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AgriGender *Journal of Gender, Agriculture and Food Security*

AgriGender 2019; **Volume 04, Issue 02**, 42–57, doi:10.19268/JGAFS.422019.4

Access to and control over agricultural labor and income in smallholder farming households: a gendered look from Chipata, Eastern Zambia

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This study assessed access to and control over agricultural income and labor among smallholder farmers in Chipata, Zambia. Data was collected through 120 structured interviews, three focus group discussions, 17 key informant interviews, and desk analysis. Results show that joint decision making over agricultural income was fairly common (48 percent) in male-headed households, but uncommon (19 percent) in female-headed households. Men dominated decisions regarding household investments and livestock sales, while decisions about crop sales were jointly made with the women. Local gender norms restricted women's mobility and limited women's participation in more lucrative distant markets. Our results suggest that joint decision making among married couples is more common than routinely assumed, and assignment of control over agricultural resources is vested based on household headship, and not primarily gender. Our work highlights the importance of micro-level studies to inform program design and cautions against interventions based on assumptions of unilateral decision making by male household heads.

Keywords: Decision-making, Tillage, Crop Marketing, Weeding, Harvard Analysis Framework

Introduction

There is increasing recognition that ownership, access to, and control over agricultural resources constitute critical elements in the determination of the well-being of farm households. "Access" is the opportunity to make use of the resource, while "control" implies the power to decide how a resource is used and who has access to it. The capacity of a farmer to employ improved technology and investment depends on their access to productive resources. Although both men and women contribute significantly to agricultural production, their access to agricultural resources differ (Deere and Doss 2006; FAO 2010). Despite the fact that women make up 50 percent of the agricultural labor force in sub-Saharan Africa (SSA), they do not have as much access to and control over agricultural resources as men (Beintema 2017; World Bank 2012). Moreover, women-managed plots are 20 to 30 percent less productive (FAO 2011).

Within households, differences in allocation of agricultural resources among plots overseen by different household members may be one of the factors that underpins gender gaps in agricultural productivity and resultant welfare (Marenya et al. 2015). Evidence suggests that women tend to have more constrained access to agricultural inputs such as land, fertilizer, labor, and improved seeds, and to critical services such as extension and credit (Farnworth et al. 2016; Marenya et al. 2015); while at the same time, women often have a greater overall workload that includes a heavy burden of low productivity activities and much of their labor remains unpaid and unrecognized (FAO 2017). Women typically assume a larger role in child-care and household responsibilities than men, which is likely to restrict their ability to work on their own farms or manage their laborers (World Bank 2014; Huyer 2016). The agricultural productivity gap between men and women contributes to income inequality between the two genders (Ali et al. 2016).

Large gender inequalities in access to and control over agricultural income and labor constitute a major challenge for inclusive development in agriculture, with efficiency and cost implications for the sector that impact the broader economy and society (FAO 2011). Africa's agricultural productivity is the lowest in the world (AGRA 2015; Ehui and Pender 2005), and gender-based resource and income gaps that cut across African production systems explain the slow productivity increases and persistent income poverty in the African smallholder sector as a whole (Quisumbing and Pandolfelli 2010). Thus, to improve the low agricultural productivity pervasive among African farming households, gender inequalities must be addressed. In order to do so, it is important to improve our understanding of access to

and control over agricultural income and labor among men and women in farming households across the diverse SSA landscape.

Gendered access to and control over productive resources in Zambia

A growing body of empirical evidence suggests that increasing women's control over agricultural resources has positive effects on a number of important development outcomes, including food security and household dietary diversity, child nutrition, and education Alkire et al, 2013. 2009; Malapit et al. 2015 Rao 2016; Mofya-Mukuka and Sambo 2019). Unfortunately, scholarly recognition of the need to increase women's access to and control over productive resources in agriculture has not translated into changes on the ground, where gender gaps persist. In Zambia, gender disparities in access to and control over agricultural resources are evident. Men are more likely than women to access credit, own and cultivate large pieces of land, and have high productive asset value (Namonje-Kapembwa and Chapoto 2016). Women are largely excluded from decision making on issues that affect their economic welfare (Sitko et al. 2011), and their control is further reduced as commercialization increases (Fischer and Qaim 2012).

