slope and soil structure, which impact the capacity of water to infiltrate the soil. It is also a function of human labour on the piece of land. Optimally, more biomass breakdown leads to more granularity of the soil and microbial diversity because of more infiltration and less run-off or evaporation. Soil structure thus determines rainfall partitioning through its infiltration capacity and the resulting biomass capacity of the land and soil microbial diversity. It should not be assumed that within small-scale farming communities soil structure is undifferentiated, in part because of biophysical factors and in part because of human work on the land. If soil structure is differentiated, this would impact agricultural production and productivity.

25 The data is from UN Women, is continually updated, and is available at https://data.unwomen.org/country/south-sudan.

26 World Bank (2020) "Ethiopia poverty assessment: harnessing continued growth for accelerating poverty reduction." Available: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/992661585805283077/ethiopia-poverty-assessment-harnessing-continued-growth-for-accelerated-poverty-reduction (access of 8 April 2024).

27 World Bank (2019) "Kenya economic update: unbundling the slack in private sector investment – transforming agricultural sector productivity and linkages to poverty reduction." Available: https://www.worldbank.org/en/country/kenya/publication/kenya-economic-update-transforming-agricultural-productivity-to-achieve-food-security-for-all (accessed on 10 April 2024).

28 World Bank (2018) "Kenya poverty and gender assessment 2015/16: a decade of progress and the challenges ahead." Available: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/905491550155961925/kenya-poverty-and-gender-assessment-2015-2016-reflecting-on-a-decade-of-progress-and-the-road-ahead (accessed on 10 April 2024).

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Irrigation combined with human work on the land has the potential to better optimize soil structure and thus increase agricultural productivity and growth. While only a small percentage of the arable area is irrigated in East Africa the region has, as will be illustrated for the 3 countries, ample potential for irrigation. It is true that water stress, which can be defined as the ratio between total freshwater withdrawn and total renewable freshwater resources, has been rising.[29] However, it remains low[30] and the water footprint per person of East African populations is a very small proportion of per person renewable freshwater resources.[31] Finally, total water storage in much of the East Africa region is in fact increasing.[32] Shallow aquifers in East Africa rapidly recharge[33] while deeper aquifers act as a source of water storage, facilitating resilience in times of stress.[34] Cumulatively, there is significant scope to expand irrigation in East Africa.

Irrigation schemes can be government-led, farmer-led, or led by a non-governmental organization or multilateral development institution. They can be large in scale or small-scale. They can use various water sources, such as rivers, lakes, aquifers, or harvested rain and surface runoff water. They can use various irrigation techniques, such as ponds, water pans / *haffirs*, tanks, boreholes, pumps, pivots, drip, canals and flooding. In Ethiopia, potentially 20 per cent of cropland could be irrigated.[35]The Government of Kenya is seeking to increase the share of cropland that is irrigated from 2 to 10 per cent.[36] In South Sudan a remarkable 1.5 million hectares of land could be brought under irrigation. However, with only 0.1 per cent of South Sudan's agricultural land being irrigated,[37] one per cent of Ethiopia's farmland being irrigated,[38] and less than two per cent of Kenya's farmland being irrigated,[39] agriculture in the region is almost wholly dependent upon rainfall, the utilization of which is a function of localized land use, storage facilities and the social relations surrounding access of men and women to water for production through the control of land. At the same time, there is ample scope to increase the capture of rainfall. In Ethiopia an estimated 110 billion cubic meters of rainwater annually is lost through surface runoff. This is the equivalent to a one-meter-deep square pond with sides of 330 kilometers or a full river ten meters deep, 100 meters wide and 110,000 kilometres long.[40] Other countries in the East Africa region, including South Sudan and Kenya, similarly lose voluminous amounts of rainwater through surface runoff that could be captured. However, a lack of interest by significant multilateral and bilateral development cooperation institutions as well as a lack of government resources means that while rainfall and surface run off will be essential to agricultural production and productivity for the foreseeable future the capturing of rain and runoff is not yet a key investment priority.

29 Annex Figure A5.

30 https://www.wri.org/data/water-stress-country (accessed on 24 October 2024).

31 Annex Figure A6.

32 https://www.sciencedirect.com/science/article/pii/S2214581822001070 (accessed on 24 October 2024).

33 https://unesdoc.unesco.org/ark:/48223/pf0000192145 (accessed on 24 October 2024).

34 https://watercommission.org/#report (accessed on 23 October 2024)

35 FAO (2016) "Country profile: Ethiopia." Available: https://www.fao.org/3/i9732en/I9732EN.pdf (accessed on 9 April 2024).

36 World Bank (2018) "Kenya poverty and gender assessment 2015/16: a decade of progress and the challenges ahead." Available: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/905491550155961925/kenya-poverty-and-gender-assessment-2015-2016-reflecting-on-a-decade-of-progress-and-the-road-ahead (accessed on 10 April 2024).

37 FAO and World Bank (2022) "Transforming agriculture in South Sudan: from humanitarian aid to a development-oriented growth path." Available: https://openknowledge.worldbank.org/server/api/core/bitstreams/1502044e-e098-519e-96cc-4eac1058491a/content (accessed on 15 April 2024).

38 USAID (2016). "Climate change risk profile – Ethiopia fact sheet. Available: https://www.climatelinks.org/sites/default/files/asset/document/2016%20CRM%20Factsheet%20-%20Ethiopia_use%20this.pdf (accessed on 8 April 2024).

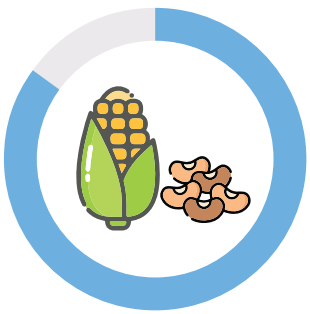
39 World Bank (2018) "Kenya poverty and gender assessment 2015/16: a decade of progress and the challenges ahead." Available: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/905491550155961925/kenya-poverty-and-gender-assessment-2015-2016-reflecting-on-a-decade-of-progress-and-the-road-ahead (accessed on 10 April 2024).

40 https://www.unocha.org/publications/report/ethiopia/ethiopia-ponds-filled-challenges (accessed 12 December 2024).

There is very little data on gender-differentiated soil structure, infiltration capacity, and biomass – microbial interactions. There is also very little data on gender-differentiated paths of rainwater use. That which is known is that the relationship between agriculture, gender and water is mediated by men and by soil, and, in this light, that women managers of plots of land often have soils of poorer quality.[41] There is however some limited data on gender bias in access to irrigation water. Thus, in Ethiopia there are 50 per cent more farm households with irrigation where men are the principal decision-maker when compared to farm households with irrigation where women are the principal decision-maker. In Kenya the figure is more than 50 per cent.[42] In Ethiopia those households where men are the principal decision-maker have 34 per cent more of the irrigated cropland area than those households where women are the principal decision-maker. Thus, farms where decisions are made by women are both less likely to have irrigation and in Ethiopia have a smaller irrigated cropped area than farms where men are the principal decision-makers. Moreover, it should not be assumed that men and women access and use the same irrigation techniques because of gender biases on the farm and in the household regarding time use, access to assets, inputs, credit and extension services, all of which are shaped by access to water for productive uses. These biases can be expected to be replicated on rain-fed farms, although the extent and degree of such replication cannot be known.

2.5 Gender and agricultural productivity

In this light, there is a very important dimension to agricultural productivity in East Africa that remains under remarked in policy and practice. This dimension is gender gaps in agricultural productivity, defined as the gap between the productivity found on plots of land managed by men and plots of land managed by women. Using data from the World Bank's Living Standards Measurement Study-Integrated Surveys on Agriculture, productivity gaps have been estimated to assess the contribution of various factors of production to the overall gender productivity gap between men and women managers of plots of farmland, where agricultural productivity is defined as the gross value of crop output produced per hectare of land. Across 7 countries in a sample from Eastern and Southern Africa, gender gaps in agricultural productivity are considerable, ranging from almost 11 per cent in Ethiopia to 28 per cent in Malawi.[43] Within women plot managers a significant share were households led by women because of death, divorce or abandonment. Studies using comparable methods have generated similar findings for other countries, with gender gaps in agricultural productivity ranging from 8 per cent in Kenya to more than 30 per cent in Nigeria.[44]



almost 85% of the **cultivated land area** was **devoted** to **growing maize** and **beans** in 2015/16

41 This is a fairly consistent finding across the World Bank-supported Integrated Surveys of Agriculture. See https://www.worldbank.org/en/programs/lsms/initiatives/lsms-ISA.

42 Annex Table A1 and A2.

43 Annex Figure A7.

44 https://www.unwomen.org/sites/default/files/Headquarters/Attachments/Sections/Library/Publications/2019/UN-Women-Policy-brief-11-The-gender-gap-in-agricultural-productivity-in-sub-Saharan-Africa-en.pdf (accessed on 22 October 2024).

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Gender gaps in agricultural productivity are witnessed in important food crops. In Kenya almost 85 per cent of the cultivated land area was devoted to growing maize and beans in 2015/16. Rural households headed by women had 10 per cent lower maize yields than rural households headed by a man. For beans, rural households headed by women had 15 per cent lower bean yields than rural households headed by men. There is also evidence in Kenya of an inverse relationship between farm size and agricultural productivity per unit of land. Thus, the maize yield productivity gap across landholding quartiles increases

from 17 per cent to 38 per cent and 69 per cent as plot size quartile ranking increases from the 2nd to the 3rd and to the 4th quartile, respectively. Moreover, the inverse relationship between units of land and maize yield is consistent. An inverse relationship is also present among bean farms in Kenya.[45] Gender is relevant here: it has already been demonstrated that farms and plots of land managed by women tend to be smaller than farms and plots of land managed by men, that there is a gender gap in maize and bean productivity per unit of land, and yet it has also been demonstrated that smaller farms tend to be more productive per unit of land. The data already provided suggests an answer to this apparent contradiction: women spend more than twice as much time in their suite of unpaid care and domestic work responsibilities than they do working on their land. Labour is the principal input into small-scale farm production; and women have less time to labour on their fields because of gendered social norms that create the expectation across households, communities and society that women are principally responsible for unpaid care and domestic work, supported when needed by girls and boys.

In this light, it is not surprising that producer characteristics, production conditions and production choices of women and men land managers need not be the same, which in turn can generate differential results in production, growth and poverty reduction. Thus, the gender gap in agricultural crop productivity in Ethiopia is driven in the first instance by women's lesser use of pesticides, herbicides or fungicides, women's lesser ability to mobilize men from within the household to work on the plots of land that women manage, and the greater use of organic fertilizer by plot managers who are men.[46] Underlying this, however, gender norms strongly impact in differential ways upon women and men plot managers and are reflected in the characteristics of producers. For example, women have less ability to mobilize men from within the household to assist them with work on the plots of land that they manage. Similarly, women's lesser cash incomes and their responsibilities to use cash to firstly meet household needs means that they are less able to buy chemical inputs. In yet another dimension women's abilities to participate in the rural economy and in their communities are often mediated by men, who play a key role in structuring rural women's lives.

2.6 Climate change, agriculture and gender

It is within this context that climate change has impacted. For the East Africa region, temperature increases are 2.15 per cent per year.[47] For Ethiopia and South Sudan, starting in the mid-1990s, the number of days when the heat index exceeded 37°C started to grow rapidly; in Ethiopia the rate of increase is 4.5 per cent per year, while in South Sudan the rate of increase is 9.9 per cent per year.[48] In those same countries the average largest cumulative 5-day precipitation is increasing at 8.3 per cent per year in Ethiopia and 13.9 per cent per year in South Sudan.[49] With increasing temperatures the probability of worsening droughts increases even as the onset, duration, and timing of precipitation changes in ways that are unpredictable but which diminish agricultural production and productivity. Both will only get worse going forward, as the range of annual temperatures increase over time, bringing with it more droughts, and as the variability of precipitation become bigger, and, with that, the increased possibility of flooding.

45 World Bank (2018) "Kenya poverty and gender assessment 2015/16: a decade of progress and the challenges ahead." Available: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/905491550155961925/kenya-poverty-and-gender-assessment-2015-2016-reflecting-on-a-decade-of-progress-and-the-road-ahead (accessed on 10 April 2024).

46 UN Women (2018) "The cost of the gender gap in agricultural productivity in Ethiopia." UN Women Ethiopia Country Office. Available: https://africa.unwomen.org/en/digital-library/publications/2018/04/study-of-cost-of-gender-gap-eth (accessed on 5 April 2024).

47 Annex Figure A8.

48 Annex Figure A9.

49 Annex Figure A10.

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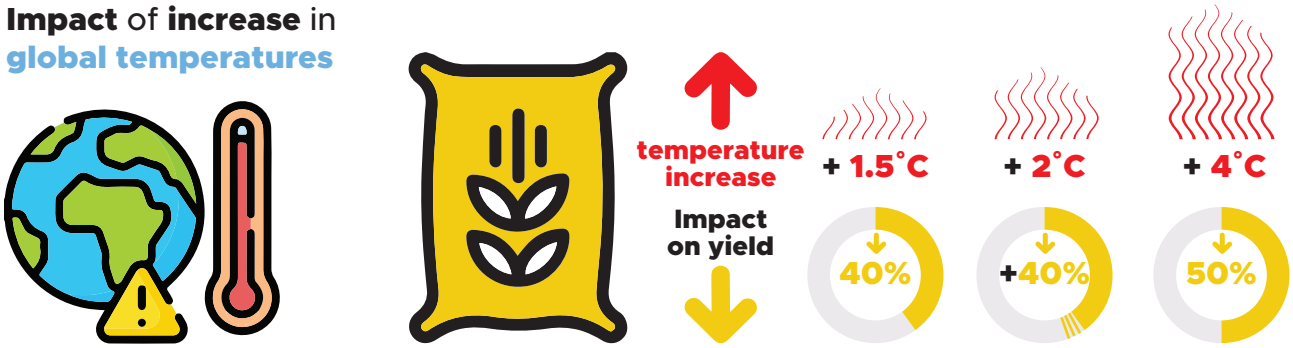

Climate change is not gender neutral; there are several key drivers of differential vulnerability to climate change between men and women and girls and boys. Thus, gender-based differences in time use, access to assets, inputs and credit, as well as gender biases in informal and formal institutions such as agricultural extension services, limit women's opportunities to respond to the risks posed by climate changes relative to that of men.[50] In particular, gender-based differences in access to land shapes access to water for agricultural production, which in turn shapes input usage, access to credit and agricultural extension services, and time use, as well as gender biases in informal and formal institutions. This is made worse by a lack of sex-disaggregated data and the failure to use an intersectional approach that would facilitate a better understanding of the gendered impacts of climate change.

In this light, a meta-analysis of 202 studies done for the Intergovernmental Panel on Climate Change in 2022 found that an increase in global temperatures of 1.5ºC will lead to a reduction of maize yields in eastern and southern Africa by almost 40 per cent. An increase in global temperatures of 2ºC will lead to a reduction of maize yields by more than 40 per cent. An increase in global temperatures of 4ºC will lead to a reduction of maize yields in eastern and southern Africa by almost 50 per cent.[51] In terms of a specific example, in Kenya maize yields are expected to decline by approximately 50 per cent. It has also been found that for every rise of one-degree centigrade yields of cereals in Kenya decline by about 200 kilograms per hectare.[52]

Moreover, the FAO has found is that in general an additional day of extreme temperatures or extreme precipitation is correlated with a 1.3 per cent and 0.5 per cent reduction, respectively, in the total income of households headed by a woman when compared to households headed by a man. Such losses cumulatively amount to households headed by women losing 8 per cent of average annual income due to heat stress and 3 per cent average annual income due to flooding. In the long term, an increase of 1°C in average temperatures is correlated with a 23.6 per cent loss in farm incomes and a 34 per cent in total incomes of households headed by a woman.[53]

The effect of climate change will continue to further reduce yields per unit of land, and in gendered ways, with implications for poverty, food insecurity and undernutrition. It will increase the variability of rainfall and change the length of the growing season. The consensus is that yields per unit of land will decline; the divergence is by how much there will be a decline.

50 World Bank (2021) "Climate risk country profile: Ethiopia." Available: https://climateknowledgeportal.worldbank.org/country-profiles (accessed on 8 April 2024).

51 IPCC (2022) *Climate Change 2022: Impacts, Adaptation, and Vulnerability*. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge: Cambridge University Press, doi:10.1017/9781009325844.

52 Kogo, B.K., Kumar, L. and Koech, R. (2021) "Climate change and variability in Kenya: a review of impacts on agriculture and food security." in *Environment, Development and Sustainability* 23: 23–43. https://doi.org/10.1007/s10668-020-00589-1.

53 FAO (2024) *The Unjust Climate: Measuring the Impacts of Climate Change on Rural Poor, Women and Youth*. Available: https://www.fao.org/statistics/events/events-detail/the-unjust-climate---measuring-the-impacts-of-climate-change-on-rural-poor--women--and-youth/en (accessed on 11 April 2024).

3.

Findings from Ethiopia

Research location:
Villages (kebeles)

Location classification:
dry / arid / semi-arid

Growing season:
60-120 days

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ETHIOPIA

3.1 The context

In Ethiopia in 2020 agriculture was responsible for around 25 per cent of real GDP growth, food prices dominated inflation, food subsidies were an important share of state spending, agricultural commodities were an important export, and wheat was a critical import.[54] Moreover, Ethiopia was and is following an "agriculture-led" development strategy. In this sense, then, and not withstanding the role of services and industrial manufacturing in Ethiopia's economy, Ethiopia remains an agricultural country, and indeed 8 out of 10 Ethiopians who are classified as "poor" have agriculture as their principal livelihood activity.[55] Agriculture is largely dependent on 12 million small-scale farmers, who are responsible for 90 per cent of agricultural production. Women account for about 43 per cent of the agricultural sector's workforce,[56] and half of that figure works as contributing family labour and is therefore unpaid.[57] This figure is growing as men migrate and agriculture becomes "feminized." This is of concern because "women-only" households with no adult men have been identified as being far more likely to be poor in Ethiopia.[58]

Ethiopia has abundant water resources. The country has about 122 billion cubic meters of total renewable freshwater resources.[59] However, water is highly unequally distributed across the country, and a significant share of water flows across borders. Water also varies across Ethiopia's three climate zones: 1) the alpine vegetated cool zone (Dega); the temperate zone (Woina Dega); and 3) the hot zone (Qola). As has been noted, the vast bulk Ethiopian agriculture is rain-fed. Small-scale farmers grow crops for own use and for sale, including wheat, barley, teff, maize and sorghum. There is also a significant reliance on livestock – 70 per cent of the population keep livestock.[60] Typically, herds are small, consisting of cattle, small ruminants, equine and poultry. Agriculture is responsible for 98 per cent of water use, and within that, crop production is responsible for 65 per cent of water use.

There is a gender gap in agricultural productivity in Ethiopia.[61] This means that there is no reason to assume that the benefits of increasing agricultural productivity, agricultural growth and poverty reduction would be equitably shared between women and men, given strongly gendered normative ideals and their impact on the material position of women. Indeed, in that the biggest driver of improved rural consumption is increased accumulation of assets, including land ownership, livestock ownership, and ownership of various durables including a cellphone, television and bicycle,[62] that there is a gender bias in the distribution of assets suggest that gender gaps in agricultural productivity and asset accumulation might be mutually-reinforcing in locking in part of the rural

54 World Bank (2020) "Ethiopia poverty assessment: harnessing continued growth for accelerating poverty reduction." Available: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/992661585805283077/ethiopia-poverty-assessment-harnessing-continued-growth-for-accelerated-poverty-reduction (access of 8 April 2024).

55 World Bank (2020) "Ethiopia poverty assessment: harnessing continued growth for accelerating poverty reduction." Available: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/992661585805283077/ethiopia-poverty-assessment-harnessing-continued-growth-for-accelerated-poverty-reduction (access of 8 April 2024).

56 World Bank (2019) "Ethiopia gender diagnostic report: priorities for promoting equity." Available: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/300021552881249070/ethiopia-gender-diagnostic-report-priorities-for-promoting-equity (accessed on 8 April 2024).

57 World Bank (2019) "Ethiopia gender diagnostic report: priorities for promoting equity." Available: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/300021552881249070/ethiopia-gender-diagnostic-report-priorities-for-promoting-equity (accessed on 8 April 2024).

58 UN Women (2015) *Progress of the World's Women, 2015 – 2016: Transforming Economies, Realizing Rights*. Available: http://progress.unwomen.org/en/2015/ (accessed on 18 March 2022).

59 The data is from AquaStat, which is available at https://data.apps.fao.org/aquastat/?lang=en, and which is continually updated.

60 FAO (2020) "The future of livestock in Ethiopia: opportunities and challenges in the face of uncertainty." Available: https://reliefweb.int/report/ethiopia/future-livestock-ethiopia-opportunities-and-challenges-face-uncertainty (accessed on 25 April 2024).

61 Annex Figure A Gender gap.

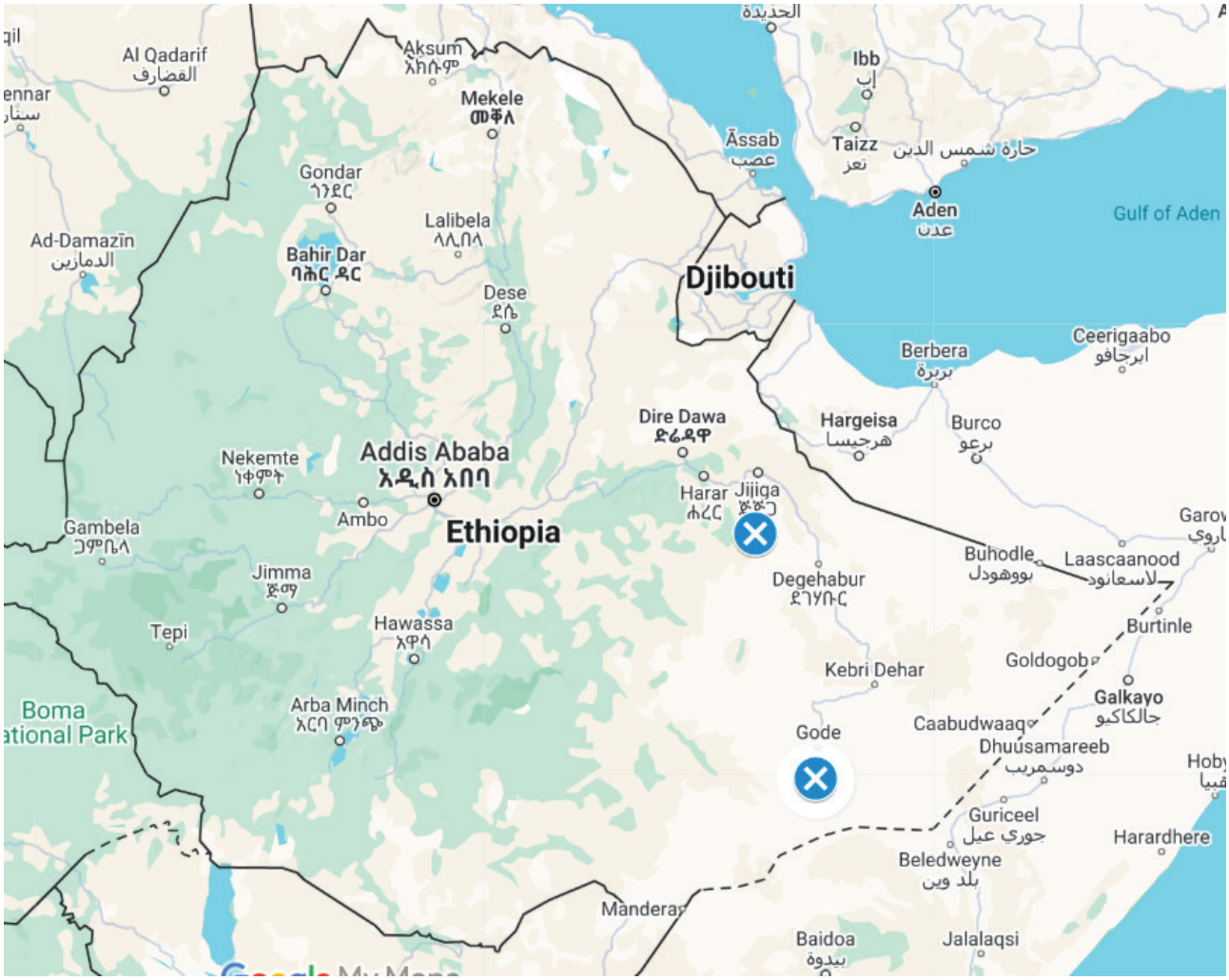
62 World Bank (2020) "Ethiopia poverty assessment: harnessing continued growth for accelerating poverty reduction." Available: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/992661585805283077/ethiopia-poverty-assessment-harnessing-continued-growth-for-accelerated-poverty-reduction (access of 8 April 2024).

population – women plot managers – into poverty traps. Moreover, in rain-fed agriculture access to water for production is attached to the control of land. In this light, gender gaps in agricultural productivity might reflect gender bias in access to water for agricultural production because of land with poorer soils or land for which women do not have the time to adequately undertake soil fertility management. Therefore, efforts at closing any gender gaps in agricultural productivity and its sources, as well as the gendered sources and practices that facilitate asset accumulation, requires understanding the relationship between gender, land and water.

3.2 The field sites

Research was undertaken in the Somali region of northeast Ethiopia in July 2024. The region is largely classified as dry, arid and semi-arid, with an average growing season of between 60 and 120 days. The research took place in villages (kebeles) that lay within a six-hour drive of the Jigjiga and Gode WFP Field Offices, illustrated in Figure 1. Village selection was coordinated between the WFP Field Offices and a non-governmental organization that was undertaking programming for the WFP.

FIGURE 1: Research sites in Ethiopia



Across the two locations 10 villages were visited. Household membership was patrilineal and patrilocal. Polygamy was common across the villages, as was child marriage at an early age. The villages ranged in size from a population of 2275 to that of a multi-village cluster with a population of 33000. The average size of a household ranged from 6 to 8 people. To a greater or lesser degree all the villages were principally engaged in agro-pastoralism, cultivating sorghum, maize, barley and vegetables, among other crops, as well as having herds of cattle with as many as 20 cows, herds of sheep and goats of up to 25 each, and chickens. Local seed varieties predominated, agro-chemical fertilizers and plant protection measures were not widely used, and in some villages larger-scale farms hired tractors to assist with land preparation. In the area around Jigjiga production had been hampered by a multi-year drought, and the changing climate had resulted in farm tasks taking longer to complete. Eight of the 10 villages were rain-fed and two villages had irrigation systems. Of these, two were arid, three were villages with low potential for agricultural productivity increases, and three were villages with high potential for agricultural productivity increases. Households sought to market any agricultural surpluses to obtain the money needed to buy *khat*, which was regularly consumed by the men in the villages. Men regularly undertook daily waged labour, intensifying the amount of work required by women and adolescent girls and boys on the farm. Those villages that did have access to boreholes or water pans / *haffirs* used them primarily for household consumption. In the villages where water pans or access to irrigation was not private there were water user's committees, and women in the villages were made chair of the committee. Every village had several agricultural households led by a widow who relied upon adolescent girls and boys and waged labour to work their land. In these households it was generally the case that stocks of land and livestock were smaller and that incomes were lower. Moreover, it was expected that when the oldest male child reached adulthood, they would take control of the household and the farm. However, women-led households had greater autonomy of decision-making. Men's focus groups ranged in size from 10 to 19 people, while women's focus groups ranged in size from 8 to 15 people.

3.3 Land and livestock

Access to water requires access to land, which acts to mediate access. All land in the villages were held under customary tenure that had lasted over generations, but the men of the villages insisted that they "owned" the land even though many of them had no written title of use rights as they had yet to benefit from the government's land certification scheme. Those that did have certificates had the names of both spouses on it, but some women were not aware of what the certificate meant. One woman put it thus: "I don't believe it is my land." Land holdings ranged from 0.5 hectares to 25 hectares and, on one occasion, 50 hectares, but most commonly land holdings were at the lower end of the scale, being between 1 and 5 hectares despite common land being widely available. Men who were unable to make an adequate living from their land might occasionally rent it out, for ETB 2000 per hectare per year, but there was no market in the buying and selling of land use rights. Rental receipts were controlled by men. Use rights over communal land was inheritable; priority would be given to young adult men and those older. When children were younger, widows gained control of the land.

To understand land-based agrarian and gender relations in the Somali region, it is vital to understand the role of polygamy, which structures the operation of rural households that are not led by women. Polygamy is a form of marriage involving multiple spouses. In Ethiopia's Somali region, it takes the form of polygyny, when a man has multiple wives concurrently. The family of the groom pays a bride price to secure a bride, usually in cattle, after which the bride moves to be close to the household of the groom. In

polygamous marriages in Ethiopia senior wives are assigned to manage certain plots of land by their husband, who tends to reside with the most junior wife. Thus, polygamous households have two types of farm plots: those controlled by men—which were commonly, if misleadingly, referred to as joint plots because in the event of a disagreement men always have the final say—and those controlled by women. The plots controlled by women were used to provide food staples for the wives' household, including the husband when he chose to eat with them.

TABLE 1: Women's access to land

	Polygamous marriages assign women land	Who makes decisions on assigned land	Assigned land has identical soil quality	Women obtain land independently of men
Jigjiga				
Kebele 1	Yes	Joint	Yes	Yes
Kebele 2	Yes	Joint	Yes	Yes
Kebele 3	Yes	Man	Yes	
Kebele 4	Yes	Man	Yes	Yes
Kebele 5	Yes	Joint	Yes	No
Gode				
Kebele 6	Yes, and monogamous	Joint	Yes	Yes
Kebele 7	Yes	Woman	Yes	Yes
Kebele 8	Yes	Joint	Yes	
Kebele 9	Yes	Joint	Yes	Yes
Kebele 10	Yes	Joint	Yes	Yes
Total	**10 of 10: Yes**	**9 of 10: Joint or man**	**10 of 10: Yes**	**7 of 8: Yes**

Table1 contains data on women and access to land in the Somali region derived from the focus group discussions with men and women. Table 1 demonstrates that in all cases polygamous marriages resulted in women being assigned land to work by their husband so that they can grow staples for household consumption. Indeed, in one instance land is assigned to women in the case of monogamous households. However, women in receipt of plots by and large do not have autonomous decision-making power over that land. In 9 of 10 cases decisions are made by the man or jointly; in the latter instance men have the final say in the use of the land, which means that it is not a joint decision at all. There is no difference in soil quality between the plots managed by men and the plots managed by women. Finally, Table 1 shows that despite men's control of the land the household "owned," women in those households did seek additional land to work independently of their husbands. In some cases, this land was under customary tenure but not previously farmed; in some cases, groups of women rented land. In many instances, this land was worked by self-help groups of women rather than individuals. In some instances, men did not help, and in some instances men did not even know where the independently-controlled land was located. Where they did not contribute to production men were unaware of the production of the independently controlled land; in most instances it was used for household consumption but in some cases crops were marketed, with women controlling the receipts from the marketing.

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The other major asset controlled by the household was livestock. Although men's focus groups claimed that livestock were jointly owned by spouses, women's focus groups said that the final say over the sale or purchase of cattle was the men's decision, and men retained full control of the money obtained from a sale. One man stated that if his wife were to sell a cow without his permission "I may kill her." Milk from livestock was sold by women for ETB 60- 70 a liter, who most of the time controlled the money from the sales. In some villages sheep and goats could be sold by women without the permission of the senior man in the household, but those were the exception to the rule. When men had final responsibility for the sales or purchase of sheep and goats all money from sales were controlled by the men. Chickens were completely the responsibility of women; men did not care about them. Thus, earnings from the sale of eggs and chickens were controlled by women. Grazing at a distance – often a distance of tens of kilometers -- would be done by young adult or fully adult men. Boys and girls from the age of 8 might be assigned the responsibility for grazing and watering cattle, sheep and goats near to the village.

3.4 Labour

With a gender division of labour within the household there must be a gender division of labour on the farm. That such is the case is demonstrated in Table 2. Table 2 shows that while women always work on plots of land controlled by men, in 4 out of 10 cases men do not work on plots of land independently controlled by women. The reason for this lies within the social relations of polygamy in Ethiopia. In polygamous households' women are expected to work on plots of land controlled by their spouses and on unpaid care and domestic work for the household, assisted by adolescent girls and boys. Working from before the sun rises to after the sun sets, Table 2 shows that in all 10 cases women state that the performance of unpaid care and domestic work places a hard limit on how much time they can spend in agricultural activities. Moreover, some of women's farm work on men's plots is "disguised," in that it resembles unpaid care and domestic work – for example, the production of food and beverages within the household to be delivered to the men of the household, the waged labour and the exchange labour assisting the men of the household in tasks on the farm. All women do this work. Only when these tasks are completed can women work on the plots of land that they control, whether they are assigned in a polygamous household or obtained independently. Yet to do this work women need time, and this is a constraint that they face because of their responsibilities to work on men's plots and perform unpaid care and domestic work. Lacking time, tasks during the crop cycle may be compromised. If soil fertility management is one of the tasks that is compromised, the result would be poorer soils, a lower infiltration rate, and runoff. The efficacy of the rainwater that fell on the land would be less for women – a gendered outcome.

TABLE 2: Women's labour on the farm and in the household

	Women work on men's plots	Men work on women's independent plots	Wage labour works on men's plots	Wage/ exchange labour works on women's plots	Women say men spend far less time on farm labour than claimed by men	Women provide food and beverages on farm	Women say unpaid care and domestic work limits labour on farm	Men perform daily waged labour
Jigjiga								
Kebele 1	Yes	No	Yes	Yes	Yes	Yes	Yes	No
Kebele 2	Yes	Yes	No	Yes		Yes	Yes	Yes
Kebele 3	Yes	Yes	2 of 17	Yes		Yes	Yes	Yes
Kebele 4	Yes	No	Yes	Yes		Yes	Yes	Yes
Kebele 5	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Gode								
Kebele 6	Yes	Yes		Yes		Yes	Yes	Yes
Kebele 7	Yes	No	Yes	Yes	No	Yes	Yes	No
Kebele 8	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Kebele 9	Yes	Yes	No	Yes	Yes	Yes	Yes	No
Kebele 10	Yes	No	No	Yes	No	Yes	Yes	Yes
Total	**10 of 10: Yes**	**6 of 10: Yes**	**4 of 9: Yes**	**10 of 10: Yes**	**3 of 6: Yes**	**10 of 10: Yes**	**10 of 10: Yes**	**7 of 10: Yes**

As a result of heavy workloads, women are always reliant upon exchange labour received from other women: family and friends work as a self-help group. They also heavily rely on adolescent girls and boys, both on and land and in the household. This is especially the case for households led by women. Conversely, there is no social expectation that men will work on land controlled by their spouses. As a result, men and women's labour for the household's agricultural livelihood is unbalanced. With women's farm labour on men's plots supported by hired farm labour on those plots in 4 out of 9 cases, men are, if they so choose, able to reduce their contribution to farming and instead undertake waged labour. The corollary of course is that women's work intensifies. Thus, in 3 out of 6 cases women say men overstate their contribution to farm labour and in 7 out of 10 cases men undertake waged labour.

The data from the 10 villages demonstrated that men often know very little of women's working lives and at the same time were consistent in overstating their contribution to the labour requirements of the household. Men understood that women worked much of the day in unpaid care and domestic work, but did not know for how long or in what tasks. As one man said, "I have no idea" about how much unpaid care and domestic work was being carried out. Men also consistently underestimated how much time women worked on plots of land, commonly saying that the maximum amount of time they could spend would be 2 hours a day. Part of the reason for this is because men may believe that women and men do different farm tasks; for example, ploughing is men's work and weeding is women's work. However, while this can be the case, it is not always so. Thus, in some villages women worked at every stage of

the crop cycle, including ploughing. In agriculture women and adolescent girls and boys serve as a highly flexible labour source, working as and when needed when instructed to do so by men. Women said that they worked "all the day," usually spending 6 – 8 hours a day working on the farm and anywhere between 5 and 13 hours collecting water and fetching firewood, assisted by children and adolescent girls and boys. Women were especially assisted by young and adolescent girls, who worked on the farm, helped in the collection of water and the fetching of firewood, and did unpaid care and domestic to both assist and substitute for her mother. Conversely, boys' responsibilities were to the large livestock from a very young age. The gendered natures of young people's work meant that in some instances girls were removed from school so that they could provide labour for the household until they were married.

Men often stated that they spent 6 – 8 hours working on the farm; but they also said that they would regularly look for daily waged labour at ETB 400 or so a day and that such a search would often result in them being absent from the farm for days and weeks at a time. Indeed, men's reliance on daily waged labour was increasing over time because of the impact of climate change on agricultural livelihoods through its impact on yields, which would seem to contradict men's claimed amount of work on the farm. Moreover, there is the issue of *khat*: men said they could spend between 8 and 12 hours a day chewing the mild narcotic, meaning that *khat* consumption displaced work as a principal daily activity and that even when they were not physically absent men were, in a very real sense, contributorily absent.

It is difficult to disentangle the specific impacts of climate change on aspects of farm activities and livelihoods. In part, this is because of the continual process of adaptation that small-scale farms must undertake. Livestock dies because of drought, or if not dead are sold to cope with drought. Grazing lands for remaining herds may be further away, and accessing those lands under customary tenure might spark conflicts over land with neighbouring villages who see the land as "theirs." It is also in part because climate change is increasing workloads across the board, both in agriculture and in unpaid care and domestic work; at best tasks must be repeated because of drought or flooding that is not anticipated, while at worst men, women and children are displaced, which also increases workloads. With lesser stocks of assets, it is probable that households led by women have a lesser capacity to adapt to climate change.

3.5 Water for agricultural production

As noted, in 8 out of the 10 villages rainwater was the principal source of water for agricultural production. When the rains were good two crops a year was possible; but not when the rains were bad, as was increasingly the case with climate change. The implications for livelihoods, food security and nutrition are clear. In this light, it was encouraging to witness 9 of the 10 villages seeking to capture water, usually in a lined or unlined water pan / *haffir*, a small water tank, or a water bund funded by the government or by a non-governmental organization. However, that water that was captured was for the most part for household consumption; occasionally it would be used to water livestock. Boreholes were also used to obtain water for household use. Thus, water by and large was not used for production. This points to the greatest constraint in rainwater capture in the Somali region: a lack of capacity. A lack of capacity to capture rain and surface runoff hinders access to water for agricultural production. Moreover, notwithstanding the fact that 3 of 9 villages had private rainwater capture for both own use and for sales, 8 of 9 villages had communal rainwater-capturing water pans. This suggests that vastly increasing the number of rainwater and surface runoff capture facilities funded by government could crowd in private sector rainwater and surface runoff capture. It is also of note that while communal rainwater capture facilities were built

by mobilizing villagers to contribute labour to their building, villagers were not mobilized to consider ways of building household rainwater and surface runoff capture facilities. Access to communal rainwater capture facilities was equitable – indeed, women were more likely to use the facilities as they were principally responsible for household water supplies-- while access to private rainwater capture facilities required money, which was in limited supply for the villages in the region.

Two villages had irrigation systems. In one water was pumped using solar power from a river into a reservoir, from where it was distributed to farm plots. Pumps were both individually owned and co-operatively controlled, and all farms had equal access to irrigation water. Villages with irrigation were notably more prosperous, as they were always able to produce two crops a year, yields were good, and they grew easily marketable fast-maturing vegetables. As a result of receiving enough water at the right time, these villages also took advantage of the opportunities afforded by agro-chemical plant growth and plant protection inputs. Hired labour was also used across the entirety of the cropping cycle, and tractors were hired at ETB 1200 an hour to plough fields, a particularly onerous task.

Both rain-fed and irrigated villages had water management committees, responsible for maintaining the operation of rainwater capture facilities or irrigation systems. Women were members of the water management committees that oversaw water governance, and indeed one village had a women's quota. It was also common for women to serve as chairs of the water management committees. Households led by women were also on the water management committees. As chairs responsible for implementing the operations and maintenance of rainwater capture facilities women's voices were not only heard but also respected, in part because rainwater capture was primarily for household consumption.

Across all villages access to timely and adequate water resulted in significantly higher yields. In all but one case when the rains were good or irrigation was used yields of staples such as sorghum, maize, wheat and *khat* could be three times higher than when villages faced drought. In the former case, farms consistently produced marketable surpluses across all major crops. Only one village failed to produce a marketable surplus across all major crops when the rains were good. Clearly, water is a critical input for both food and cash crops, which explains why irrigated villages were materially better-off than rain-fed villages.

3.6 Income

Table 3 provides information on sources of income and the extent to which income flows into the household are shared between men and women. It has already been noted that households led by women had lower incomes than those led by men. There are 5 principal sources of income flows: receipts from crop sales; daily wages for men and adolescent daughters; the selling of large livestock; the selling of eggs and milk; and petty trading.