Using a nationally representative panel survey data set, Shipekesa and Jayne (2012) found that the proportion of maize and rice fields controlled by men rose as the household's degree of farm commercialization increased. Only 17.6 percent of the beneficiaries of the Farmer Input Support Programme (a national agricultural subsidy program) were female-headed households, while the rest (82.4 percent) were male-headed households. This gap was attributed to the program's requirement that 50 percent of the costs of inputs are provided upfront in order to qualify for the subsidy. This disadvantages female-headed households, because of their lack of resources (Ministry of Gender and Child Development 2016). Similarly, Namonje-Kapembwa and Chapoto (2016) reported that men within households have control over most maize fields in Zambia largely because maize is a source of income for many rural households.

In the Eastern Province of Zambia, groundnut commercialization reportedly reduced women's control over production but increased their decision making at sale and in revenue use even in those cases in which they did not control production (Ngoma-Kasanda and Sichilima 2016). Orr et al. (2015) argued that the higher sales of groundnuts did not reduce women's perceived level of control over groundnuts and women welcomed the greater male participation in groundnut machine shelling as it reduced the drudgery associated with hand shelling which was performed by women. Curtis et al. (2018) reported that women in the Eastern Province of Zambia did not lose control of groundnut production, marketing, or use of proceeds as commercialization increased. They concluded that increased commercialization of a traditionally female-controlled crops does not necessarily lead to loss of female control, and that many couples work together to maximize benefits for the household.

i. Agricultural income

According to traditional gender roles in Zambia, women are considered the providers of food, while men are seen to be the providers of cash income. Consequently, when food crops become commercialized these gender roles are brought into conflict, prompting men to seize control of the income garnered from products formerly regarded as women's crops, thereby relegating womens'role to that of mere labor suppliers (Quisumbing et al. 2015; Orr et al. 2016). In a nationwide survey, only about 35 percent of women who grew groundnuts in male-headed households across Zambia, made the decision to sell and control income from this crop (CSO/MoA/IAPRI 2015). Shipekesa and Jayne (2012) reported that over 80 percent of the largest maize fields are controlled by a man in households where over half of maize production is marketed. Kumar (1995) had earlier opined that households' adoption of hybrid maize reduces women's share in crop management and agricultural decision-making, independently of farm size. Kalinda et al. (2010) reported that the distribution of income from the sale of crops and livestock among the household members in Choma, Zambia was made solely by the male household head in 67 percent of the households surveyed. Me-Nsope and Larkins (2016) argue that development programs which seek to achieve improved food, nutrition, and income security for the rural poor must consider the implications of intra-household gender dynamics for these outcomes and in turn, design interventions that address existing gender disparities and improve women's participation and bargaining power in important household decisions.

Control over agriculture income varies by crop and across regions. In a recent study conducted by Orr et al. (2016) in eastern Zambia, the authors reported a marked contrast in the level of control by men and women over cotton and groundnuts. Women perceived themselves to have little control over decisions about cotton production, and minimal control over selling and use of cotton income. By contrast, women felt that they controlled all the major decisions about groundnuts. Maize occupied the middle ground, with control shared somewhat evenly between women and men. Farnworth and Farnworth and Munachonga (2010) found that women were able to market agricultural produce in important quantities in their own right in many cases, or if men marketed them, everyone in the household was seen to benefit. They observed that this development has the potential to revolutionize attempts to involve women in cash cropping and to resist their marginalization in agriculture. This suggests that generalizations about level of control over agricultural incomes may mask important differences across regions, even within the same country.