Only 3 of **10 cases** where **women control money received** from crop sales

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TABLE 3: Income flows

	Control of money from crop sales	Sharing of men's wages/non-wage income?	Women/daughters earn cash?	Women are petty traders?
Jigjiga				
Kebele 1	Joint	N/A	Yes	Yes
Kebele 2	Joint	Yes	Yes	No
Kebele 3	Women	Yes	No	Yes
Kebele 4	Men	No	Yes	Yes
Kebele 5	Women	Yes	Yes	Yes
Gode				
Kebele 6	Women	No	Yes	No
Kebele 7	Joint	N/A	Yes	Yes
Kebele 8	Men	No	Yes	Yes
Kebele 9	Men	N/A	No	No
Kebele 10	Men	No	Yes	Yes
Total	**3 of 10: Women**	**4 of 7: No**	**8 of 10: Yes**	**7 of 10: Yes**

Table 3 demonstrates that income flows are asymmetrically distributed within the household between men and women. First, when crops are sold, when it is understood that so-called "joint" control of money in fact leaves the man with the final say, then in only 3 of 10 cases do women control the money received from crop sales; men ultimately have greater control over money from crop sales, and indeed women often do not know the price at which the crop was sold. Second, where men earn daily wages or obtain income from selling large livestock, in 4 of 7 cases that money is not shared with the senior woman of the household. In the case of wages from daily waged labour, women do not know how much men agree to be paid, and when men are absent for periods of time women do not know how many days that they have worked during that absence. In the case of receipts from the sale of large livestock these are never shared equitably nor is the sale price disclosed to the woman. Moreover, even when income flows are shared it is not an equitable distribution of the flows of income. As one man said, "I am the bank," with the man providing the woman with a highly contingent and highly-variable "allowance." Considering major income flows being controlled by men, women earn money from selling eggs and milk and it is regularly the case that adolescent daughters who are not married will work in local shops for daily wages that are passed over to their mother. The final source of income is from petty trading. Women are commonly petty traders, as demonstrated in Table 3, but their ability to establish a petty trading enterprise differs from village to village. In some cases, men provide start-up money for trading shops run by women but where men expect all or some of the receipts from petty trading to be given to the man. In some cases, men provide start-up money for trading shops run by women, who control the receipts from the petty trading. In a minority of cases, women can save enough money to independently establish petty trading enterprises, the revenues from which they control. In these cases, women may need the permission of the man to do so.

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Cumulatively, except for households led by women any sharing of income flows across the villages is an exception to the rule that the man is the first custodian of household money. This is especially the case when child marriage is involved. As such, men and women do not know how much money the other has available to them. Consequently, men and women have different spending patterns. Men spend the money they have on themselves: on *khat*, on their mobile phones, on food and beverages with their friends and, when absent for periods of time, paying for sex workers. They also contribute to household expenses. However, women are the ones who are expected to spend any money that they have on meeting household needs. They do not spend money on their own socializing.

3.7 Decision-making and intimate partner violence

With women in households led by men accessing land through men, not being allowed to independently own livestock, and not having equitable access to total household income inflows, women have a materially weaker resource base than men. This then feeds into the allocation of decision-making responsibilities. Households led by women also have a materially weaker resource base.

Table 4 documents the principal decision-maker across 3 different sets of decisions in households led by men, along with presenting limited evidence on the extent of intimate partner violence.[63]

TABLE 4: Decision-making and intimate partner violence

	Who makes minor spending decisions?	Who makes major spending decisions?	Do women need permission from a man to leave the area?	Is intimate partner violence present?	What are the causes of intimate partner violence?
Jigjiga					
Kebele 1	Joint	Joint	Yes	Yes	Control of resources
Kebele 2	Women	Joint	Yes	No	
Kebele 3	Women	Women	Yes		
Kebele 4	Joint	Joint	Yes	Yes	Control of resources
Kebele 5	Women	Men	Yes	Yes	Control of resources
Gode					
Kebele 6	Women	Women	Yes		
Kebele 7	Joint	Women	Yes	Yes	Control of resources
Kebele 8	Men	Men	Yes	No, but a man covered his face in shame	
Kebele 9	Men	Men	Yes		
Kebele 10	Women	Men	Yes		
Total	**5 of 10: Women**	**3 of 10: Women**	**10 of 10: Yes**	**4 of 5: Yes**	**4 of 4: Resources**

63 Limited because circumstances did not permit pursuit of these questions.

As noted earlier, in Table 4 joint decisions should be considered the man's domain because men have the final say over contested joint decisions. Recalling that women are responsible for the spending required to meet household needs, it is somewhat surprising that in only 5 of 10 cases do women have the authority to make minor spending decisions. Not only do women require men's acquiescence to decisions such as whether to buy cooking oil, in some instances men will do the actual shopping – and not necessarily complete the requested task. In this light, it is possibly surprising that in 3 of 10 cases women can take responsibility for major spending decisions such as education fees or the buying of some goats. However, it is expected that when women make these decisions, they will assume responsibility for financing the spending – which means that they can make major decisions only if they have the money, which is usually not the case. Finally, in every instance across the 10 villages women did not have the freedom to travel independently of agreement from a man. Across the three questions, then, women did not have equal decision-making authority compared to that of a man. This was especially the case for married adolescent girls. Thus, not only do women have a materially weaker resource base than do men, but without adequate resources many women are under the decision-making authority of men.

Clearly, while "women are part of the world," as one woman put it, "a woman needs a man," as one man put it. Enforcing this dependence is intimate partner violence. As depicted in Table 4, in a large majority of the cases where enquiries were made intimate partner violence was present and was enabled by disputes over the control of resources. Married adolescent girls were in a particularly weak position to resist intimate partner violence. Thus, men use intimate partner violence to ensure that they control the decision-making over significant usage of resources: money, livestock and land, to be sure, but also labour. Women for the most part accept the legitimacy of intimate partner violence, in part because they are socialized to accept it as "normal", in part because of the wide prevalence of child and early marriage, and in part because of their peer group in the village. Indeed, some women are of the view that when intimate partner violence takes place it is the fault of the women that receives it. Intimate partner violence ensures that biased decision-making is enforced: women work on plots of land controlled by men as well as in unpaid care and domestic work for the household before any work is undertaken on plots of land controlled by women. Men seek to enforce these arrangements because within their communities and clans the status of the head of the household is increased by the number of livestock the household has and the extent to which the man has autonomy from the obligations imposed upon them by their household and family. To achieve this, women must effectively be "the property of men," as one man said. Women acquiesce to this because they seek the autonomy that comes from compliance, a social compromise predicated upon inequality that nonetheless leaves them to raise their children and limit their significant interactions with men.

3.8 Conclusions from the Ethiopian field sites

Water is essential to the production of marketed surpluses in rural Ethiopia, and thus to improvements in incomes, food security and nutrition. However, most farms in Ethiopia are rain-fed, and there is a lack of capacity to capture rainwater and surface runoff that hinders access to water for agricultural production. Moreover, access to water for production is gendered, including rainfall, which reflects and affects gender-based differences in agricultural production and productivity, food security and nutrition. This is because in the Somali region of Ethiopia household structures reflect widespread polygamous marriages.

Men, controlling the land that they "own" in the households that they lead, assign their wives plots of land to work to produce food for their household. That land which is assigned has soil of the same quality as that operated by men.[64] In addition, many women independently operate land as part of a women's self-help group. However, before work can be done on the land that they control, women are expected to both perform extensive unpaid care and domestic work in the household and in the community as well as working on that land which is controlled by men. As a result, women have insufficient amounts of time to undertake adequate soil fertility management on their plots of land, an activity that can affect the infiltration capacity of water into the soil. This serves to reinforce the position of men as those who both have higher productivity on their land as well those who control significant income flows. This hierarchical household structure reinforces women's dependence on men for land and financial resources, while maintaining this compliance is often upheld through intimate partner violence. This is especially the case for married adolescent girls. Gendered access to water for production is legitimated in the social norms and values that underpin gender relations. It is only by tackling those social norms and the values that sustain intimate partner violence head-on that the implications of gendered access to water for production can be properly addressed and women's agricultural production and productivity improved in ways that are clearly beneficial to the members of their household and themselves.

64 It should be noted, though, that recent research has suggested that in Ethiopia there are significant differences in soil fertility and the slope of the land on plots managed by men and plots managed by women. See: https://www.sciencedirect.com/science/article/pii/S2666154323004672 (accessed on 13 November 2024).

4.

Findings from South Sudan

Research location:
Warrap state

Location classification:
moist / semi-arid

Growing season:
120-180 days

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SOUTH SUDAN

4.1 The context

Agriculture share in **GDP increased** from **4.7%** to **9.6%**

Only 7% of the state budget is **allocated toward** the **Ministry of Agriculture and Food Security**

In South Sudan the share of agriculture in GDP has doubled, from 4.7 per cent in 2011 to 9.6 per cent in 2020.[65] Some 80 per cent of South Sudanese have agriculture as their primary livelihood activity;[66] food prices are a significant component of inflation; food imports have risen from 9 per cent of merchandise exports in 2014 – 2016 to 40 per cent of merchandise exports in 2019 – 2021;67 the cereal trade deficit is 35 per cent of overall food requirements;[68] 7 per cent of the state budget is allocated toward the Ministry of Agriculture and Food Security;[69] and the cereal harvest of sorghum and maize is an important determinant of macroeconomic stability because of widespread food insecurity. South Sudan is an agricultural country, and this is recognized by the Government, which pursues an agriculture-led development strategy. However, with 74 per cent of those employed in agriculture being women, women are overrepresented in agricultural employment; men are underrepresented.[70] Moreover, women are responsible for 80 per cent of all agricultural activities, including manual labour.[71] Thus, agriculture is becoming steadily feminized.

With the Nile River Basin covering 97.5 per cent of the country, South Sudan has plentiful water resources, although this means that the country depends upon surface water resources that originate beyond its borders. The country has approximately 49.5 billion cubic meters of total renewable freshwater resources, although these are unevenly distributed across the country and subject to high inter-seasonal variation.[72] Nonetheless, South Sudanese agriculture relies upon rainwater. Small-scale farms undertake own use-oriented or market-oriented surplus production. Sorghum accounts for 70 per cent of cereal harvests and maize accounts for 21 per cent of cereal harvests.[73] Livestock is also very important to rural livelihoods in South Sudan, producing over 13 per

65 The data is from Index Mundi, which is available at https://www.indexmundi.com/facts/south-sudan/indicator/NV.AGR.TOTL.ZS, and which is continually updated. The figure is low because of the role of oil in the economy.

66 Deutsche Gesellschaft für Internationale Zusammenarbeit (2022) "Country Pastoralism and Small-Scale Farming Profile – South Sudan." Available: https://nelga.org/wp-content/uploads/2023/01/South-Sudan-Country-Profile-Pastoralism-and-Smallscale-farming.pdf (accessed on 15 April 2024).

67 The data is from FAOStat, which is available at https://www.fao.org/faostat/en/#home, and which is continually updated.

68 World Bank (2022) "South Sudan economic monitor: towards a jobs agenda." Available: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099650002152233681/p1737580e2efa4025093600b8be2b53aa10 (accessed on 15 April 2024).

69 Republic of South Sudan Ministry of Finance and Planning (2022) "Quarterly macroeconomic update: Q1FY 2022/2023." Available: https://mofp.gov.ss/doc/Q1FY2022_23EconomicandBudgetImplementationReport.pdf (accessed on 15 April 2024).

70 The data is from the World Development Indicators of the World Bank, which are continuously updated, and which are available at https://databank.worldbank.org/source/world-development-indicators.

71 FAO and World Bank (2022) "Transforming agriculture in South Sudan: from humanitarian aid to a development-oriented growth path." Available: https://openknowledge.worldbank.org/server/api/core/bitstreams/1502044e-e098-519e-96cc-4eac1058491a/content (accessed on 15 April 2024).

72 The figure is from https://knoema.com/atlas/South-Sudan/topics/Water/Total-Renewable-Water-Resources/Renewable-water-resources, and is continually updated.

73 FAO and WFP (2022) "2021 FAO/WFP Crop and Food Security Assessment Mission (CFSAM) to the Republic of South Sudan." Available: https://www.wfp.org/publications/special-report-2022-faowfp-crop-and-food-security-assessment-mission-cfsam-lao-peoples (accessed on 16 April 2024).

cent of agricultural GDP, more than half of which is accounted for by milk production.[74] Agriculture is responsible for an estimated 36 per cent of water use.[75] Agricultural demand for water is highest in the northern regions of the Upper Nile state, followed by more limited demand in the east and southwest.[76]

There is no documented evidence regarding possible gender gaps in agricultural productivity in South Sudan. However, there are significant gender gaps in agriculture. As noted, women do the bulk of farm work, having principal responsibility for farm tasks including seeding, weeding, harvesting, shelling, threshing and winnowing, all of which are time- and labour-intensive. At the same time, while women's land rights are protected under the Land Act of 2009, rural households led by women, where husbands or men relatives are dead, can be denied the formal ownership of property, including land, because land authorities and institutions are both unaware of women's land rights and develop and implement policies that contradict the existing legal framework by prioritizing the centrality of customary land tenure systems that vary widely between ethnic groups.[77, 78] As a result, only 13 per cent of women in 5 counties of South Sudan even realized that they had legal and constitutional rights to property ownership, including land.[79] This means that apart from households led by women women's access to land is mediated by men and derived from their positions as mothers, wives, daughters and sisters, which in turn means that women's access to rainwater for agricultural production is a function of their access to land that is largely controlled by men. From this, other inequalities can follow; most importantly, there can be gender bias in the ownership of livestock, which is the most important asset after land. Access to agricultural inputs and technologies, agricultural extension services, agricultural finance and credit facilities can also be gender-biased.[80] While women have the right to control their own crop harvests, they are expected to first and foremost meet their family's food needs from their own labour and in this sense social norms dictate how crops are used.[81] Women can sell the food crops that they produce if necessary, but do not control any cash crops that are produced by the farm household as these are considered "men's crops".[82] In light of this, it is clear that the rural economy of South Sudan must be approached as a gendered structure. Moreover, with access to water for rain-fed agricultural production being attached to the control of land, gender gaps in agricultural production might reflect women receiving land from men that has poorer soils or land for which women do not have the time to adequately undertake the necessary soil fertility management.

74 IGAD (2016) "The contribution of livestock to the South Sudan economy." Available: https://www.icpald.org/wp-content/uploads/2019/08/Policy-Brief-on-the-Contribution-of-Livestock-to-South-Sudan-National-GDP-Jan-2016.pdf (accessed on 25 April 2024).

75 Borgomeo, E., Chase, C., Salazar Godoy, N., and Kwadwo, V.O. (2023) *Rising from the Depths: Water Security and Fragility in South Sudan*. Washington, DC: World Bank. Available: https://openknowledge.worldbank.org/entities/publication/91048a50-eacb-5a24-9fa4-30cf8a9a9c9b (accessed on 21 April 2024).

76 USAID (n.d.) "South Sudan Water Resources Profile." Available: https://www.globalwaters.org/sites/default/files/south_sudan_country_profile_final.pdf (accessed on 21 April 2024).

77 African Development Bank (2023) "South Sudan country gender profile: building resilience through humanitarian and development interventions." Available: https://www.afdb.org/en/documents/south-sudan-country-gender-profile-january-2023 (accessed on 15 April 2024).

78 FAO and World Bank (2022) "Transforming agriculture in South Sudan: from humanitarian aid to a development-oriented growth path." Available: https://openknowledge.worldbank.org/server/api/core/bitstreams/1502044e-e098-519e-96cc-4eac1058491a/content (accessed on 15 April 2024).

79 African Development Bank (2023) "South Sudan country gender profile: building resilience through humanitarian and development interventions." Available: https://www.afdb.org/en/documents/south-sudan-country-gender-profile-january-2023 (accessed on 15 April 2024).

80 FAO and World Bank (2022) "Transforming agriculture in South Sudan: from humanitarian aid to a development-oriented growth path." Available: https://openknowledge.worldbank.org/server/api/core/bitstreams/1502044e-e098-519e-96cc-4eac1058491a/content (accessed on 15 April 2024).

81 African Development Bank (2023) "South Sudan country gender profile: building resilience through humanitarian and development interventions." Available: https://www.afdb.org/en/documents/south-sudan-country-gender-profile-january-2023 (accessed on 15 April 2024).

82 African Development Bank (2023) "South Sudan country gender profile: building resilience through humanitarian and development interventions." Available: https://www.afdb.org/en/documents/south-sudan-country-gender-profile-january-2023 (accessed on 15 April 2024).

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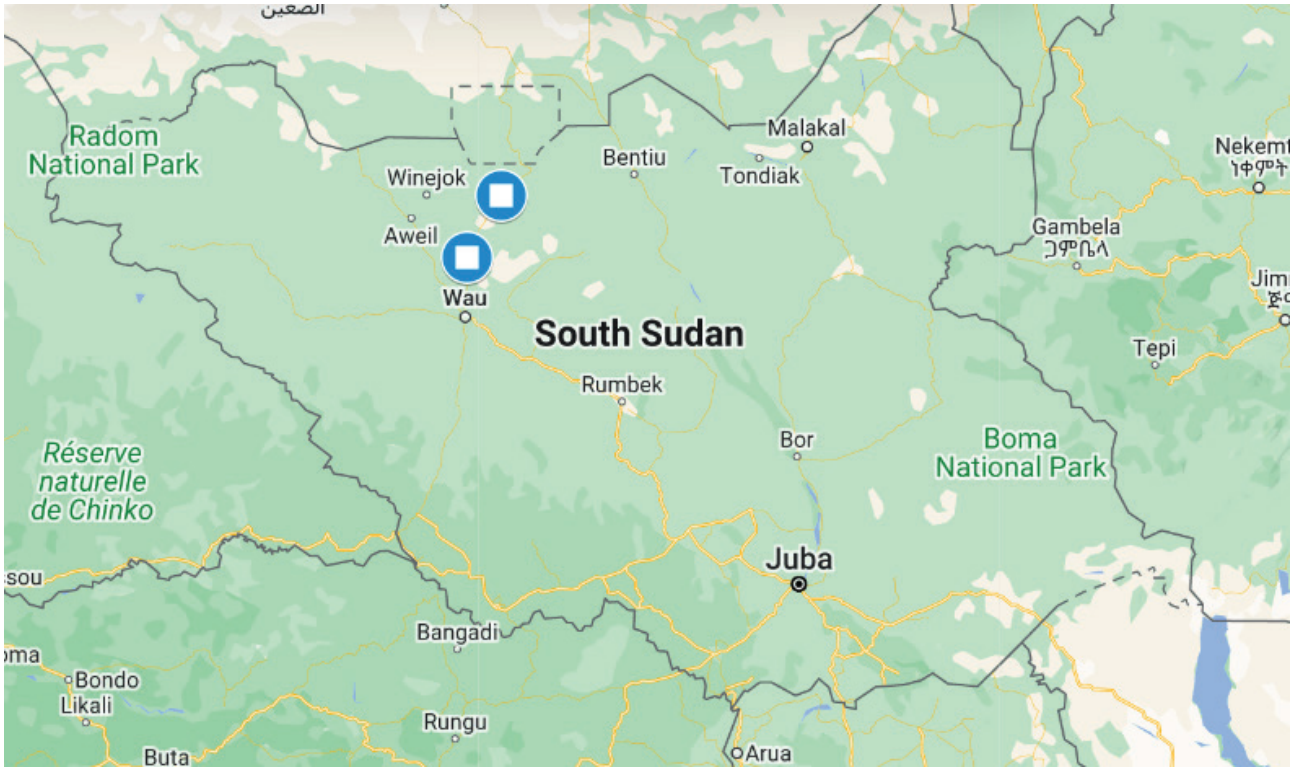
4.2 The field sites

Research was undertaken in Warrap state in July and August 2024. The state is largely classified as being moist and semi-arid, with an average growing season of between 120 and 180 days. Soils are for the most part good for cultivation. However, there is a narrow time in which cultivation can be optimized. Most farming is rain-fed. The research took place in villages that lay within a four-hour drive of the Kuajok WFP Field Office and Wunrok, illustrated in Figure 2. Village selection was coordinated between the WFP Country and Field Offices and a non-governmental organization that was undertaking programming for the WFP.

FIGURE 2: Research sites in South Sudan



Agricutural production was **hampered** by **very late rains** and **climate change**

Across the two locations 6 multi-cluster "villages" were visited; each "village" had several "sub-villages" in proximity, for a grand total of 17 sub-villages. Household membership was patrilineal and patrilocal. Polygamy was common across the clustered villages, as well as child marriage at an early age. The clustered villages ranged in size from a population of 3900 to that of 12861. The average size of a household ranged from 6 to 8 people. Food insecurity was visible in the two locations, in the form of stunting. To a greater or lesser degree all the villages were principally engaged in agro-pastoralism,

cultivating sorghum, maize, groundnuts, beans and vegetables, among other crops, as well as having what appeared to be small herds of cattle, small herds of sheep and goats, and chickens. While people were unwilling to disclose the size of their herds, it was reported that one of the households in each of two clustered villages had 500 cows. With a single cow having a market value of approximately US$200,[83] it was implied that these two households had assets in the form of cattle worth US$100000. Local seed varieties predominated, and agro-chemical fertilizers and plant protection measures were not used. Better-off households used oxen for land preparation, but those who were not better off prepared land manually. In some villages it was said that production was being hampered by very late rains, and the changing climate had resulted in farm tasks taking longer to complete. Although all 6 of the clustered villages were rain-fed, they all had a high potential for agricultural productivity increases. Households sought to market any agricultural surpluses that they produced. Men regularly undertook daily waged labour, intensifying the need for women's farm labour as well as that of adolescent girls and boys. In villages close to rivers some men fished. Clustered villages had access to water pans, which were used primarily for household consumption, but which also provided water for nearby market micro-gardens producing fast-maturing vegetables such as onions and okra. Some villages had boreholes, and some had access to nearby rivers. In the villages where water pans had been constructed by a non-governmental organization there were water user's committees, and women in the villages had been chair of the committee. Every village had several agricultural households led by a widow who relied upon older children and waged labour to work their land. Women from these households also sat on water management committees. In these households it was generally the case that stocks of land and livestock were smaller and that incomes were lower. Moreover, it was expected that when the oldest male child reached adulthood, they would take control of the household and the farm. However, women-led households had greater autonomy of decision-making. Men's focus groups ranged in size from 10 to 42 people, while women's focus groups ranged in size from 10 to 23 people.