ii. Agricultural labor

Research exploring labor contribution towards agricultural activities by men and women farmers shows mixed results. While the dominant view is that women farmers provide more labor towards agricultural production than men (see for instance Ngoma-Kasanda and Sichilima 2016; Kalinda et al. 2010; Blackden and Bhanu, 1999), Shipekesa and Jayne (2012) reported that labor activities were split roughly equally between men and

women, especially in maize and rice production. The authors thus cautioned that sweeping generalizations claiming that women account for most of the labor in Zambian agriculture could be misleading. The differences reported in the results could be explained by the variations in scale and time, geographical and cultural differences, and levels of mechanization. Ngoma-Kasanda and Sichilima (2016) noted that there is insufficient country and sector specific empirical knowledge on factors that influence gender differences in Zambia. Since there is a high degree of variation in time and space in patterns of household decision making and allocation of resources, there is a need for more context-specific information on how decisions are being made at household level (Meijer et al. 2015).

Decision making among men and women in the agricultural sector is embroiled in a complex web of cultural norms, traditional practices, and patriarchal attitudes that are entrenched in society (Ministry of Gender and Child Development 2016). The interplay between local traditional practices, economic opportunities, and the bio-physical environment result in gender dynamics that reflect the local context. This may explain the mixed results on agricultural labor and income control among smallholder farming households in Zambia. Failing to understand the specificity of local dynamics could result in inappropriate agricultural development interventions which have the potential to perpetuate gender gaps through the promotion of ill-advised gender policies and programs. It is thus important to conduct research at a micro level to determine the manifestations of this interplay of factors, in order to better inform interventions at a local scale. This study therefore, had two objectives: (1) to investigate decision making over agricultural income by men and women and (2) to examine the gendered aspects of household labor allocations among smallholders in Chipata, Zambia. The rest of the article is arranged as follows; the next section reviews literature on access to and control over agricultural labor and income. This is followed by the methods section which describes the study area, data collection and analysis methods. Results and then presented and discussed, before the article concludes.

Literature review

Within rural households in Africa, women supply the majority of the labor for food production, processing, and household chores including care work. Meanwhile, men divide their time mainly between farm work and leisure activities, providing minimal assistance to women in domestic work (Evers and Walters 2000). Because women shoulder the bulk of domestic responsibilities in most societies, they are unable to allocate their time to more productive (or remunerative) uses unless their labor productivity increases (Evers and Walters 2001; Quisumbing and Pandolfelli 2010; FAO 2011; Forsythe et al. 2016). In most cases, when rural African women generate income through their labor, they do not control it (Arora 2015). Moreover, most women in SSA do not enjoy equal access to household resources (Brown, 1994). Because they often do not control household income even from their own farm labor, female farm plot managers are less likely than their male counterparts to adopt yield-enhancing and soil restoring strategies, or to use modern inputs such as improved seed varieties, pest control measures, and mechanical tools (Theriault et al. 2017; FAO 2016; Doss 2001). This is partly because use of inputs depends on control over other assets — such as land and social capital — but also because women tend to have less access to or control over financial capital which is required for the purchase of inputs (FAO 2016).

Rural women in particular, tend to be at a disadvantage in relation to men in their ability to access productive resources and accumulate capital in order to advance economically. They often lack the power necessary to benefit from, and have control over economic activities (FAO 2016). Women farmers often lose control over market niches, resources, and products they traditionally manage, once those resources and products become lucrative (Doss 2002; Beuchelt and Badstue 2013; Chapoto and Zulu-Mbata 2016). Cultural restrictions on women's mobility and gender disparities in transportation assets exclude women from participating in lucrative export markets and confines them to marketing traditional crops such as maize, sorghum, cassava, and leafy vegetables in local markets, thereby giving men more access to crop sales revenue (Me-Nsope and Larkins 2016; Mehra and Rojas 2008). Women often do not have the power to make decisions about how to use their time or how they allocate their income and resources. These constraints effectively result in a hindrance not only to women's productive potential, but also to the qualitative contributions they can make to household well-being (FAO 2016). Cultural expectations of women's domestic responsibilities reduce the amount of time (labor) they may freely give to cash crop agriculture (Blackden and Wodon 2006). Farms run by female-headed households tend to have less labor available for farm work, because these households are typically smaller, and women have unpaid household duties that take them away from income-generating productive activities (Huyer 2016).