4.3 Land and livestock

As is the case throughout East Africa, access to rainwater is a function of access to land. All land in the villages were held under customary tenure that had lasted over generations, but the men of the villages that led households insisted that they "owned" the land even though they had no written title of use rights. Land holdings ranged from 1 to 12 hectares, but most commonly land holdings were between 3 and 5 hectares despite common land being widely available. There was no market in the buying and selling of land. Use rights over communal land was inheritable; priority would be given to young adult men and those older. When children were younger, widows gained control of the land.

As in Ethiopia, polygamy structured the operation of rural households that were not led by women. Bride price was paid by the groom's family to secure a wife. In polygamous marriages senior wives are assigned to manage certain plots of land by their husband, who tends to reside with the most junior wife. In some instances, the plots assigned to women were in fact larger than the plots retained by men. So polygamous households had two types of farm plots: those controlled by men—which were misleadingly referred to as joint plots because, once again, in the event of a disagreement men had the final say about the use of the land—and those controlled by women. The plots controlled by women were used to provide food staples for the wives' household, including the husband when he chose to eat with them. Where women had sizeable assigned plots agricultural surpluses were produced, which women sold to meet household expenses.

83 The estimate is based on the information supplied from focus groups.

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TABLE 5: Women's access to land

	Polygamous marriages assign women land?	Who makes decisions on assigned land?	Assigned land has identical soil quality?	Women obtain land independently of men?
Kuajok				
Village 1	Yes	Man	No, poorer	No
Village 2	Yes	Man	No, poorer	Yes
Village 3	Yes	Woman	No, poorer	No
Wunrok				
Village 4	Yes	Woman	No, poorer	Yes
Village 5	Yes	Joint	No, poorer	Yes
Village 6	Yes	Woman	No, poorer	Yes
Total	**6 of 6: Yes**	**3 of 6: Joint or man**	**6 of 6: Poorer**	**4 of 6: Yes**

Apart from households led by women, Table 5 contains data on women and access to land in Warrap state derived from the focus group discussions with men and women. Table 5 demonstrates that in all cases polygamous marriages resulted in women being assigned land to work by their husband so that they can grow staples for household consumption. However, women in receipt of plots at times do not have autonomous decision-making power over that land. In 3 of 6 cases decisions are made by the man or jointly; in the latter instance men have the final say in the use of the land, which means that it is not a joint decision at all. Women clearly claimed that the land that they were assigned had soils of poorer quality than those lands managed by men. Finally, Table 5 shows that despite men's control of the land the household "owned," women in some of those households commonly sought additional land to work independently of their husbands. Most commonly this land was under customary tenure but not previously farmed. It was common for this land to be "far away," as one woman said. In many instances, this land was worked by self-help groups of women rather than individuals so that farmwork could be combined with unpaid care and domestic work across a group of women. In some instances, men did not even know where the independently controlled land was located and they did not know the production of the independently controlled land; in most instances it was used for household consumption but in some cases crops were marketed, with women controlling the receipts from the marketing.

The other major asset controlled by the household was livestock. Women's focus groups suggested that while women's ownership of cows, sheep and goats was rare, it did happen, although it was the exception to the rule and men's focus groups bluntly stated that "women don't own cattle." Except for households led by a woman, men did not have to consult women to buy cattle and men retained full control of the money obtained from the sale of cattle. Only in the absence of men who were doing daily waged labour for extended periods of time did women take full responsibility for the health, well-being and safety of the animals, and, even then, women could not independently decide to sell a cow. In some villages sheep and goats could be sold by women without the permission of the senior man in the household, but those were the exception to the rule. Chickens were completely the responsibility of women; men did not care about them. Grazing at a distance – often a distance of tens of kilometers– would be done by young adult or older men. Boys and girls from the age of 8 might be assigned the responsibility for grazing and watering cattle, sheep and goats near to the village. Milk and eggs from livestock were sold by women who most of the time controlled the money from the sales.

The social status of men in Warrap state was defined by the number of cattle and sons that they had. As one woman put it, "men love cows more than they love their wives." For this reason, some men seemed unaware of the size of the land that they were operating. Moreover, attaching status to the number of sons one has helps explain why child marriage and polygamy persists. To have more sons' men take more wives who are very often not adults. However, to do that they need more cows, which means they must produce marketable surpluses. Thus, the enhancement of social status is the most important impulse behind the accumulation of cattle in Warrap state.

4.4 Labour

Table 6 demonstrates that there is a gender division of labour on the farm. Women work on plots of land controlled by men – work that is increasing because of climate change and the fact that many tasks need to be repeated – but men often do not work on plots of land independently controlled by women. As in Ethiopia, the reason for this lies within the social relations of polygamy; women are expected to work on plots of land controlled by their spouses and on unpaid care and domestic work for the household. The performance of unpaid care and domestic work then places a fixed constraint on how much time they can spend in agricultural activities, and such work is increasing because of climate change. As one woman said, she was "never able to do all the farmwork" because of unpaid care and domestic work responsibilities. Moreover, the production of food and beverages within the household by women had to be delivered to the men of the household as well as waged labour and exchange labour assisting the men of the household in tasks on the farm. This demonstrates that some women's farm work on men's plots is "hidden." All women do this work. Only when these tasks are completed can women then go and work on the plots of land that they control, whether they are assigned in a polygamous household or obtained independently. Yet to do this work women need time, and this is a constraint that they face because of their responsibilities to work on men's plots and perform unpaid care and domestic work. Lacking time, tasks during the crop cycle on the plots controlled by women may be compromised, which is especially damaging when soils are poor. If soil fertility management is compromised within the context of poor soils, the result would be even poorer soils, a lower infiltration rate, and runoff. The efficacy of the rainwater that fell on the land would be less for women.

As a result of heavy workloads, women commonly relied upon exchange labour received from other women: family and friends work as a self-help group. They also heavily rely on adolescent girls and boys, both on and land and in the home. This is especially the case for households led by women. Conversely, there is no social expectation that men will work on land controlled by their spouses. Indeed, there is no social expectation that men will work on their land at all. Most women agreed that "the men don't work on the farm much" and that no man worked all day on the farm. One man was blunter: "I don't work." As a result, men and women's labour for the household's agricultural livelihood is unequal. With women's farm labour on men's plots supported by hired farm labour on those plots in 3 out of 6 cases, men are, if they so choose, able to reduce their contribution to farming and instead undertake waged labour. With a reduction in men's availability to work, women and adolescent girls and boys were expected to increase their availability to work. Thus, in 6 out of 6 cases women say men overstated their contribution to farm labour, which men claimed was around 6 hours a day. Girls also work more than boys. One man explained: "I monitor the wives' cultivation every day." In 5 out of 6 cases men undertake daily waged labour. Construction was an especially favoured type of work because the pay was higher. Search for and then undertaking construction work would often result in men being absent from the farm for days and weeks at a time, and during that time "women do everything," as one woman said. Indeed, men's reliance on daily waged labour was increasing over time because of the impact

of climate change on agricultural livelihoods through its impact on yields, which would seem to contradict men's claimed amount of work on the farm. However, some men were absent from the farm because they fished in water pans, ponds and rivers for household consumption, or they sold firewood or charcoal.

TABLE 6: Women's labour on the farm and in the household

	Women work on men's plots	Men work on women's independent plots	Wage labour works on men's plots	Wage/ exchange labour works on women's plots	Women say men spend far less time on farm labour than claimed by men	Women provide food and beverages on farm	Women say unpaid care and domestic work limits labour on farm	Men perform daily waged labour
Kuajok								
Village 1	Yes	N/A	No	Yes	Yes	Yes	Yes	No
Village 2	Yes	No	No	Yes	Yes	Yes	Yes	Yes
Village 3	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Wunrok								
Village 4	Yes	No	No	Yes	Yes	Yes	Yes	Yes
Village 5	Yes	Not clear	Yes	Yes	Yes	Yes	No	Yes
Village 6	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Total	**6 of 6: Yes**	**4/5 of 5: No**	**3 of 6: Yes**	**6 of 6: Yes**	**6 of 6: Yes**	**6 of 6: Yes**	**5 of 6: Yes**	**5 of 6: Yes**

Men often know very little of women's working lives, consistently underestimating how much work they did. They knew that women did unpaid care and domestic work, but did not know for how long or in what tasks. Women also worked at every stage of the crop cycle, including ploughing. These tasks were getting harder as climate change made farmwork both more difficult and lengthier. Cumulatively, in agriculture women and their children serve as a highly flexible labour source, working as and when needed when instructed to do so by men, whose instructions normally take precedence because of social expectations and whose time in the fields were limited: "men rarely spend time on the farm" said one woman. By way of contrast, women usually worked 6 – 8 hours a day on the farm and anywhere between 1 and 4 hours collecting water and fetching firewood, assisted by young and adolescent girls and boys. The water that is collected is for household consumption and not farm production.

4.5 Water for agricultural production

In all 6 villages rainwater was the principal source of water for agricultural production. When the rains were good two crops a year was possible; but not when "the rains are too late," as one man said. In 5 of the 6

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©UN WOMEN

villages efforts were made capture rainwater; in three this took the form of an unlined water pan of 34 x 34 x 3 funded by the WFP and in two villages private operators collected and sold rainwater. However, that rainwater that was captured was for the most part for household consumption, especially in the dry season; it was though used to water vegetable market micro-gardens by jerrycan and occasionally it would be used to water livestock. Boreholes were also used to obtain water for household use. This points to the greatest constraint in rainwater capture: a lack of capacity. A lack of capacity to capture rain and surface runoff hinders access to water for agricultural production. This suggests that vastly increasing the number of rainwater and surface runoff capture facilities funded by government could crowd in private sector rainwater capture. It is also of note that while communal rainwater capture facilities were built by mobilizing villagers to contribute labour to their building, villagers were not mobilized to consider ways of building household rainwater and surface runoff capture facilities for productive purposes for each other. Access to communal rainwater capture facilities and boreholes was equitable – indeed, women were more likely to use the facilities as they were principally responsible for household water supplies– while access to private rainwater capture facilities required money, which was in limited supply for the villages in the region.

The villages with collective water pans had water management committees, responsible for maintaining the operation of rainwater capture facilities. Women were members of the water management committees, which made decisions by consultation and consensus. Households led by women also had members of the water management committees. Indeed, some water management committees consisted entirely of women. It was common for women to serve as chairs of the water management committees. While in general "men have more voice in the water management committee," when women were chairs responsible for implementing the operations and maintenance of rainwater capture facilities women's voices appear to have been respected by many but not all men because they were leading. In this way, some women were able to express agency. In addition, in one village the borehole's management was the responsibility of a woman.

Across all villages access to timely and adequate water resulted in significantly higher yields. When the rains were good yields of staples such as sorghum and maize could be significantly higher than when villages faced drought. In the former case, farms consistently produced marketable surpluses across all major crops. Clearly, water is a critical input for agriculture.

4.6 Income

Table 7 provides information on sources of income and the extent to which income flows into the household are shared between men and women for households that are led by men. There are 6 principal sources of income flows: receipts from crop sales; daily wages for men and adolescent daughters; the selling of large livestock; the brewing and selling of alcohol; the selling of milk and eggs; and petty trading.

TABLE 7: Income flows

	Control of money from crop sales	Sharing of men's wages/non-wage income?	Women/daughters earn cash?	Women are petty traders?
Kuajok				
Village 1	Women	No	Yes	Yes
Village 2	Women	Yes	Yes	Yes
Village 3	Women	No	Yes	Yes
Wunrok				
Village 4	Men	No	Yes	Yes
Village 5	Women	No	Yes	Yes
Village 6	Women	No	Yes	Yes
Total	**5 of 6: Women**	**5 of 6: No**	**6 of 6: Yes**	**6 of 6: Yes**

Table 7 demonstrates that income flows in households led by men are unequally distributed within the household between men and women. First, when crops are sold in 5 of 6 cases women control the money received from crop sales. Second, where men earn daily wages or obtain income from selling large livestock in 5 of 6 cases that money is not shared with the senior woman of the household. In the case of wages from daily waged labour, women do not know how much men agree to be paid, which can range from between US$1 to US$3 per day. When men are absent for periods of time working construction women do not know how many days that they have worked during that absence. One woman said that men "don't share at all" when they earn wages from construction. In the case of receipts from the sale of large livestock these are never shared equitably nor is the sale price disclosed to the woman. It was also noted a couple of times that in the dry season some men would hire water trucks and sell water for a profit. Moreover, even when income flows are shared it is not an equitable distribution of the flows of income, with the man providing the woman with either a highly contingent and highly-variable "allowance" or directly buying household provisions. With major income flows being controlled by men, women earn money from selling milk and eggs and it is regularly the case that adolescent daughters who are not married will work in local shops for daily wages that are passed over to their mother. The final source of income is from petty trading. Women are commonly petty traders, as demonstrated in Table 7, but their ability to establish a petty trading enterprise differs from village to village. In some cases, men provide start-up money for trading shops run by women but where men expect all or some of the receipts from petty trading to be given to the man. In some cases, men provide start-up money for trading shops run by women, who control the receipts from the petty trading. In a minority of cases, women can save enough money to independently establish petty trading enterprises. In these cases, while women retain the revenues from the enterprise, they may need the permission of the man to set it up.

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Cumulatively, any sharing of income flows in households led by men across the villages is an exception to the rule that the man is the first custodian of household money. This is especially the case when child marriage is involved. As such, men and women often do not know how much money the other has available to them. Indeed, some women noted that if they shared money with men the men would cease offering them any financial assistance at all. With a lack of sharing, men and women have different spending patterns. Men spend the money they have on themselves: on alcohol, on their mobile phones, on food and beverages with their friends and, when absent for periods of time, paying for sex workers. Men also buy cows without consulting women. Men contribute to household expenses, including healthcare expenses and school fees, but never equitably. Women are the ones who are expected to spend any money that they have on meeting household needs. They do not spend money on their own socializing. Nonetheless, in their spending patterns some women can express autonomous agency.

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4.7 Decision-making and intimate partner violence

With women in households led by men accessing some of the land they operate through men, not being allowed to independently own livestock, and not having equitable access to total household income inflows, women have a materially weaker resource base than men. This is also true for households led by women. This then feeds into the allocation of decision-making responsibilities. Table 8 provides information on the household's principal decision-maker in households led by men across 3 different sets of decisions, along with presenting evidence on intimate partner violence.

TABLE 8: Decision-making and intimate partner violence

	Who makes minor spending decisions?	Who makes major spending decisions?	Do women need permission from a man to leave the area?	Is intimate partner violence present?	What are the causes of intimate partner violence?	What is the severity of intimate partner violence?
Kuajok						
Village 1	Women	Men	Yes	Yes	Money, sex, alcohol	Femicide
Village 2	Women	Men	Yes	Yes	Money, sex, alcohol	Femicide
Village 3	Women	Men	Yes	Yes	Sex	Femicide
Wunrok						
Village 4	Men	Men	Yes	Yes	Sex, alcohol	Femicide
Village 5	Women	Men	Yes	Yes	Money, sex, alcohol	Femicide
Village 6	Women	Men	Yes	Yes	Sex, alcohol	Femicide
Total	**5 of 6: Women**	**6 of 6: Men**	**6 of 6: Yes**	**6 of 6: Yes**	**6 of 6: Sex 5 of 6: alcohol 3 of 6: money**	**6 of 6: Femicide**

Recalling that women are responsible for the spending required to meet household needs, it is not surprising that in 5 of 6 cases women have the authority to make minor spending decisions. That notwithstanding, though, in some instances when women earn money they must inform the man as to how the money is being used. Moreover, in 6 out of 6 cases men have final responsibilities for major spending decisions such as buying cattle. Indeed, while women make all decisions when men are absent working they cannot make major spending decisions; men control women's autonomy through mobile telephones. Indeed, as we have seen, when absent men make decisions about selling cattle, they do not share the proceeds of the transaction equitably with women even though, as one woman said, "men waste money." Finally, in every instance across the 6 villages women did not have the freedom to travel independently of agreement from a man. Across the three questions, then, while women in some households led by men had agency, they nonetheless did not have equal decision-making authority compared to that of a man. This was especially the case for married adolescent girls. Thus, not only do women have a materially weaker resource base than do men, but without adequate resources many women are under the decision-making authority of men.

Enforcing this dependence is intimate partner violence. As depicted in Table 8, in 6 out of 6 villages intimate partner violence was present. In one village it was so "very common" that the women were seeking to have a women's center made available to them. Intimate partner violence was enabled by: women's unwillingness to engage in sexual relations; alcohol consumption; and disputes over money.

Given that the number of boy children reflects a man's status a woman's refusal to engage in sexual relations might be seen as a questioning of that status. In terms of disputes about money, men were known to take their wives' money, by force if necessary, to engage in social activities. In addition, men used intimate partner violence to ensure that they maintained control of household resources. Married adolescent girls were in a particularly weak position to resist intimate partner violence. The consequences of intimate partner violence were major: femicides had taken place in 6 out of 6 villages. In one instance intimate partner violence has resulted in a life-long mental infirmity for the victim.

Intimate partner violence was a more specific expression of the more generalized presence of widespread gender-based violence. Thus, women collecting firewood had been raped in one village and in another a 10-year-old girl going to the market had been raped. Moreover, underpinning the presence of intimate partner and gender-based violence, some women believed that men had the right to beat women. Having said that, women also believed that they had the right to beat men, and did so. Nonetheless, men use intimate partner violence to ensure that they maintain their status in their own eyes and the eyes of their peers as well as control the decision-making over significant usage of resources: money, livestock and land, to be sure, but also labour. Intimate partner violence helps ensure that women work on plots of land controlled by men as well as in unpaid care and domestic work for the household before any work is undertaken on plots of land controlled by women. Women also give men the first share of food that is prepared, to ensure that men eat to their satisfaction, even when food is short. Women accede to this because they seek the autonomy that comes from compliance, a compromise predicated upon inequality that nonetheless leaves them the agency to raise their children and limit their significant interactions with men.

4.8 Conclusions from the South Sudanese field sites

Improvements in incomes, food security and nutrition in rural South Sudan are predicated upon access to water for agricultural production, which can facilitate increases in marketed surpluses. However, most farms in South Sudan are rain-fed, and there is a noticeable lack of capacity to capture rainwater and surface runoff. This severely restricts access to water for agricultural production. Moreover, access to water for production is gendered, including rainfall, which reflects and affects gender-based differences in agricultural production and productivity, food security and nutrition. This is because except for households led by women, in Warrap state household structures reflect widespread polygamous marriages. Men, controlling the land that they "own" in households that they lead, assign their wives plots of land to work to produce food for their household. That land which is assigned may have poorer quality soil than that land operated by men. In addition, many women independently operate land as part of a women's self-help group. However, before work can be done on the land that they control, women are expected to both perform extensive unpaid care and domestic work in the household and in the community as well as working on that land which is controlled by men. One woman said it best: "women do everything." As a result, women can have insufficient amounts of time to undertake adequate soil fertility management on their plots of land which may have poorer quality soils. This serves to reinforce the position of men as those who both have higher productivity on their land as well those who control significant income flows. Higher productivity and incomes allow men to invest in more cows that can be used as the bride price for more wives. In this way, men can increase the available labour force to work the land that they control. In so doing, men's need to labour on their land is reduced even as their incomes rise. Men effectively become managers of women's labour that is used to increase the incomes of men. This hierarchical household structure sustains women's dependence on men for land and money in households led by men, especially in the case of married adolescent girls. It is enforced using intimate partner violence, which brings material benefits to men, and which comprises one element of the broader prevalence of gender-based violence. While there can be several circumstances in which women are able to express meaningful agency, it is nonetheless the case that gendered access to water for production is legitimated in the social norms and values that underpin gender relations. It is only by addressing those social norms and values directly that the implications of gendered access to water for production can be properly addressed and women's agricultural production and productivity improved in ways that are clearly beneficial for their agency and their household.

5.