Access is use, control is decision making

"Access" is the right to use or benefit from a productive resource (Berry 1989) while "control" is the power to decide how a resource is used, and who has access to it. In agricultural contexts in SSA, women often have access but no control (March et al. 1999). For example, a woman may have access to a field in that she works on it regularly, but she may not have control over decisions made regarding what and how much is grown there, how much of the produce is sold, how much is kept for family consumption, or even what the waste products of the crop are used for (March et al. 1999). Decision making plays a central role in accessing and controlling resources and benefits among various sections of the population, and encompasses many dimensions of power including influence and authority, or legitimate power derived from social and legal norms (Ministry of Gender and Child Development 2016). Assignment of decision authority in households may be influenced by variables including age, gender, education level, and access to land and control over resources (Meijer et al. 2015).

Both women and men in the agricultural sector in SSA work on their families' farms, but men are more often regarded the decision makers and holders of income from the farming busi-

ness, while women are more often considered unpaid workers instead of co-managers of the farming business (FAO 2018). This is true in Zambia where men are usually considered the household heads and key decision makers. Traditionally, women are expected to give priority to working in fields belonging to the heads of their household (Sakala 2000). Women are more engaged in hand-hoe based tillage while the men dominate animal draft powered tillage (Nyanga et al, 2012). A recent meta-analysis of gender in conservation agriculture by Wekesah et al (2019) found that well- off male farmers do not often engage in hand-hoe tillage and found a few cases of women using animal draft power for cultivation, which indicated a shift in gender roles regarding land preparation. Chapoto and Zulu-Mbata (2016) found that in male-headed households, men dominated decision making on management of fields whilst women made the decisions in female-headed households. In their study of smallholder farming households in southern Zambia, Kalinda et al. (2010) found that male household heads made decisions on land allocation to food and cash crops in 71 percent and 67 percent of the households respectively. However, this does not hold true across all crops, as Orr et al. (2015) reported that women saw themselves as having greater control over groundnuts than other crops, and both genders saw groundnuts as controlled by women.

Gender norms shape gender roles and responsibilities. Gender norms include everything from cultural beliefs to expected behaviors and practices (Njuguna et al. 2016). Usually in rural societies, women are responsible for collecting water and fuel, preparing food before cooking, cooking, and child care (Whitehead 1999; Abdourahman 2010; Arora 2014). The high proportion of women's time spent on such activities has implications for women's capacity to do other work (Whitehead 1999). Compared to men, women have very heavy time loads due to the need to balance the demands of their multiple roles: productive, reproductive, social, and community. The patriarchal foundation of the distribution of roles by gender is a major cause of gender inequality, and ultimately, the feminization of poverty (Abdourahman 2010). Gender norms are in constant dialogue with women's agency and may determine women's capacity to act (Njuguna et al. 2016). Even within countries, there may be substantial heterogeneity in gender roles and women's property rights (Quisumbing and Pandolfelli 2010).

It is important to note that gender norms are not static. They change in response to shifting economic, political, and cultural forces, which can create new opportunities for women and men (Doss 2001). For instance, Meijer et al.'s (2015) study of smallholder farming households in Malawi calls into question the assumption that household heads are the chief decision-makers in rural African households. They noted that most couples use a mix of decision-making approaches (Meijer et al. 2015). Similarly, Farnworth and Munachonga (2010) found men in rural households to be willing to share decision-making with their wives, though they generally still consider themselves household heads.

Methods

Study area

The study was carried out in Msandire and Mkanda Agricultural Camps which are two of six agricultural camps in Mushaba Chiefdom, which is in Chipata district in the Eastern Province of Zambia (Figure 1).