Findings from Kenya

Research location:
Isiolo / Tharaka Nithi

Location classification:
dry / arid / semi-arid

Growing season:
60-90 days

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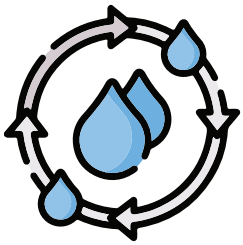
KENYA

5.1 The context

In Kenya agriculture is responsible for between 20 and 25 per cent of real GDP growth, and while its share of GDP is declining, food prices dominate inflation, food and agricultural input subsidies are an important share of state spending, agricultural commodities are 65 per cent of exports, and the maize harvest is an important determinant of macroeconomic stability.[84] In this sense, then, for the peoples of Kenya the country remains agricultural. Agriculture has a commercial sub-sector, but the vast majority of farms are small-scale market-oriented or subsistence farmers,[85] who control 57 per cent of the farmed area, operate on average only 2.5 hectares,[86] and are responsible for almost 75 per cent of agricultural production by value.[87] The vast bulk of small-scale farmers use traditional hoe-based agrarian technologies and rely upon the rain as the principal source of water, cultivating maize, beans and potatoes. Some 84 per cent[88] of small-scale farms also rear livestock-- cattle, small ruminants and poultry – and the livestock sector accounts for 4.4 per cent of the country's GDP. More than half of all livestock is found in the arid and semi-arid lands, where 90 per cent of the population raise animals both for milk and beef production.[89] Crop production, livestock and fishing is consistently the single most important source of income for both poor and non-poor households in rural areas, at 64 per cent and 53 per cent, respectively.[90] Moreover, agriculture is making an important contribution to poverty reduction over time in Kenya; those who have farming as their principal livelihood activity contributed 31.4 per cent of all poverty reduction.[91] Having said that, almost 80 per cent of the 36.1 per cent of the country's population that lives below the 2016 international poverty line of US$1.90PPP per adult live in the countryside.[92]



Kenya has
30.7 billion
cubic meters of total
renewable freshwater resources

42% of **renewable freshwater resources** used in **crop production** out of **90%** used in **Agriculture**

84 World Bank (2019) "Kenya economic update: unbundling the slack in private sector investment – transforming agricultural sector productivity and linkages to poverty reduction." Available: https://www.worldbank.org/en/country/kenya/publication/kenya-economic-update-transforming-agricultural-productivity-to-achieve-food-security-for-all (accessed on 10 April 2024).

85 As defined in the International Standard Classification of Occuptions, ISCO-08 Sub-Major Groupings 62 and 63.

86 The number of smallholder farmers is difficult to isolate in Kenya. This figure comes from the Alliance for a Green Revolution in Africa, and can be found at https://agra.org/news/how-agra-plans-to-build-resilience-of-kenyan-smallholder-farmers/ (accessed on 10 April 2024). Part of the issue is that in Kenya there are multiple definitions of what constitutes a smallholder farmer.

87 Kenya National Bureau of Statistics (2022) *Economic Survey* 2022. Available: https://new.knbs.or.ke/publications/ (accessed on 10 April 2024).

88 UN Women (2023) "Country gender equality profile: Republic of Kenya." Available: https://africa.unwomen.org/en/digital-library/publications/2024/02/country-gender-equality-profile-kenya (accessed on 10 April 2024).

89 FAO (2019) "The future of livestock in Kenya: opportunities and challenges in the face of uncertainty." Available: https://www.preventionweb.net/publication/future-livestock-kenya-opportunities-and-challenges-face-uncertainty (accessed on 25 April 2025).

90 World Bank (2019) "Kenya economic update: unbundling the slack in private sector investment – transforming agricultural sector productivity and linkages to poverty reduction." Available: https://www.worldbank.org/en/country/kenya/publication/kenya-economic-update-transforming-agricultural-productivity-to-achieve-food-security-for-all (accessed on 10 April 2024).

91 World Bank (2019) "Kenya economic update: unbundling the slack in private sector investment – transforming agricultural sector productivity and linkages to poverty reduction." Available: https://www.worldbank.org/en/country/kenya/publication/kenya-economic-update-transforming-agricultural-productivity-to-achieve-food-security-for-all (accessed on 10 April 2024).

92 The data is from the World Development Indicators of the World Bank, which are continuously updated, and which are available at https://databank.worldbank.org/source/world-development-indicators.

Some 85 per cent of Kenya's area is considered arid or semi-arid.[93] The country has 30.7 billion cubic meters of total renewable freshwater resources.[94] Agriculture is responsible for 90 per cent of water use, and within that, crop production is responsible for 42 per cent of water use.[95] Women account for about 51 per cent of employment in the agricultural sector workforce,[96] but women's employment in agriculture fell by more than 30 per cent between 2010 and 2022, compared to just over a 12 per cent decline for men's employment in agriculture.[97] Young and adolescent girls and boys also commonly work in agriculture. Almost 70 per cent of all women engaged in employment work as own-account or contributing family labour and are therefore unpaid.[98]

As has been suggested, evidence suggests that there is a gender gap in agricultural productivity in Kenya. This means that there is no reason to assume that the benefits of increasing agricultural productivity, agricultural growth and poverty reduction would be equitably shared between women and men, given strongly gendered normative ideals and the material outcomes they produce. Indeed, in that the biggest driver of improved rural consumption is increased accumulation of assets, including land ownership, livestock ownership, and ownership of various durables including a mobile phone, television and bicycle,[99] that there is a gender bias in the distribution assets suggest that gender gaps in agricultural productivity and asset accumulation might be mutually-reinforcing in locking in part of the rural population – women plot managers – into poverty traps. Moreover, in rain-fed agriculture access to water for production is attached to the control of land. In this light, gender gaps in agricultural productivity might reflect gender bias in access to water for agricultural production because of land with poorer soils or land for which women do not have the time to adequately undertake soil fertility management. Therefore, efforts at closing any gender gaps in agricultural productivity and its sources, as well as the gendered sources and practices that facilitate asset accumulation, requires understanding the relationship between gender, land and water.

5.2 The field sites

Research was undertaken in Isiolo and Tharaka Nithi counties in northeast Kenya in August and September 2024. The region is largely classified as dry, arid and semi-arid, with an average growing season of between 60 and 90 days. Soils are good for farming but require close management because of widespread soil exhaustion. The research took place in villages that lay within a four-hour drive of Meru, illustrated in Figure 3. Village selection was coordinated between the WFP Country and Field Offices and a non-governmental organization that was undertaking programming for the WFP.

93 The data is from UN Environment's Interactive Country Fiches, which is found at https://dicf.unepgrid.ch/ethiopia/water (accessed on 8 April 2024), and which is continually updated.

94 The data is from AquaStat, which is available at https://data.apps.fao.org/aquastat/?lang=en, and which is continually updated.

95 The data is from UN Environment's Interactive Country Fiches, which is found at https://dicf.unepgrid.ch/ethiopia/water (accessed on 8 April 2024), and which is continually updated.

96 The data is from FAOStat, which is available at https://www.fao.org/faostat/en/#data, and which is continually updated.

97 The data is from the World Development Indicators of the World Bank, which are continuously updated, and which are available at https://databank.worldbank.org/source/world-development-indicators.

98 "World Bank (2018) "Kenya poverty and gender assessment 2015/16: a decade of progress and the challenges ahead." Available: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/905491550155961925/kenya-poverty-and-gender-assessment-2015-2016-reflecting-on-a-decade-of-progress-and-the-road-ahead (accessed on 10 April 2024).

99 World Bank (2020) "Ethiopia poverty assessment: harnessing continued growth for accelerating poverty reduction." Available: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/992661585805283077/ethiopia-poverty-assessment-harnessing-continued-growth-for-accelerated-poverty-reduction (access of 8 April 2024).

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FIGURE 3: Research sites in Kenya

Across the two counties 8 villages were visited. Household membership was patrilineal and patrilocal. While less common than in Ethiopia or South Sudan, polygamy was still widespread because of a syncretic understanding of sharia. Moreover, it was a common aspiration for men – in one village it was agreed in the men's focus group that 40 per cent of adult men would take another wife if they could afford it. It was also routine for men to have "secret" common-law spouses and families in a nearby urban area that they would stay with when absent from the village for the purpose of seeking waged work; men thought that their wife or wives were unaware of these extra-marital relationships. Child marriage was also common; sexual activity by age 15 was high, according to a key informant in Tharaka Nithi. However, while marriage is a source of pride for women and adolescent girls, it should be noted that divorce rates have been rising.

The villages ranged in size from a population of 280 to that of a multi-village cluster with a population of 11175. The average size of a household ranged from 6 to 8 people. Between 15 and 20 per cent of households were led by women, who relied upon adolescent girls and boys and waged labour to work their land. In these households it was generally the case that stocks of land and livestock were smaller and that incomes were lower. Moreover, it was expected that when the oldest male child reached adulthood, they would take control of the household and the farm. However, women-led households had greater autonomy. To a greater or lesser degree most villages in the two counties were principally engaged in agro-pastoralism, cultivating maize, sorghum, millet, beans and a variety of vegetables, among other crops, as well as having herds of cattle with as many as 10 cows, camels, herds of sheep and goats of up to 200 each, and chickens. Having said that, climate change has led to a reallocation of livestock: fewer cattle and increased numbers of sheep and goats because the latter are more drought resistant, and the numbers of livestock per household was reported to be falling by a key informant. Two villages in Tharaka Nithi had households that had commercial dairy operations that used cross-bred Friesian cows. Both counties witnessed beekeeping being practiced, and fishing was done by men who lived close to a river. In both counties it was common for land preparation to be done manually or with oxen; the use of machinery was the exception to the rule. At other stages of the crop cycle work was done by hand. Local seed varieties predominated, and agro-chemical fertilizers and plant protection measures were not widely used in the two counties even though climate change had resulted in the arrival of tree locusts in Tharaka Nithi for the first time. Although relations of reciprocity and the availability of adolescent girls and boys reduced the need for it waged labour is increasing in importance in the two counties, and men and women regularly undertook it, both on- and off-farm. Two of the 8 villages were rain-fed; both were in Tharaka Nithi. Of the 6 that had irrigation, one in Isiolo had a canal system, and the remainder used manual pumps, pipes and occasionally sprinklers. Three irrigation systems

were communal; two in Tharaka Nithi and one in Isiolo. These were overseen by a water management committee in which women were active, and women in the villages could be chair of the committee. Irrigation was widespread because of the proximity of Mount Kenya. Households sought to market any agricultural surpluses, although two villages in Tharaka Nithi, both rainfed, reported never producing consistent surpluses. *Khat* was regularly consumed by the men in the villages in both counties, for periods of between 7 and 10 hours a day. It was a common view across the focus groups in both Tharaka Nithi and Isiolo that villages were neglected because the county government was absent: it didn't consult with communities about their needs and extension workers did not reach the villages. Men's focus groups ranged in size from 10 to 16 people, while women's focus groups ranged in size from 9 to 15 people.

5.3 Land and livestock

As noted, in households led by men access to rainwater is mediated through access to land. In all 8 villages in households led by men land was held under customary tenure that had lasted over generations. In some villages this was codified in land use certificates, in other villages codification was coming, and the remaining villages wanted the codification of land use rights. Nonetheless, even when men did not have land use certificates, they insisted that they "owned" the land. In any event, land is plentiful and the only constraint facing farming households from increasing their operated area was a lack of resources to invest into expanding the operated area. As one woman said, "land is not an issue." In the four villages of Tharaka Nithi land use certificates had been issued and there was a land market – land use certificates were bought and sold, even though the market was "thin." There was also land rental; in one village in Tharaka Nithi half of all households rented at a price of between KSH 6000 and 8000 per acre. Households led by women in Tharaka Nithi were also in receipt of land use certificates, but it was noted in two villages that if only the man's name was on the land use certificate it was very difficult to get the name changed. Women-led households engaged in the land market, buying, selling and renting land, although in generally smaller quantities of land. It was noted by several respondents that the county government of Tharaka Nithi had awarded land use certificates to "big farmers" when in fact the land was being held under customary tenure without a land use certificate and was being operated; it was not "empty." In the villages of Isiolo the issuance of land use certificates had yet to take place. Land holdings ranged from less than 1 hectare to 100 hectares, but most commonly land holdings were between 0.5 and 4 hectares. Use rights over communal land and land with land use certificates was inheritable; priority would be given to young adult men and older men. When children were younger, widows gained control of the land.

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Table 9 contains data on women and access to land in households led by men in the two counties based on the focus group discussions with men and women. Once again polygamy structured the operation of rural households led by men. Men paid bride price to secure a wife, in camels in Isiolo and in cows in Tharaka Nithi. In all 8 villages in polygamous marriages senior wives are assigned to manage certain plots of land by their husband, who tends to reside with the most junior wife. In one case in Isiolo that land consisted of a market micro-garden – but the men in that village only very rarely worked on land that they themselves retained. Moreover, in several cases wives were assigned land to operate in monogamous marriages. It should also be noted that in some cases common law spouses were also assigned land to operate. As one woman put it, "women work on men's land," while another said, "every wife has a portion of land." The quality of the soils on land assigned to women was variable; in some instances, it was poorer and in other instances it was the same as that land which men retained as "their" land to operate. One woman remarked that "soil quality depends on the time spent on soil management." So many households led by men had two types of farm plots: those controlled by men—which were commonly, if misleadingly, referred to as joint plots even though in the event of a disagreement about the use of the land the man would have the final say—and those controlled by women. The plots controlled by women were used to provide food staples for the wives' household, including the husband when he chose to eat with them in those households that were polygamous.

TABLE 9: Women's access to land

	Polygamous marriages assign women land?	Who makes decisions on assigned land?	Assigned land has identical soil quality?	Women obtain land independently of men?
Isiolo				
Village 1	Yes	Women	Yes	No
Village 2	Yes	Men	Depends on soil management	No
Village 3	Yes, micro-gardens	Women	N/A	N/A
Village 4	Yes	Varies	Depends on soil management	Yes
Tharaka Nithi				
Village 5	Yes, and in monogamous	Men	Yes	Yes
Village 6	Yes	Men	Poorer	Yes
Village 7	Yes, and in monogamous	Women	Poorer	Yes, including purchase
Village 8	Yes	Women	Yes	No
Total	**8 of 8: Yes**	**4 of 7: Woman**	**2 of 4: Poorer**	**4 of 8: Yes**

However, it was consistently the case that men did not want to cultivate land. As one woman put it, "men do not have a lot of interest in crops" and so "farms are for women." Indeed, women "must" ensure that men's "land" is cultivated. One village demonstrated the lengths to which this was taken. All land was assigned by men for women to work, and so men "have no land" that they operated. As a result, as one woman put it, "men have no idea what is going on." At the same time, Table 9 shows that women in receipt of plots often do not have autonomous decision-making power over that land. In 3 of 7 cases, of which two were in Tharaka Nithi, cultivation decisions are made by the man, who is in effect a land manager. Table 9 also shows that despite men's control of the land the household "owned," women in those households commonly sought additional land to work independently of their husbands. Three of the villages where this occurred were in Tharaka Nithi. Most commonly this land was under customary tenure but not previously farmed. In many instances, this land was worked by self-help groups of women of between 10 and 15 people rather than individuals so that farmwork could be combined with unpaid care and domestic work across a group of women. In one case in Tharaka Nithi a self-help group purchased land to work, and in another instance in the same county a self-help group rented land to work. In some instances, land used for growing was to produce household consumption but in other cases crops were marketed as they were surplus, with women controlling the receipts from the marketing.

The other major asset controlled by the household was livestock. For households that had livestock an average of 5 cows and 10 sheep and goats were owned. In Isiolo a few households owned camels. In Isiolo households owned shoats, but not in Tharaka Nithi.[100] Women's focus groups suggested that while women's ownership of cows, sheep, goats and shoats was rare, it did happen, although barring households led by a woman it was the exception to the rule.

Except for households led by a woman, men did not have to consult women to buy cattle and men retained full control of the money obtained from the sale of cattle. Some men engaged in the buying and selling of cows as a business. Only in the prolonged absence of men for up to 4 months, who were doing daily waged labour for extended periods of time or grazing cattle at a great distance, did women take full responsibility for the health, well-being and safety of the animals. Even then women cannot independently decide to sell camels or cattle. If she did, she would be "answerable:" "there must be a beating," as one man put it. The capacity of women to independently sell sheep, goats and shoats varied by community; in some cases they could, and in others they could not. When women could not sell sheep, goats and shoats men fully controlled the proceeds from the sale. Chickens were completely the responsibility of women; men did not care about them, and women retained the money from a sale. Milk and eggs from livestock were sold by women who most of the time controlled the money from the sales. Boys and girls from the age of 8 and adolescent boys over 15 might be assigned the responsibility for grazing and watering cattle, sheep, goats and shoats near to the village; households led by women were more reliant on the labour of children and adolescents.

The social status and identity of men in Isiolo and Tharaka Nithi is defined by the number of livestock that they possess. As a result, it was rare for households led by a man to not have any livestock. Indeed, men sought to enhance their status by increasing the number of cows and camels that they owned. To do that, men require access to money, which means that the farm must produce marketable surpluses. Thus, the enhancement of social status is the most important impulse behind the accumulation of cattle in the agro-pastoralist areas of Isiolo and Tharaka Nithi, and the accumulation of camels in Isiolo. As a key informant said, "men help on the farm, but women do far more" because men are focused on their herds of camels and cows, assisted by adolescent girls and boys

100 In Isiolo a shoat is a hybrid between a sheep and a goat.

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5.4 Labour

Table 10 demonstrates that there is a gender division of labour on the farm. In households led by men women always work on plots of land controlled by men – work that is increasing because of climate change and the fact that many tasks need to be repeated – but men for the most part do not work on plots of land independently controlled by women. The social relations of polygamy explain this distinction: women are expected to work on plots of land controlled by their spouses and on unpaid care and domestic work for the household. However, in only 3 of 8 villages in the two counties did women say that the performance of unpaid care and domestic work placed a constraint on how much time they could spend in agricultural activities. Moreover, the production of food and beverages within the household to be delivered to men of the household when they were helping, the waged labour that was hired, and the exchange labour used in assisting in tasks on the farm demonstrates that some women's farm work is "hidden." All women do this work. Yet to do this work women need time, and this is a constraint that they face because of their responsibilities to work on men's plots and perform unpaid care and domestic work. Lacking time, tasks during the crop cycle may be compromised, which is especially damaging when soils are poor. If soil fertility management is compromised within the context of the poorer soils that some women have, the result would be even poorer soils, a lower infiltration rate, and runoff. The efficacy of the rainwater that fell on the land would be less for women.

TABLE 10: Women's labour on the farm and in the household

	Women work on men's plots	Men work on women's independent plots	Wage labour works on men's plots	Wage/ exchange labour works on women's plots	Women say men spend far less time on farm labour than claimed by men	Women provide food and beverages on farm	Women say unpaid care and domestic work limits labour on farm	Men perform daily waged labour
Isiolo								
Village 1	Yes	N/A	Yes	Yes	Yes	Yes	Yes	No
Village 2	Yes	N/A	Yes	Yes	No	Yes	No	Yes
Village 3	N/A	N/A	Yes	Yes	N/A, "men don't want to farm"	Yes	No	No
Village 4	Yes	No	Yes	Yes	No, but men absent and *khat* = 7 hrs/ day	Yes	No	Yes
Tharaka Nithi								
Village 5	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village 6	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Village 7	Yes	No	Yes	Yes	Yes	Yes	No	Yes
Village 8	Yes	No	Yes	Yes	Yes	Yes	No	Yes
Total	**7 of 7: Yes**	**1 of 5: Yes**	**8 of 8: Yes**	**8 of 8: Yes**	**5 of 6: Yes**	**8 of 8: Yes**	**3 of 8: Yes**	**6 of 8: Yes**

Only when work on men's plots and the performance of unpaid care and domestic work are completed can women work on the plots of land that they control, whether they are assigned in a polygamous household, a monogamous household in Tharaka Nithi, or obtained independently. Women thus had heavy workloads; for example, women were expected to manually grind millet every day to make porridge, an arduous and time-consuming task. Fetching water and collecting firewood could take between 1.5 and 11 hours in Isiolo and 1 and 7 hours in Tharaka Nithi. As a result, women are always reliant upon exchange labour received from other women: family and friends work as a self-help group. They also rely on their adolescent girls and boys. This was especially the case for households led by women. Indeed, exchange labour and adolescent labour was often inadequate to the needs of the land operated by women for men and for themselves; if they could afford it, hired labour was also used because working on man's land was prioritized. Women-led households also hired labour when they have sufficient stocks of assets and flows of income, which only occurred in a minority of cases. In such cases that labour that was hired in some cases might be women. In one village in Tharaka Nithi it was noted that without hired labour women didn't have enough time to complete all necessary farm tasks, which impacts on their production and productivity. Indeed, in 5 out of 7 cases, including every village in Tharaka Nithi, women said that their farm productivity was less than that of men; in the remaining two villages in Isiolo women said that time management is the key to farm productivity, and that some women's plots of land that they operate are better managed than the men's plots of land on which they work.

Conversely, there is no social expectation that men will work on land controlled by their spouses. Indeed, there were limited expectations that men would work on their land at all, hiring labour to substitute for any help that they provided. As a result, men and women's labour for the household's agricultural livelihood is unequal. With women's farm labour on men's plots supported by hired farm labour on those plots in 8 out of 8 cases, men are, if they so choose, able to limit their contribution to farming and instead focus on their livestock or undertake waged labour. Women and adolescent girls and boys are expected to increase their labour contribution in such circumstances. Thus, in 5 out of 6 cases women say men overstated their contribution to farm labour, which men claimed was between 4 to 7 hours a day. One woman in Tharaka Nithi put it thus: "men don't want to farm." Indeed, given the time devoted to *khat* consumption it is difficult to see where men would have the time to farm. Moreover, herding livestock at a long distance from the household offered ample opportunity to consume *khat*. Adolescent girls also work more than adolescent boys. In all cases in Tharaka Nithi and in 2 out of 4 cases in Isiolo men undertake daily waged labour, which was usually off-farm and in an urban area, which would often result in men being absent from the farm for weeks and months at a time. Indeed, men's reliance on daily waged labour was, as noted, increasing over time. Pay rates for daily waged labour was KSH 400 a day, a piece-rate or a longer contract. In such cases it was adolescent boys who were responsible for herding the livestock. Men were also absent for prolonged periods when herding their livestock far away from the household.