Chipata is the administrative capital of the Eastern Province of Zambia Fieldwork for this study was conducted between February and March 2016, when the region was projected to have a population of 512,511and a population density of 38 persons per square kilometre (CSO 2013). The study site — Mushamba Chiefdom — has 72 villages, each headed by a village headperson. Village headpersons aid the chief in the day-to-day governance of the chiefdom. The smallholder farming households that were interviewed for this study were drawn from five villages; Chingongolingo and Changa, which are part of Mkanda agricultural camp, and Khabango, Ngozi and Mgwazo from Msandire agricultural camp.

The predominant tribes in Chipata are the *Chewa* in the north and *Ngoni* in the south of the district. Mushaba Chiefdom is dominated by the *Ngoni*. The *Ngoni* are a warrior and pastoralist tribe that follows a patrilineal system of inheritance and patrilocal residency pattern. This means that land is passed on to male heirs, and upon marriage, the couple resides in the husband's village. Women in patrilineal systems access land through their male relations. A married woman relocates to her husband's village and farms the land that is allocated to the couple for use by the man's family. All of her rights and claims to such land are contingent upon her continued relationship to her husband. In cases of divorce, she loses all her rights to this land. In case of widowhood, she is free to keep using the land provided she had children with her deceased husband, as she does not remarry (Umar 2018).

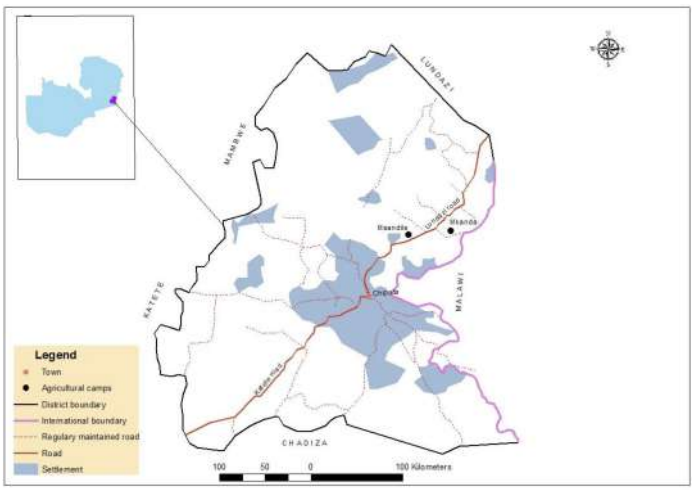

Figure 1 Location of the study sites. (*Source: Adapted from Chipata District Agricultural Office, 2014.*)

The economy of Chipata is agro-based. Maize, cotton, groundnuts, and tobacco are the major cash crops. Cotton and tobacco are grown almost exclusively for the export market. Other crops in the area include sunflowers, soya beans, cassava, cowpeas, sorghum, millet, sweet potatoes, common beans, and various species of cucurbits. Most of the rural based farming households practice mixed farming which combines both pastoral and arable activities. Pastoral farmers concentrate on keeping cattle and other livestock such as goats, pigs, sheep, and poultry.

Data collection methods

A mixed methods approach was used in this study. It included structured interviews, key informant interviews and focus group discussions.

i. Structured interviews

To get information from the five villages, structured interviews were conducted through the administering of questionnaires to 120 out of the 402 households in the five villages. The interview schedule had both open and closed ended questions. Informed consent was obtained at the start of the interviews. The respondents were assured of confidentiality and anonymity. Stratified sampling method was used to select 30 percent of households from each of the five villages that had been purposively selected for inclusion in the study (Table 1). The research team used village lists, which comprised a listing of all the households in each village, to select the respondents. This was achieved by selecting every third household on the list, based on the sampling interval calculated using the equation:

$$i = \frac{n}{N} \qquad (1)$$

Where i is the sampling interval, N is the population size, and n is the sampling size. To select the first household, the numbers 1, 2, and 3 were placed in box and then one number was randomly picked from that box. The number picked represented the number of the first house to be interviewed from the village list. Afterwards, every third house was selected.