Men know that women do unpaid care and domestic work, but did not know for how long, the intensity of the work, or in what tasks. Women also worked at every stage of the crop cycle, with tasks getting harder as climate change made farmwork both more difficult and lengthier. In agriculture women and adolescent girls and boys serve as a highly flexible labour source, working as and when needed when instructed to do so by men, whose instructions take precedence and whose time in the fields were limited As a result, women often worked 8 or more hours a day on the farm and similar amounts of time on unpaid care and domestic work, assisted by children and adolescent girls and boys.

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5.5 Water for agricultural production

Two of the villages in Tharaka Nithi and none of the villages in Isiolo were rain-fed. When the rains were good two crops a year was possible: but less so with the increasing variability of rainfall and changes in the length of the growing season. In 3 of the 8 villages, and in both counties, efforts were made capture rainwater; in one village each in each of the two counties this took the form of an unlined water pan, and in one village in Isiolo it took the form of 10000 litre storage tanks assigned to individuals and self-help groups. Water capture facilities were both community and individually owned in both counties. Rainwater collection facilities were provided by international non-governmental organization working with local partners. However, in two villages – one in each county– where rainwater was captured it was for the most part for household consumption; only occasionally would it be used to water livestock. Only in a village in Isiolo with the storage tanks was the water used to irrigate market micro-gardens. Boreholes were also used to obtain water for household use; in one village in Isiolo it was necessary to pay to access the boreholes. No efforts were made to capture surface runoff. This points to the greatest constraint in rainwater capture: a lack of capacity. A lack of capacity to capture rain and surface runoff hinders access to water for agricultural production. This suggests that vastly increasing the number of rainwater and surface runoff capture facilities is an urgent priority. It is also of note that while communal rainwater capture facilities were built by mobilizing villagers to contribute labour to their building, villagers were not mobilized to consider ways of building individual rainwater or surface runoff capture facilities for household and productive purposes for each other. Access to communal rainwater capture facilities and boreholes was equitable, including for households led by women, except for the boreholes that required money to access. Indeed, women were more likely to use the facilities as they were principally responsible for household water supplies.

Of the 6 villages that had irrigation, one in Isiolo had a canal system, and the remainder used pumps, pipes and sprinklers. In these villages the bulk of the agricultural activity was carried out on land that was close to a river. Pumps were privately owned and operated, although in some instances irrigation was shared with neighbouring farms at no cost. Some households in both counties however had neither a pump nor access to a pump. Most pumps were manually operated, as those that needed a generator were costly. Interestingly, in one village the women's self-help group that was independently farming land had invested in a generator. In the canal system channels were built by villagers and later lined by the WFP. In theory all farms had equal access to irrigation water, but in the canal system access to adequate quantities of water at the right time was contingent upon the location of the farm in relation to the water course; those at the tail of the water course received less water, especially during the dry season. It is not clear if this had a disproportionate impact on women's plots or for households led by women. Villages with irrigation were notably more prosperous, as they were always able to produce two crops a year, yields were good, and they grew easily marketable fast-maturing vegetables. As one woman said of a village that had irrigation, "water is not our issue." Villages with irrigation had also witnessed economic diversification: the villages with commercial dairies, where all production was sold, were both irrigated.

Both rain-fed and some of the irrigated villages in the two counties had water management committees, responsible for maintaining the operation of rainwater capture facilities or irrigation systems. Women, including those who led households, were members of the water management committees, and indeed in several villages in both counties women were a majority of the water management committee. It was also common for women to serve as chairs of the water management committees. As chairs responsible for implementing the operations and maintenance of rainwater capture facilities women's voices were not only heard but also respected.

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One village in Isiolo is worth profiling. This village focused on livestock rather than farming. One household had 50 camels, and another had between 30 and 40 goats, sheep and shoats. These were sizeable stocks of assets. In this village men were often absent, grazing livestock far away or working for wages, and not contributing sufficient money to the household was a significant source of spousal conflict. Men are absent for 10 months at a time, and the wife is in control of the homestead during those periods. However, despite their absence, the men retained control of major decisions about buying and selling. Men had the final say in the selling of goats, sheep, shoats and camels. In such circumstances the only farming was in market micro-gardens where the plots were "owned" by men and worked by women and adolescent girls and boys, occasionally with the assistance of waged labour from men. Women did not have any independent land. The choice of vegetables grown in the micro-gardens was made by men, who ensured that water was piped to the gardens from the 10000-liter storage tank that had been built by an international non-governmental organization and is now owned by the village. The tank's maintenance and operations were controlled by a water management committee on which women sat. Women used the vegetables that they grew for household consumption and sold the surplus. Any extra cash remaining after necessary minor spending was deposited into the village savings and credit cooperative, which some women used to finance the opening of a shop that they would run, but whose existence was not disclosed to absent men.

Across all villages access to timely and adequate water resulted in significantly higher yields and the production of marketable surpluses. In two villages in Tharaka Nithi this had led to significant commercialization. However, the two rainfed villages in Tharaka Nithi did not produce marketable surpluses, and one of those villages had witnessed distress sales of crops being sold before they were ready for harvest because of an urgent need to access money. Another village in Isiolo engaged in the production of fast-maturing vegetables to sell at local markets. Households led by women tended to not produce marketable surpluses. Clearly, water is a critical input for agriculture.

5.6 Income

Table 11 provides information on sources of income for households led by men and the extent to which income flows into the household are shared between men and women. There are 8 principal sources of income flows: receipts from crop sales; the selling of livestock; daily wages; the selling of milk, eggs and poultry; the brewing and selling of alcohol; dressmaking; petty trading; and government service. Government service was only done in Tharaki Nithi; the other 7 sources of income were found in both counties. It should be noted that goat's milk and milk from local breeds of cows are sold by women and that men sell camel's milk and commercial milk from cross-bred Friesen cows only in Tharaka Nithi. It should also be noted that 5 men across the 8 villages were boda boda drivers and that historically women from Tharaka Nithi have undertaken waged labour on tea and coffee plantations in the area, distributing all their earnings to fathers and husbands. Finally, lacking an earning man, households led by women tended to have lower incomes.

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TABLE 11: Income flows

	Control of money from crop sales	Sharing of men's wages/non-wage income?	Women/daughters earn cash?	Women are petty traders?
Isiolo				
Village 1	Women	No	Yes	Yes
Village 2	Women	No	Yes	Yes
Village 3	Women	No	Yes	Yes
Village 4	Women	Yes	Yes	Yes
Tharaka Nithi				
Village 5	Men	No	Yes	Yes
Village 6	Men	No	Yes	Yes
Village 7	Men for men's, women for women's	No	Yes	Yes
Village 8	Men for men's, women for women's	No	Yes	Yes
Total	**5 of 6: Women**	**7 of 8: No**	**8 of 8: Yes**	**8 of 8: Yes**

Table 11 demonstrates that in households led by men income flows are unequally distributed within the household between men and women. First, when crops are sold in 4 of 4 cases in Isiolo and in two of 4 cases in Tharaka Nithi women control the money received from crop sales. As one woman said, "money comes in quickly from farm surpluses." However, the decision to sell the crop lays with the man in both villages. Second, where men earn daily wages or obtain income from selling large livestock in 7 of 8 cases – in other words, in both counties-- that money is not shared with the senior woman of the household. Similarly, women do not share the income that they earn from waged labour or from the selling of poultry, milk, eggs and alcohol. In the case of wages from daily waged labour, women do not know how much men earn when they are absent, which is around KSH 400 per day. When men are absent, they do not know if women are performing daily waged labour. In the case of receipts from the sale of large livestock these are never shared equitably nor is the sale price disclosed to the woman. Moreover, even when income flows are shared it is not an equitable distribution of the flows of income, with the man providing the woman with a highly contingent and highly variable share. Considering major income flows being controlled by men, women earn money from selling milk, eggs and poultry, selling alcohol that they have brewed, and dressmaking. It is regularly the case that adolescent girls who are not married will work in local shops for daily wages that are passed over to their mother. The final source of income is from petty trading. Women are commonly petty traders, as demonstrated in Table 11, but their ability to establish a petty trading enterprise differs from village to village. In some cases, men provide start-up money for trading shops run by women but where men expect all or some of the receipts from petty trading to be given to the man. In some cases, men provide start-up money for trading shops run by women, who control the receipts from the petty trading. In a minority of cases, women can save enough money to independently establish petty trading enterprises. In these cases, while women retain the revenues from the enterprise, they may need the permission of the man to spend it.

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Cumulatively, in households led by men across the two counties any sharing of income flows in the villages is an exception to the rule that the man has control of the bulk of household money, particularly because of receiving receipts from the sale of cattle. This is especially the case for married adolescent girls. However, households rely upon the incomes that women produce to meet daily household needs. As such, men and women do not know how much money the other has available to them. Women in Isiolo spoke of buying goats and leaving them with a neighbouring woman-led household so that the man did not know of the goat. They spoke in Tharaka Nithi of taking money from men when they are asleep. Indeed, one man said that "if women have resources they no longer have to listen to men." With a lack of sharing, men and women have different spending patterns. Men spend the money they have on themselves: on alcohol, on *khat*, on their mobile phones, on food and beverages with their friends and, when absent for periods of time, paying for sex workers. One village chief put it thus: "men have unique needs, so you have to have your own money." Men also buy cows without consulting women. They do contribute to household expenses, including healthcare expenses and school fees, but never equitably. Women are the ones who are expected to spend any money that they have on meeting household needs. They do not spend money on their own socializing.

5.7 Decision-making and intimate partner violence

With women in households led by men in the two counties accessing some of the land they operate through men, only rarely being allowed to independently own livestock, and not having equitable access to total household income inflows, most notably from the sale of livestock, women have a materially weaker resource base than men. Households led by women also generally have a materially weaker resource base. This then structures the allocation of decision-making responsibilities. Table 12 provides information on the household's principal decision-maker across 3 different sets of decisions, along with presenting evidence on intimate partner violence.

Recalling that women in households led by men are responsible for the spending required to meet household needs, it is not surprising that in 7 of 8 cases women have the authority to make minor spending decisions. That notwithstanding, though, in some instances when women earn money, they have to inform the man as to how the money is being used and in other instances when women sell crops they have to have the permission of the man to sell. Moreover, in 8 out of 8 cases men have final

responsibilities for major spending decisions such as buying cattle. Indeed, while women assume all responsibilities when men are absent working they cannot make major spending decisions; men control women's autonomy through mobile telephones. Indeed, when absent men make decisions about selling livestock to support their absence, they do not share the proceeds of the transaction with women, let alone equitably. Finally, in every instance across the 8 villages women did not have the freedom to travel independently of agreement from a man.

Across the three questions, then, women did not have equal decision-making authority compared to that of a man. For married adolescent girls this was especially true. As one woman said, "men don't care what women are doing on the farm as long as they are doing it according to the decisions of men." Thus, not only do women and married adolescent girls have a materially weaker resource base than do men, but without adequate resources many women and married adolescent girls are under the decision-making authority of men. Of course, women do have authority in the households that they lead.

TABLE 12: Decision-making and intimate partner violence

	Who makes minor spending decisions?	Who makes major spending decisions?	Do women need permission from a man to leave the area?	Is intimate partner violence present?	What are the enablers of intimate partner violence?	What is the severity of intimate partner violence?
Isiolo						
Village 1	Women	Men	Yes	Yes	Food; chores; disrespect	Broken bones
Village 2	Women	Men	Yes	Yes	Sex; men not contributing; disrespect	Severe bruising
Village 3	Men	Men	Yes	Yes	Alcohol; sex; money	Femicide
Village 4	Women	Men	Yes	Yes	Sex; *khat*; disrespect	Near death
Tharaka Nithi						
Village 5	Women	Men	Yes	Yes	Alcohol; money; disrespect	Severe bruising
Village 6	Women	Men	Yes	Yes	Alcohol; infidelity; sex	Severe bruising
Village 7	Women	Men	Yes	Yes	Alcohol; infidelity; money	Broken bones
Village 8	Women	Men	Yes	Yes	Money; alcohol; disrespect	Severe bruising
Total	**7 of 8: Women**	**8 of 8: Men**	**8 of 8: Yes**	**8 of 8: Yes**	**6 of 8: Alcohol 5 of 8: money 5 of 8: sex 5 of 8: disrespect**	**1 of 8: Femicide**

Enforcing this dependence in households led by men is intimate partner violence. As depicted in Table 12, in 8 out of 8 villages in the two counties intimate partner violence was present. Intimate partner violence was enabled by: alcohol consumption in Tharaka Nithi; disputes about money in Tharaka Nithi; women's unwillingness to engage in sexual relations in both counties; and a lack of "respect" in 3 of the 4 villages in each county. In some villages men were quite apprehensive about women controlling money and becoming more autonomous; as one man said in Tharaka Nithi, "women grab resources and leave because they are empowered." Indeed, this helps explain why men marry adolescent girls: because of socialization and limited life experiences they are less capable of asserting themselves and thus married adolescent girls were in a particularly weak position to resist intimate partner violence. It also explains why men did not look favourably on households led by women. The consequences of intimate partner violence were major: femicide, hospitalization, and broken bones in both counties. In the one village where femicides had taken place, deaths occurred from being shot in the head and from an uncommonly severe violent assault. As one woman said, "if you depend on men, you will not be presentable." Intimate partner violence was a more specific expression of the more generalized presence of widespread gender-based violence, which is reflected in 70 per cent of girls undergoing female genital mutilation, according to a key informant in Tharaka Nithi. It was also reflected by the fact that women collecting firewood had been assaulted. Having said that, many women also believed that they had the right to beat men, and did so. Indeed, in one village women had killed men, only to find themselves subjected to more violence.

Men who lead households use intimate partner violence to ensure that they maintain their own sense of status as well as control the decision-making over significant usage of resources: money, livestock and land, to be sure, but also labour. In a more prosperous village in Tharaka Nithi where commercial dairy operations were operating, women were visibly materially better off and knew their rights. Nonetheless, in this village the extent of intimate partner violence was easily ascertained; a woman police officer explained that when she stepped into her home, she was no longer a police officer but was a woman and was subjected to intense violence. Intimate partner violence ensures that a biased set of work arrangements is enforced: women and adolescent girls and boys work on plots of land controlled by men as well as in unpaid care and domestic work for the household before any work is undertaken on plots of land controlled by women. Men seek to enforce these arrangements and even women that know their rights acquiesce to these arrangements because they seek material benefits and the autonomy that comes from compliance, a social compromise predicated upon inequality and violence that nonetheless reduces their interactions with men.

5.8 Conclusions from Kenyan field sites

The production of marketed surpluses critically depends upon reliable access to enough water if incomes, food security and nutrition are to improve in Kenya. However, most farms in Kenya, but not in Isiolo or Tharaka Nithi, are rain-fed, and these farms' lack of capacity to capture rainwater and surface run-off significantly reduces access to water from agricultural production. At the same time access to that water that is available is gendered, including rainfall, impacting upon women's agricultural productivity and hence poverty reduction and food security and nutrition improvements. In Isiolo and Tharaka Nithi household structures reflect the fading prevalence of polygamous marriages where two or more women share a husband. In both monogamous and polygamous

households men control the land that they "own" and assign their wives plots of land to work to produce food for their household. In addition, many women independently operate land as part of a women's self-help group. However, before work can be done on the land that they control, women are expected to both perform extensive unpaid care and domestic work in the household and in the community as well as working on that land which is controlled by men. As a result, women can have insufficient amounts of time to undertake adequate soil fertility management on their plots of land. With poorer soils and lesser amounts of time, soil fertility management activities are not comprehensively undertaken. This serves to reinforce the dependence of women upon men, as men have both higher productivity on the land that they control while at the same time controlling significant income flows. Men's higher incomes and women's lesser productivity on the land that they are assigned allow men to invest in more cows that can potentially be used as the bride price for more wives when the economic circumstances permit, and most notably adolescent girls. In this way, some men can increase the available labour force to work the land that they control. In so doing, men's own labour on their land is reduced to that of helping even as their incomes rise. Men become managers of women's labour that is used to increase the incomes of men and support their consumption of *khat*.

The hierarchical household structures women's dependence on men for land and money and ensures that women comply with gender-biased arrangements that are often enforced using intimate partner violence and other ways that bring material benefits to men. Dependence is particularly notable among those adolescent girls who marry. Moreover, while households led by women had lesser stocks of assets and flows of income across the two counties distinct markers of social differentiation beyond those of gender emerged. These markers included the extent to which a household used waged labour, pump ownership (whether manual or generator-powered), the household's location along a canal watercourse, and the economic capacity to engage in commercial dairy farming.

In this context, gendered access to water for production both reflects and reinforces gender-based disparities in agricultural production and productivity, income, food security and nutrition. These disparities facilitate the processes that drive social differentiation, which are legitimized by the social norms and values that shape gender relations. Thus, gender relations have material consequences, for women, for children, and for men. As one woman correctly stated, "Women are the economic drivers of Isiolo," highlighting the critical role women play in the county's economy. To effectively address the material implications of gendered access to water for production and enhance women's agricultural production and productivity in ways that are clearly beneficial for their household, it is essential to directly challenge and transform the underlying social norms and values.

6.

Comparative results across the field sites

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6.1 Land and livestock

In providing comparative results across the 3 countries, it is first necessary to emphasize the heterogeneity of the field research sites and their farming systems. In this light, the purpose of providing comparative results is to look for areas of similarity and difference in gender relations and their material impact, as this helps explain gendered access to water for production, and particularly rainfall. Difference is to be expected; similarity points to processes that are more generalizable. One immediate similarity is that households led by women tended to operate smaller holdings of land when compared to households led by men. Beyond households led by women, Table 13 contains comparative results across the 3 countries regarding women's access to land in households led by men.

TABLE 13: Women's access to land

	Polygamous marriages assign women land?	Who makes decisions on assigned land?	Assigned land has identical soil quality?	Women obtain land independently of men?
Ethiopia	10 out of 10: Yes	9 out of 10: Joint or man	10 out of 10: Yes	7 out of 8: Yes
South Sudan	6 out of 6: Yes	3 out of 6: Joint or man	6 out of 6: Poorer	4 out of 6: Yes
Kenya	8 out of 8: Yes	3 out of 7: Man	2 out of 4: Poorer	4 out of 8: Yes
Total	**24 of 24: Yes**	**15 of 23: Joint or man**	**8 of 20: Poorer**	**15 of 22: Yes**

As demonstrated in Table 13, in all villages across the 3 countries polygamous marriages result in women being assigned land to grow food for their families. On that land, in Ethiopia it is primarily men who make decisions about what is grown on the land that is assigned; in South Sudan and Kenya in just under half of all cases do men make decisions about what is grown on the land that is assigned. Also, however, in Ethiopia the land that is assigned has soil that is of the same quality as those plots that grow crops for the men. In South Sudan and Kenya in 8 out of 10 cases the land assigned to women is poorer than that land that grows crops for men. Finally, in Ethiopia and South Sudan it is common for women to obtain land independently of men, often working it in self-help groups. In Kenya in only half of cases do women obtain land independently of men. Nonetheless, across the 3 countries it is quite common for women to obtain land independently of men.

In terms of livestock, across the 3 countries cows and camels were almost but not exclusively owned by men. The exception to this rule was households led by women. The ownership of goats and sheep varied; in some field sites, goats and sheep were owned by men, but in others they were owned by women. Chickens in all 3 countries were the provenance of women. Men's almost exclusive control of cows was a result of gendered social norms that bestowed status upon those that controlled cows, a status that could be enhanced by acquiring more cows. Some herds may have been significant sources of wealth, but for those with large herds men tended not to utilize that wealth but rather increase it by investing in more cows. Thus, the acquisition of cows was a significant behavioural objective of men, one that played a large role in masculine identity-formation. Moreover, herds of cows often led to long absences of men from

their villages as they took their herds to communal grazing pastures far away. In those instances, women assumed complete responsibility for the operation of all the land controlled by the household, but did not acquire the right to sell any cows that remained on the farm while men took the bulk of the herd to graze at a distance. That remained the domain of men and carried with it a threat of femicide if it was ignored.

6.2 Labour

Table 14 provides comparative data on women's work in households led by men. It demonstrates that in all cases where households were led by men women worked on plots of land controlled exclusively by men to grow crops for men. The reverse was not the case. In South Sudan and Kenya men very rarely worked on the plots of land independently controlled by women, and in Ethiopia in 4 of 10 cases men did not work on the plots of land independently controlled by women.

In part, this was because in most cases across the 3 countries men were increasingly undertaking daily waged labour. This waged labour also commonly led to prolonged absences from the village. To compensate for this loss of household farm labour, women are expected to increase the amount that they work on the household farm and to be supported in that work by adolescent girls and boys. Moreover, in Kenya in all villages' waged labour was used on the farm to supplement household labour supply. In Ethiopia and South Sudan in half of the cases waged labour was used to supplement household labour supply. Women also said that they relied on exchange labour, primarily from other women, as well as some waged labour, who occasionally were men, in order supplement the labour that they needed to operate the household's land that was being operated. This was especially the case for households led by women. However, the use of waged and exchange labour in fact increased women's workloads because of the social expectation that women would provide food and beverages for those working on the land.

TABLE 14: Women's labour on the farm and in the household

	Women work on men's plots	Men work on women's independent plots	Wage labour works on men's plots	Wage/ exchange labour works on women's plots	Women say men spend far less time on farm labour than claimed by men	Women provide food and beverages on farm	Women say unpaid care and domestic work limits labour on farm	Men perform daily waged labour
Ethiopia	10 of 10: Yes	6 of 10: Yes	4 of 9: Yes	10 of 10: Yes	3 of 6: Yes	10 of 10: Yes	10 of 10: Yes	7 of 10: Yes
South Sudan	6 of 6: Yes	0/1 of 5: Yes	3 of 6: Yes	6 of 6: Yes	6 of 6: Yes	6 of 6: Yes	5 of 6: Yes	5 of 6: Yes
Kenya	7 of 7: Yes	1 of 5: Yes	8 of 8: Yes	8 of 8: Yes	5 of 6: Yes	8 of 8: Yes	3 of 8: Yes	6 of 8: Yes
Total	**23 of 23: Yes**	**7/8 of 20: Yes**	**15 of 23: Yes**	**24 of 24: Yes**	**14 of 18: Yes**	**24 of 24: Yes**	**18 of 24: Yes**	**18 of 24: Yes**

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As a result of men's absences to graze herds of cows or undertake daily waged labour, as well as heavy *khat* consumption in Ethiopia and Kenya and heavy alcohol consumption in South Sudan, it was common for men to overstate their contribution to working on the household's land. In almost all cases in South Sudan and Kenya and in half of cases in Ethiopia women clearly were of the view that men worked far less on the farm than they claimed.

Finally, women's work on the farm in households led by men cannot be considered in isolation from their unpaid care and domestic work responsibilities, which across all 3 countries were extensive. In Ethiopia and South Sudan in almost all cases, and in Kenya in 3 out of 8 cases, women stated that unpaid care and domestic work placed binding constraints on the amount of time that they could allocate to farm work. In such cases, when farm work was undertaken it was on men's plots. Only when work on men's plots was completed and unpaid care and domestic responsibilities fulfilled could women work on the plots of land that they managed, but such work was constrained by a lack of time. This meant that soil fertility management was not practiced as thoroughly as it should have been, if at all, on plots of land managed by women in households led by men.

6.3 Water for agricultural production

In Kenya only 2 of 8 villages captured rainwater because of access to irrigation. However, in Ethiopia and South Sudan, most villages captured rainwater that was primarily used for household consumption, but which might also be used to irrigate market micro-gardens, water livestock and hold fish for protein. Surface runoff was not captured. In 14 out of 18 cases across the 3 countries rainfall was captured in communal water pans, which for the most part had been financed by an international organization contracting a local non-governmental organization to mobilize village labour to contribute to the digging of the water pan. There was equality of access to the pan across the village. Communal water pans were

operated and maintained by a water management committee, on which women sat, and indeed, the chair of the committee in most of the villages in each of the countries had been or was a woman. Households led by women were at times represented on water management committees.

The field sites in South Sudan lacked irrigation. In those villages in Kenya were there was irrigation, as well as the instances of irrigation in Ethiopia, for the most part water was brought from rivers using manual pumps and pipes. Most irrigation systems were privately owned, but when there was communal ownership the irrigation system would have a water management committee to operate and maintain the facility. Again, women could chair this committee. It is not clear if households led by women were disadvantaged in access to irrigation water.

For most of those villages without irrigation, when the rain came at the right time and in the right quantities agricultural surpluses would be generated, and life would be easier. However, across the 3 countries this was becoming less and less the case, with changing timing and length of growing seasons and increasingly variable rainfall.

With most women having heavy workloads, it is interesting to note that in 9 of the 11 villages in the 3 countries where it was asked women said that their agricultural productivity was less than that of men. It has been shown that in polygamous households in the 3 countries it was expected that women would first work on plots of land devoted to crops controlled by men. It is also of interest to note that in Ethiopia and South Sudan in most cases women stated that the performance of unpaid care and domestic work constrained the amount of time that could be spent farming. In part, then, lower productivity might be explained by workloads: with not enough time to devote to work on plots women were assigned or independently accessed, women would not have the time needed to adequately practice soil fertility management. In this way, then, social norms that produce gendered expectations around working on men's plots and unpaid care and domestic work would reduce the efficacy of the rain that fell on plots of land managed by women. Of course, for households led by women these dynamics would be different.

6.4 Income

Table 15 documents income flows across the 3 countries. It demonstrates that while in South Sudan and Kenya it is usually the case that money generated by crop sales is controlled by women, in Ethiopia this happens only in 3 of 10 cases. At the same time, in the 3 countries in most cases men do not share flows of income that accrue to them with women or share access to non-wage income that would result from livestock sales. In South Sudan and Kenya this is almost always the case, while it is the case in most field sites in Ethiopia. It was especially notable in households where wives were married adolescent girls. This would not be the case in households led by women: all income would be controlled by women, although in most circumstances these incomes were lower than those for households led by men.

TABLE 15: Income flows

	Control of money from crop sales	Sharing of men's wages/non-wage income?	Women/daughters earn cash?	Women are petty traders?
Ethiopia	3 of 10: Women	4 of 7: No	8 of 10: Yes	7 of 10: Yes
South Sudan	5 of 6: Women	5 of 6: No	6 of 6: Yes	6 of 6: Yes
Kenya	5 of 6: Women	7 of 8: No	8 of 8: Yes	8 of 8: Yes
Total	**13 of 22: Women**	**16 of 21: No**	**22 of 24: Yes**	**21 of 24: Yes**

With women in households led by men in South Sudan and Kenya neither controlling money produced from crop sales or being in receipt of shared wage and non-wage income flows, it comes as little surprise that in both countries in all instances women or adolescent girls go out to earn money and that women engage in petty trading to generate cash. In Ethiopia even though women are more likely to control money from crop sales and witness men's income flows being shared, it is still common for women or adolescent girls to earn or for women to engage in petty trading.

6.5 Decision-making and intimate partner violence

Finally, Table 16 compares decision-making and intimate partner violence across the 3 countries. Table 16 shows that while it is very common in South Sudan and Kenya for women to make minor spending decisions independently of men, in Ethiopia this is the case only half the time. Table 16 also shows that in 21 of 24 cases major spending decisions are made by men; only in 3 cases in Ethiopia are major spending decisions jointly decided by women and men. Finally, in all cases women must receive permission from men to leave the area of the village. Households led by women do not face these challenges around decision-making, and so it seems fair to conclude that men hold significantly more decision-making power than women in households led by men in the 3 countries.

Men's decision-making power is reinforced by intimate partner violence in households led by men. Only in one village in Ethiopia did women say that intimate partner violence was not present. In many cases women said that intimate partner violence was pervasive, enabled by a refusal of women to have sexual relations with men, especially when they return home after the excessive consumption of alcohol. It was also enabled by disputes over money, with women wanting men to give them money and men demanding from women that they hand over money. The consequences of intimate partner violence were stark: in half of all cases in South Sudan and Kenya intimate partner violence resulted in femicide. However, this figure is largely the result of the pattern of violence in South Sudan, where in every village there had been a femicide and in more than one village there had been multiple femicides resulting from intimate partner violence.

TABLE 16: Decision-making and intimate partner violence

	Who makes minor spending decisions?	Who makes major spending decisions?	Do women need permission from a man to leave the area?	Is intimate partner violence present?	What are the enablers of intimate partner violence?	What is the severity of intimate partner violence?
Ethiopia	5 of 10: Women	7 of 10: Men	10 of 10: Yes	4 of 5: Yes	4 of 4: Money	Not asked
South Sudan	5 of 6: Women	6 of 6: Men	6 of 6: Yes	6 of 6: Yes	6 of 6: Sex 5 of 6: alcohol 3 of 6: money	6 of 6: Femicide
Kenya	7 of 8: Women	8 of 8: Men	8 of 8: Yes	8 of 8: Yes	6 of 8: Alcohol 5 of 8: money 5 of 8: sex 5 of 8: disrespect	1 of 8: Femicide
Total	**17 of 24: Women**	**21 of 24: Men**	**24 of 24: Yes**	**18 of 19: Yes**	**11 of 18: Sex 11 of 18: alcohol 12 of 18: money**	**7 of 14: Femicide**

6.6 Generalizing from the comparative evidence

Notwithstanding the immense heterogeneity of the field sites, the comparative analysis provides answers to the reasons why men and women access water for production differently, particularly rainwater. It has been demonstrated, firstly, that access to assets is gendered. Apart from households led by women, men "own" the land, although self-help groups of women do obtain land independently. Men assign land to women to grow food for their families and retain control of land, often misleadingly referred to a jointly held, so that it can grow crops for which men take responsibility. In instances where plots of land managed by women have inferior soils, which is evident in some of the data, the infiltration rate and biomass capacity of the soil will be less than that of land retained by men. As a result, the efficacy of rain will differ between men and women's plots of land even though the quantities that fall may be identical.

Men's almost exclusive control of cows and camels is a result of gendered social norms that result in the acquisition of cows being a significant behavioural objective of men and a key part of their identity. It can also result in significant absences of men from their villages, which reduces the labour supply to work the land, even as mobile telephony allows men to retain decision-making authority in the household. These findings do not apply to households led by women.

The other cause of men's long absences was their increasing recourse to waged labour. As a result of men's absence from households that they are expected to lead, women take an increasing responsibility for agricultural work, a responsibility that reflects the social expectation that women and adolescent girls and boys will work on land retained by men first, and then ensure that the necessary unpaid care and domestic work is carried out, before they work on land that they manage.[101] The result is that women are growing the crops grown by men for men who are often not contributing labour to the farm. Women and adolescent girls and boys are, in effect, a flexible source of labour, and polygamy is a means of mobilizing that labour for agricultural work.With waged labour becoming more important and working on the land becoming less important for men, it is common for men to significantly overstate their contribution to agriculture and underestimate women's contribution to agriculture even as they retain control of the crops grown by women for them and retain decision-making authority in the household from a distance. The result is that while women increasingly have greater responsibility for agricultural work, they still must work on land retained by men first, and the benefits flowing from such work are directed toward men. In effect, men have become the managers of women's labour and the labour of adolescent girls and boys. In this, women may be assisted by waged or exchange labour. This is needed not only to augment labour supply, but because while being expected to work on land retained by men, they are also expected to perform the unpaid care and domestic work required within the household. The result of excessive demands on their working day means that time poverty places binding constraints on the amount of time that they could allocate to agricultural work on men's retained plots or on the plots of land that they manage. However, women's responsibilities on these two different types of plots of land is not the same; men's retained plots are more important. Thus, one consequence of time poverty is a lack of time to work on the plots of land managed by women. This leads to another consequence of time poverty: women may not have to time to adequately and appropriately undertake soil fertility management even on good soils, let alone poorer soils. As a result, the efficacy of rain will differ for men and women. These findings do not apply to households led by women.

In households led by men they do not share their waged or non-waged flows of income with women, and so women have limited resources with which to manage the farm and their responsibilities on it. This is especially the case for those households where wives may be adolescent girls. Moreover, women often do not know how much money a man

101 Goh, A. H. X. (2012) "A literature review of the gender-differentiated impacts of climate change on women' s and men' s assets and well-being in developing countries." CAPRi *Working Paper* no 106.

has, suggesting an important source of asymmetric information between men and women. In the face of this, and notwithstanding time poverty, women's responsibilities to meet the needs of the household results in them sending their adolescent girls out to work, their selling of milk, or their opening of small shops to undertake petty trading. However, the money that is used is not used for the farm; it is used for the household to meet its needs. Indeed, in South Sudan and Kenya women are not free to spend the money that they earn as they please; minor spending decisions in most cases are controlled by men. In almost all cases across the 3 countries major spending decision are also controlled by men. Thus, men control land, livestock, crop receipts from sales of output produced on men's retained land, cash from livestock sales, and cash from waged labour. This is only not the case in households led by women. Women's and adolescent girls and boys' labour is critical to this control; women and adolescent girls and boys grow the crops that generate receipts for men, facilitating their ability to work for wages away from the farm.

With women and adolescent girls and boys working on men's retained plots, performing unpaid care and domestic work, and working on the plots that women manage, women's cash flow from wages or receipts from petty trading are far lower than that of men. Resources controlled by women, who are increasingly important in operating the farm, are inadequate to accommodate being able to respond to the challenges facing farming arising from increased variability of rainfall and changes in the length of the growing season. Women are also subject to asymmetric information. That these are the case, perhaps, should not be surprising. The farming system is set up to generate resource flows in households led by men to men from women's labour, in which case more women's labour is equivalent to greater resource flows to men. In this context, polygamy sustains a farming system that reinforces men's identity and social status by facilitating the acquisition of more cows.

Behind this highly unequal economic structure lies the use of intimate partner violence in households led by men. Men require that women accede to this disadvantageous set of relations, and this acquiescence is maintained using intimate partner violence, sometimes to murderous effect. Moreover, when intimate partner violence is pervasive, it may not be necessary to use it to obtain acquiescence; the threat of its use may be sufficient. Married adolescent girls are in a particularly weak position to resist intimate partner violence. It is important to ask: why do women stay in these marriages? Four possibilities can be offered. First, adolescent girls' socialization and limited life experience means that they may think that intimate partner violence is a universal aspect of marriage. Second, it is certainly the case that many adult women believe that men have the right to use intimate partner violence within a marriage. Third, for women there is a strong social stigma against divorce that can be reinforced by the intervention of men who are relatives. Finally, many women might view intimate partner violence as a trade off regarding the enhanced autonomy that they have when men are absent.

Gendered access to rainwater for agricultural production in households led by men is a function of women's time and resource poverty and social norms that sustain material inequalities between women and men. With intimate partner violence sustaining a farming system that is constructed to facilitate resource flows to men from women's labour, women lack the time needed to adequately and appropriately undertake the soil fertility management practices that would increase the efficacy of rainfall on land that women are farming by increasing the infiltration rate and the biomass capacity of the soil. Women do not have the resources needed to respond to increased variability in rainfall and changes to the length of the growing season. Women often operate poorer quality soils. They lack the information available to men. Therefore, women's agricultural productivity per unit of land that they manage is less than that of the land that men continue to work, resulting in higher levels of food insecurity and nutritional deficiencies within the household. However, as these material inequalities shape and are shaped by social norms, it is necessary to confront social norms directly in order to address their role in sustaining and being sustained by material inequalities.

7.

Recommendations

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This Report has examined the drivers of gendered access to rainwater for agricultural production in households led by men and has demonstrated that it is a function of women's time and resource poverty. Soil quality and soil fertility management are also very important but are not the causes of gendered access to rainwater for agricultural production. The Report thus shows that the combination of heavy labour responsibilities coupled with lack of control over the fruits of that labour is hugely disempowering for women. For women, growing crops and managing livestock is not the same as controlling those crops or livestock, or indeed being able to influence how they are used to bring benefit to women, children and men in the household. However, women's time and resource poverty are also functionally interlinked to sets of social norms and values that bring explicit material benefits to men from the control of the labour of women and adolescent girls and boys. In this light policy must be developed, designed and implemented that addresses women's time and resource poverty and the social norms that fortify such material constraints.

Recommendation 7.1: reduce the time poverty that prevents women from increasing their agricultural productivity.

This Report has shown that access to water for agricultural production on land managed by women in households led by men is not the same as that of land managed by men because women lack the time to undertake the soil fertility management activities needed to sustain or restore biomass capacity, and in many cases women's plots of land have poorer soils. Moreover, the lack of facilities to capture rainfall and surface runoff for production means that a lack of access to irrigation can also be a source of time poverty.

It is clear from the three countries that the construction of water pans can relieve time poverty from the unpaid care and domestic work responsibilities to fetch water for human consumption and collect firewood as a source of energy. Yet it is also evident that there is a lack of capacity to capture rainwater and surface runoff. The design, development and implementation of a major programme of construction of public infrastructure to capture rainwater and surface runoff, namely community ponds and water pans, could significantly ease time poverty. This would be of clear benefit to women and children; for children by freeing up time would allow the possibility of going to school. It is also clear from the success of vegetable market micro-gardens that increasing the construction of public infrastructure to capture rainfall and surface runoff can have, through the resulting increase in small-scale manual irrigation, a significant impact on the outcomes of the farming system, its reliance on women and men's labour, individual and household poverty and incomes, and food security and nutritional improvements. This is because significantly increasing the amount of rainwater and surface runoff harvested should result in passing the threshold of water needed for household consumption, allowing water to be used more generally for productive purposes. This means that such public infrastructure, if funding for operations and maintenance is sustained, is of benefit to all members of a community because it facilitates improvements in livelihoods.

Community ponds have a low capital cost and low operations and maintenance cost.[102] Water pans have a higher capital cost, while ongoing operations and maintenance costs can be low.[103] These costs are less than those of digging a deep well or digging boreholes, and dramatically less than building sub-surface and surface dams, including micro-dams. In addition, households should be facilitated to independently construct their own household ponds with the assistance of their neighbours. Given the volumes of rainwater and surface runoff that are lost the cost of

102 According to the FAO, in 2015 the estimated cost of a community pond was US$5 – 7 per square meter. https://www.unep.org/resources/report/planning-construction-and-operation-water-harvesting-structures-south-sudan (accessed on 11 December 2024).

103 According to the FAO, in 2015 the estimated cost of a water pan / *haffir* was US$17 – 22 per square meter. https://www.unep.org/resources/report/planning-construction-and-operation-water-harvesting-structures-south-sudan (accessed on 11 December 2024).

public infrastructure will likely be more than offset by the increased availability of water to increase yields, increase food security and improve nutrition.

The provision of energy infrastructure to reduce women's time poverty is a more costly, and hence more demanding, proposition. Given that the largest component of unpaid care and domestic work within the home is the preparation and cooking of food, possibly the most cost-effective source of energy in rural East Africa is biogas. Using biodegradable materials such as livestock dung, crop waste and food waste, the bacterial breakdown of organic matter produces mostly methane, along with carbon dioxide and other trace gases. In a 2300-liter biogas unit, three cows can produce enough dung to provide 3 hours or more cooking time every day. Every 4 rural households could be provided with access to a flexible biogas plant.

Recommendation 7.2: transform the gender relations and social norms within households and communities that underpin the material superiority of men in households led by men and which determine water access for agricultural production.

This Report has shown that women's time and resources are not the same as men's, in households led by both men and by women, and this hinders women's ability to respond to increased rainfall variability and changes in the length of the growing season. It also means that women may need to find a source of income to meet household needs, thereby reducing the time that they can spend on soil fertility management.

In practical terms, efforts to reduce women's time and resource poverty requires reshaping gender norms, which would be demonstrated in policies and programmes that produce interventions seeking to produce gender transformative outcomes. However, most gender-aware interventions accommodate gender norms by focusing specifically on women and trying to alter immediate barriers to women's empowerment. Gender is thus still treated as a shorthand for women, and the responsibility for women's empowerment in placed upon women. It does not challenge the privileged social position of men. In this light, it is not surprising that it has been well documented since the 1980s that men respond to projects whose intended beneficiaries are women by subverting the project to materially benefit themselves at the expense of women.[104]

There is therefore a need for policies, programmes and methodologies to dispense with the use of gender as a shorthand for women in favour of identifying the gender-transformative potential of interventions. Central to gender-transformative approaches is the need to:

"1) raise awareness about unhealthy gender norms

2) question the costs of adhering to these norms

3) replace unhealthy, inequitable gender norms with redefined healthy ones."[105]

Most fundamentally, a reduction, or ideally a cessation, of intimate partner violence must be at the heart of gender-transformative interventions and outcomes. This requires working with individual men and women and boys and girls, as well as couples, in interventions that are driven by feminist principles of equality. Engaging with women is crucial to be able to provide support for survivors of intimate partner violence, while engaging with men within the couple is critical to laying the foundations of gender transformation. Engaging with girls and boys

104 Dey Abbas, J. (1997) "Gender asymmetries in intrahousehold resource allocation in Sub-Saharan Africa: some policy implications for land and labor productivity." In Haddad, L., Hoddinott, J. and Alderman, H. (eds) *Intrahousehold Resource Allocation in Developing Countries: Models, Methods and Policy*. London: The Johns Hopkins University Press.

105 Rutgers (2018) "Adopting a gender transformative approach in sexual and reproductive health and rights, and gender-based violence programmes: guide to the theoretical background." Available: https://rutgers.international/wp-content/uploads/2021/03/GTA-guide-to-theory.pdf (accessed on 12 January 2024).

is central to reinforcing the foundations of gender transformation and provide support for those children that have been directly subjected to or traumatized by violence. It has been strongly demonstrated that this can work, and that cumulatively gender relations can be transformed.[106]

With adequate resourcing, time, skilled facilitators, care in implementation, and attention to context, couples-based interventions seeking to reduce and end gender-based violence work.[107] In so doing, they improve gender equality, especially when combined with improvements in livelihoods. Moreover, scaling up couples-based interventions is significantly less costly than the costs of intimate partner violence, in terms of reduced labour supply, less production, less expenditure on non-necessary items like alcohol, more spending on household needs, less investment and less savings.