ii. Focus group discussions

The Harvard Analysis Framework was used to come up with a four-tier focus group discussion (FGD), which was conducted in each of the two agricultural camps selected as study sites. The focus group discussants from each agricultural camp included six adult women, six young women, six adult men, and six young men who discussed in their respective groups and later came together in plenary to express their views in a mixed gender group setting. According to the National Youth Policy of 2015, youth refers to a person aged between 15 and 35 years old (Government of the Republic of Zambia 2015), therefore, the groups of young people were made up of men and women between the ages of 15 and 35, while the adult groups were made up of men and women aged above 35 years. The information from the FGDs was recorded using a digital recorder as well as notes written in a notebook. Verbal consent to record was obtained from the discussants after the research topic was introduced to them, and their rights explained.

	Total number of households		
Village	**Agricultural camp**	**Households**	**Sampled**
Changa	Mkanda	41	12
Chingongolingo	Mkanda	27	8
Ngozi	Msandire	23	7
Khawango	Msandire	26	8
Mgwazo	Msandire	285	85
Total		402	120

Table 1 Sample size determination for household interviews in the study sites. (*Source: Field data, 2016.*)

iii. Key informant interviews

Purposive sampling was used to select key informants. They included representatives from the district agricultural office, two zone leaders, two men and two women lead farmers and two men and two women contact farmers from the Conservation Farming Unit (CFU), two village head persons, and two women from women clubs. According to Bryman (2008) purposive sampling is strategic and entails an attempt to establish good correspondence between research questions and sampling, meaning that the researcher samples people that are knowledgeable on research topic. Therefore, the key informants provided information concerning smallholder agricultural activities in Msandire and Mkanda agricultural camps.

Data analysis

Quantitative data collected during the structured interviews was entered into Microsoft Excel 2013 spreadsheets and analyzed. The analyzed data was then presented in tables, bar graphs, and as percentages. Qualitative data from the FGDs, the key informant interviews, and answers to the open-ended questions of the structured interviews was analyzed using content analysis through the use of the qualitative data analysis software QDA Miner 4.0. The responses to each open-ended question were read through several times and analyzed for themes. Exhaustive and mutually exhaustive categories were then created and category names assigned. Each response was next examined and placed in the relevant category. Frequencies for each category were calculated. The Harvard Analysis Framework (HAF) was used to identify the roles and the access to and control over agricultural resources by men and women farmers in the study sites.

The HAF — also known as the gender roles framework — focuses principally on the gender division of labor and the activi-

ties and roles of men and women (Warren 2007). It has three main components; (i) Activity profile (ii) Access and control profile, and (iii) influencing factors (AWARD 2014). The three profiles are briefly explained below:

i. **Activity profile**
   This step identifies all relevant productive and reproductive tasks and answers the question, "who does what?". For smallholder agricultural households, the focus is on the gender division of labor for the main agricultural activities as well as marketing activities.
ii. **Access and control profile**
   The second step is to make an analysis similar to the activity profile, but focusing on access to and control of resources. The analysis therefore involves first identifying all the relevant resources and then assessing which of the gender groups has access to these, and which of the gender groups has control over them.
iii. **Influencing factors**
   The third step involves analysis of what determinants lie behind the patterns of activities, access, and control observed. These include all those factors that shape gender relations and determine different opportunities and constraints for men and women. They include community norms and social hierarchies such as family/community forms, cultural practices, and religious beliefs, demographic conditions, institutional structures, and infrastructure.

The HAF gives a clear and simple picture of who does what, when, and with what. It makes women's work visible and helps planners to avoid mistakes such as underestimating women's existing workloads, as it clearly shows differences in labor, and in access to and control over resources (March et al. 1999). The framework has, however, been criticized for not drawing out power dynamics, and not showing how people bargain and make decisions. Looking only at production cycles and access and control over resources does not give account of the negotiations and decision-making processes over key stages (March et al. 1999). We attempted to mitigate this limitation by adding questions to the interviews and FGDs on the power dynamics and decision-making processes during important farming operations, and probing why gender roles were as reported.