Recommendation 7.3: build gender-responsive climate-responsive agricultural extension and training services.

Increased access to irrigation from the capture of rainfall and surface runoff will result in changes to the agro-pastoral farming systems found across the field sites for generations, and it is not clear that women and men farmers have the capacity to appropriately adapt to these changes, especially given the challenge of climate change. Therefore, to effectively use that rainwater and surface runoff that is harvested or that energy which is supplied there is a needed to reinvigorate derelict, underfunded agricultural training and extension systems. Water withdrawal methods may be inappropriate, water application may be inefficient, crop selection may not be optimal for the water that is available, and the adaptations to the cropping schedule necessitated by climate change may not have been introduced. For these reasons, men and women farmers should be trained in improving the effective use of water within the specific context where their specific agricultural activities are taking place. Training is also required in new sources of energy that can be used in the household or on the farm as men and women farmers will not be familiar with them. Moreover, because men and women have different sets of information available to them, as documented in the evidence for this Report, it should not be assumed that the challenges requiring agricultural training and extension services are gender neutral. This means that the reinvigoration of such services must be gender responsive. Rendering climate-responsive agricultural practices gender-responsive requires recognizing the gender-segmentation of cropping decisions and on-farm tasks and putting in place practices that promote cooperative on-farm decision-making and task allocations to maximize yields in technically efficient climate-appropriate ways. Many farmers, whether women or men, already practice elements of climate-appropriate agriculture, such as intercropping maize with leguminous crops. What is required is the training of agricultural extension officers so that they can integrate climate-appropriate agronomic practices into gender-responsive training and capacity-building at the village level. What is also required is the establishment of farmer-to-farmer field schools that provide evidence-based context-specific scale-specific practical, cost-effective agronomic best practices that reflect the needs of communities. The task of building gender-responsive climate-responsive agricultural resilience is urgent, given the extent to which climate change is disrupting the performance of the agricultural sector.

106 Kerr-Wilson, A., Gibbs, A., McAslan Fraser E., Ramsoomar, L., Parke, A., Khuwaja, HMA and Jewkes, R. (2020). *A Rigorous Global Evidence Review of Interventions to Prevent Violence against Women and Girls*. Pretoria: What Works to Prevent Violence Against Women and Girls Global Programme. Available: https://www.whatworks.co.za/documents/publications/374-evidence-reviewfweb/file (accessed on 2 February 2024).

107 Kerr-Wilson, A., Gibbs, A., McAslan Fraser E., Ramsoomar, L., Parke, A., Khuwaja, HMA and Jewkes, R. (2020). *A Rigorous Global Evidence Review of Interventions to Prevent Violence against Women and Girls*. Pretoria: What Works to Prevent Violence Against Women and Girls Global Programme. Available: https://www.whatworks.co.za/documents/publications/374-evidence-reviewfweb/file (accessed on 2 February 2024).

Recommendation 7.4: undertake further research into gender and access to water for agricultural production, given the lack of an evidentiary base.

This Report has shown that there is far more that is not known about gender and access to water for production than is known. Almost nothing is known about how gender relations can result in rainwater being less effective on plots of land managed by women when compared to plots of land managed by men. This is true not just for East Africa, but globally. There is therefore an urgent need to increase the knowledge base on gender and access to water for production, especially considering the implications of climate change. Robust interdisciplinary knowledge needs to be quantitative, to answer the "what", and qualitative, to answer the "why". However, it is not sufficient for the knowledge to be evidence-based; it also needs to be policy-oriented so that the implications of research are quickly and effectively put in practice.

7.5 A final reflection

By way of conclusion, the evidence is very good that strongly designed and implemented couples' interventions can be effective at reducing women's experiences of intimate partner violence and the effects of alcohol abuse. Moreover, when paired with interventions that improve household livelihoods economically couples' interventions can be seen by women and men as being economically beneficial. Such interventions can include items such as improved access to water and improved access to energy. However, the uptake of interventions that combine to improve gender equality within the household and the livelihoods of that household take place in conjunctural and contextual settings, and so it should not be assumed that interventions universally work in the same way. For this reason, there is a need to urgently resuscitate gender-responsive climate appropriate agricultural training and extension services for men and women farmers. In turn, to resuscitate gender-responsive climate-responsive agricultural training and extension services it is necessary to gather the necessary evidence that can ensure conjunctural and contextual appropriateness. Thus, there is a need for far more policy-oriented evidence-based research on gender and access to water for production.

Cumulatively, these Recommendations can be effective in transforming gender relations within a couple and within communities, fostering gender-responsive and climate-responsive agricultural resilience, improving agricultural productivity, and with that, incomes, food security and nutrition. Indeed, in the wider East African region these interventions have already been attempted, and the results have often been positive and dramatic.


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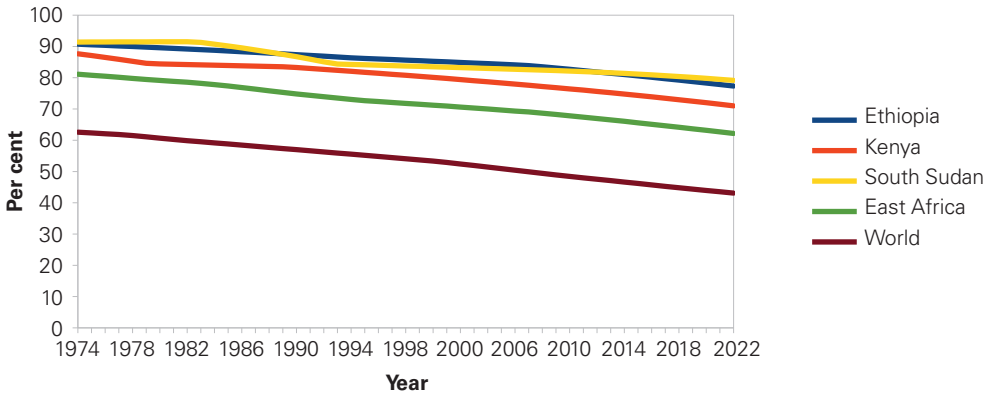
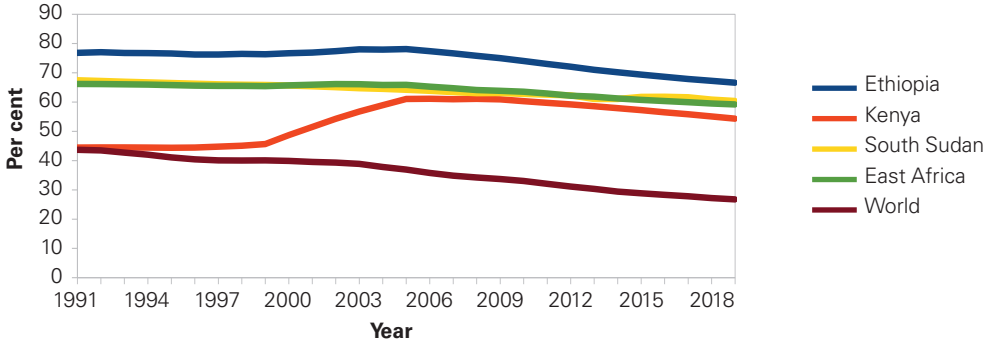
ANNEX FIGURES AND TABLES

FIGURE A1: Share of rural population



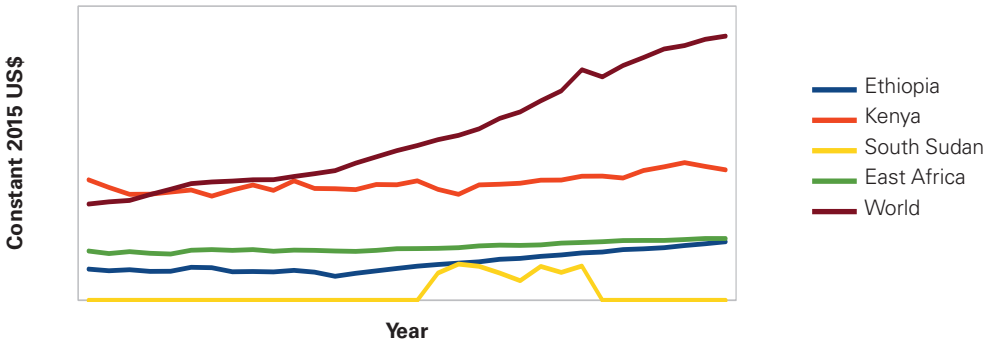
Source: World Bank World Development Indicators (Available: https://databank.worldbank.org/source/world-development-indicators (accessed on 28 January 2025))

FIGURE A2: Share of the labour force employed in agriculture



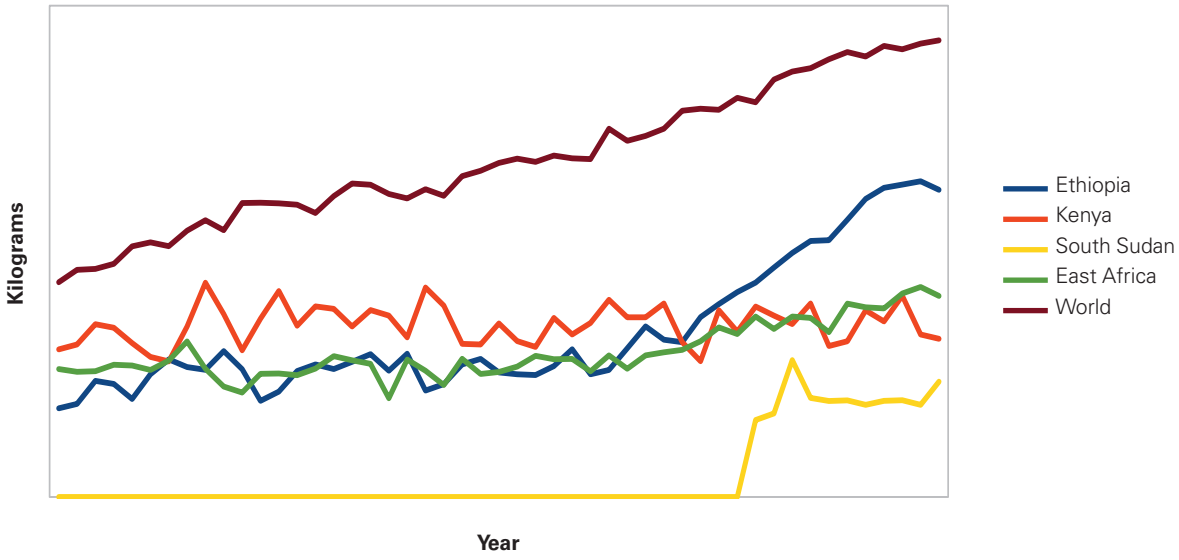
Source: World Bank World Development Indicators (Available: https://databank.worldbank.org/source/world-development-indicators (accessed on 28 January 2025))

FIGURE A3: Agricultural value added per worker



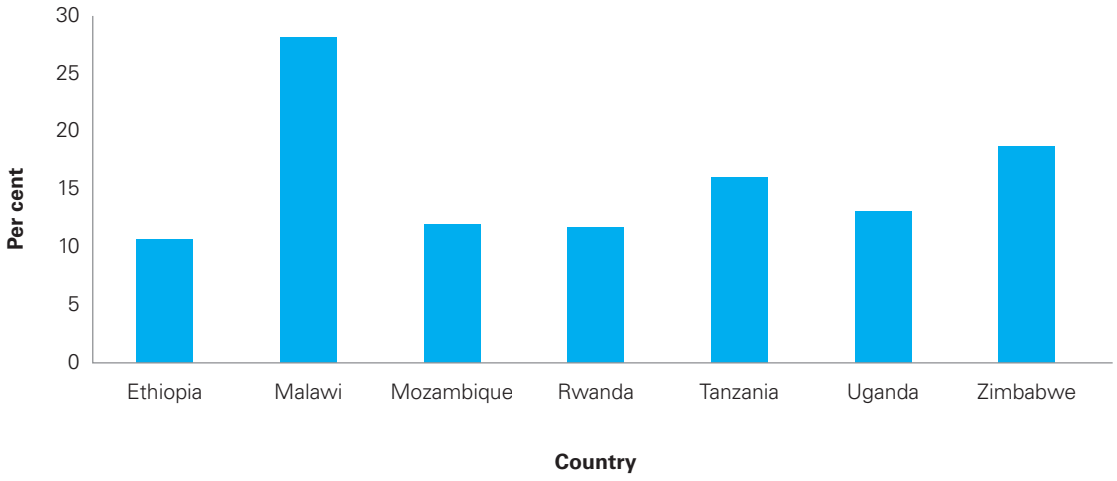
Source: World Bank World Development Indicators (Available: https://databank.worldbank.org/source/world-development-indicators (accessed on 28 January 2025))

FIGURE A4: Cereal yields per hectare



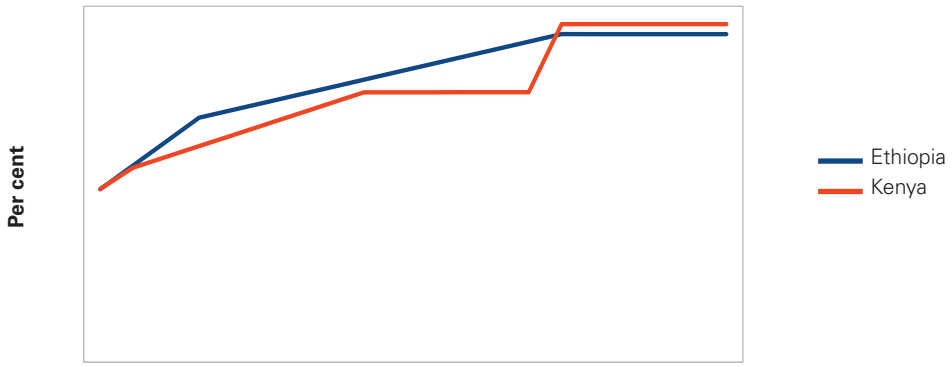
Source: World Bank World Development Indicators (Available: https://databank.worldbank.org/source/world-development-indicators (accessed on 28 January 2025))

FIGURE A5: Gender gaps in agricultural productivity in eastern and southern Africa



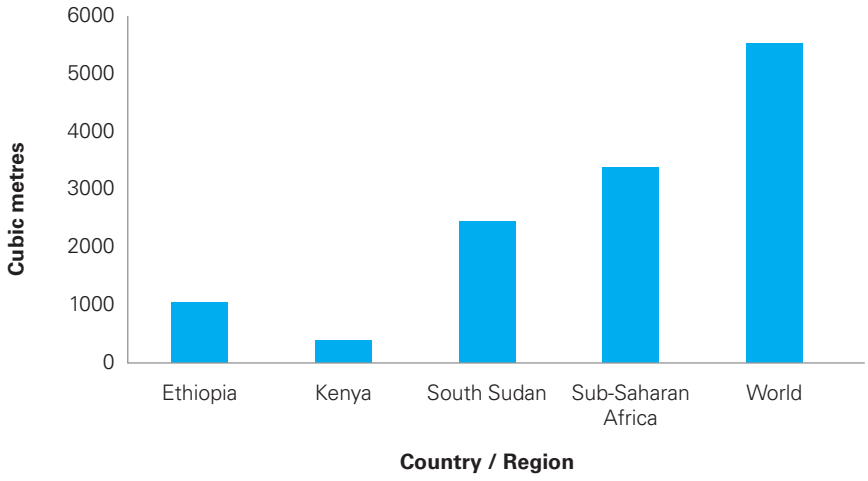
Source: UN Women (2018) "The cost of the gender gap in agricultural productivity: five African countries."(Available: https://africa.unwomen.org/en/digital-library/publications/2019/05/the-cost-of-gender-gap-policy-brief (accessed on 28 January 2025)).

FIGURE A6: Water stress



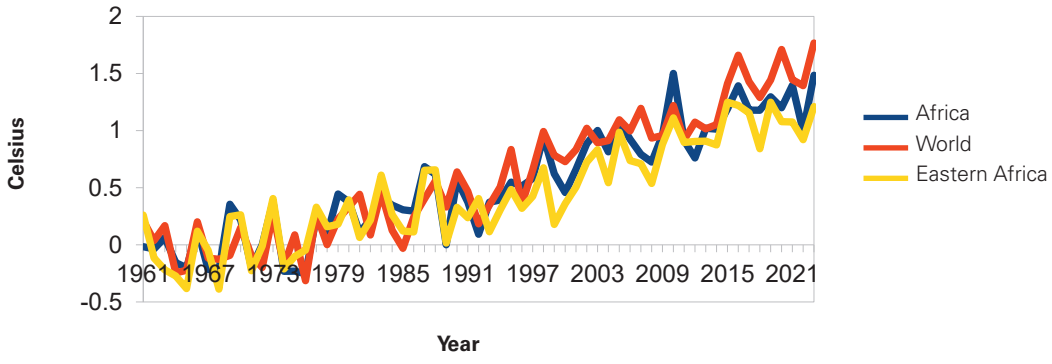
Source: FAO AQUASTAT (Available: https://data.apps.fao.org/aquastat/?lang=en (accessed on 28 January 2025)).

FIGURE A7: Total renewable freshwater resources per capita



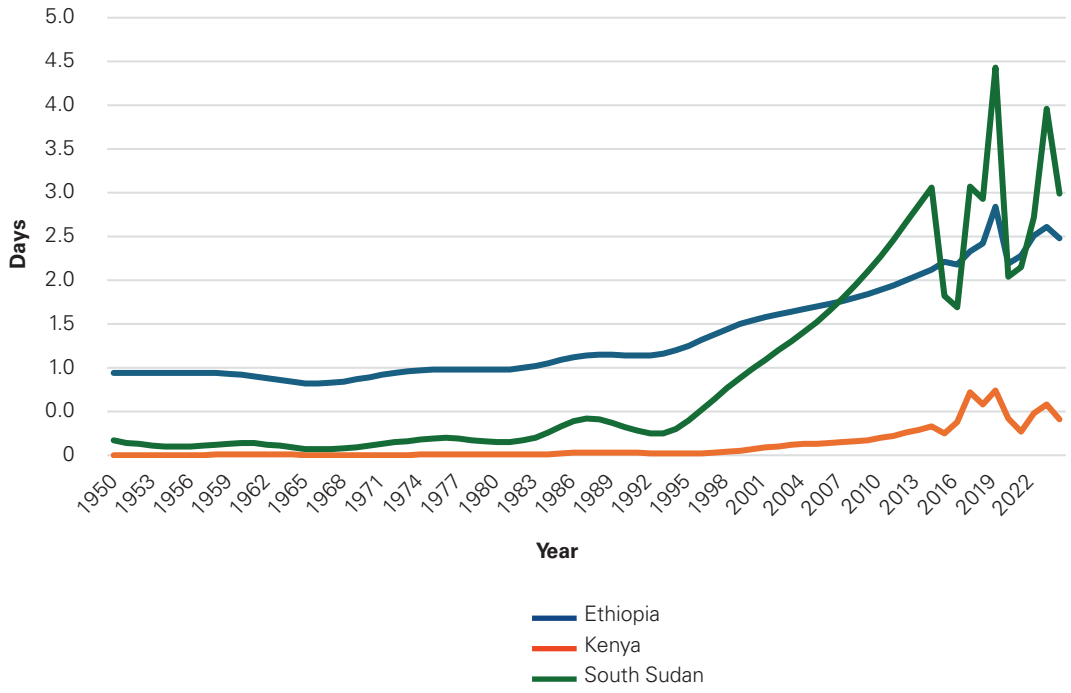
Source: FAO AQUASTAT (Available: https://data.apps.fao.org/aquastat/?lang=en (accessed on 28 January 2025)).

FIGURE A8: Temperature changes 1961 -2023, from 1951 -1980 baseline



Source: FAOSTAT (Available: https://www.fao.org/faostat/en/#data (accessed on 28 January 2025)).

FIGURE A9: Number of days when the heat index is greater than 37°C



Source: World Bank Climate Change Knowledge Portal (Available: https://climateknowledgeportal.worldbank.org/download-data (accessed on 29 January 2025)).

TABLE A1. Share of irrigated cropland to total cropland by farm household and land area, Ethiopia, 2016

	Principal farm decision-maker	
	Men	Women
Share of irrigated crop-growing farm households to total crop-growing farm households, per cent	9.75	6.5
Share of irrigated crop-growing land area to total land area, per cent	9	6.7

Source: FAO RuRLIS (Available: https://www.fao.org/in-action/rural-livelihoods-dataset-rulis/data-application/data/by-indicator/en (accessed on 9 April 2024)).

TABLE A2. Share of irrigated cropland to total cropland by farm household, Kenya, 2005

	Principal farm decision-maker	
	Men	Women
Share of irrigated crop-growing farm households to total crop-growing farm households, per cent	8.95	4

Source: FAO RuRLIS (Available: https://www.fao.org/in-action/rural-livelihoods-dataset-rulis/data-application/data/by-indicator/en (accessed on 12 April 2024)).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