Figure 2 (a) Basins (b) oxen- ripping (c) flat culture (d) oxen–ploughing. (*Source: CFU, 2009*)

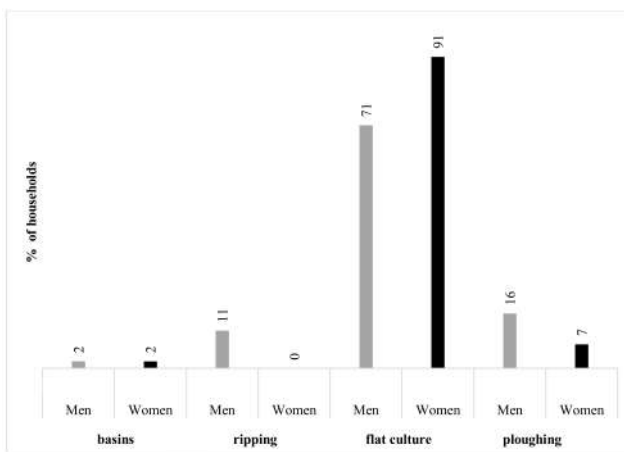

Figure 3 Tillage systems used by male and female-headed households.

Results and discussion

Agricultural practices, labor use, and gender

Out of the 120 respondents with whom structured interviews were conducted, 44 percent were women while 56 percent were men. Over three-quarters (77 percent) were married, 12 percent were widowed, 9 percent were divorced, and 2 percent were single. Within married couples, men were considered the heads of the households in accordance with local social norms. Widowed, single, and divorced women were reported to be the heads of households even where there were adult men (brothers and adult children) in the family. They all participated in agricultural activities, and thus formed part of the target population of smallholder farmers for this study.

Basins, ripping, flat culture, and ploughing are the common tillage systems used in the study area (Figure 2). Flat culture (the complete inversion of soil using a traditional hand hoe) was the most practiced tillage method by both male and female-headed households (Figure 3). Ploughing and ripping — which both require animal draught power for operation — were more common among the households headed by men. Not a single female-headed household ripped its fields, and only 7 percent ploughed their fields.

Discussants in all the four FGDs observed that only men undertook the ploughing, ripping, and animal draft powered weeding tasks. When ploughing or ripping methods were used for tillage, it was the men that operated the oxen while the women followed closely behind them, planting the seed. The women respondents explained that land preparation by hoe (clearing

Farming operation	Views from men	Views from women
Land preparation	- Tree cutting during field extension done by men	- Making of ridges, basins, and flat culture done jointly
	- Ploughing done by men, as women perceived not to be physically strong enough to handle oxen	- Tree cutting using axes left to the men
	- Local social norms against operation of oxen by women	
	- Construction of ridges or basins done jointly	
Planting of seed	- Both men and women involved in planting of maize and cash crops	- Both men and women involved in planting of maize and cash crops
	- Planting of food crops left to women	- Planting of food crops left to women
Manual weeding (using hand hoe)	- Weeding using a hoe done by both men and women	- Weeding using a hoe done by both men and women
Herbicide weeding	- Only men spray herbicides	- Only men spray herbicides
Harvesting	- Both men and women involved in harvesting	- Both men and women involved in harvesting
	- Mostly women responsible for packing harvest into granary for home consumption	- Mostly women responsible for packing harvest into granary for home consumption
Storage of harvest	- Storage responsibilities shared when packing into sacks for sale	- Storage responsibilities shared when packing harvest into sacks for sale
Threshing of maize cobs	- Women and children do threshing of maize cobs, unless the grains are for sale, then men participate	- Women and children do threshing of maize cobs, unless the grains are for sale, then men participate
Winnowing	- Winnowing is only done by women	- Winnowing is only done by women

Table 2 Focus group discussants' views on participation in various farming operations by men and women (*Source: Field data, 2016*)

the field, construction of ridges or basins) was done by both men and women. Basins were unpopular among both male and female-headed households (Figure 3), despite their yield improving benefits, perhaps because of the high labor demands and associated drudgery (Umar et al. 2011; Umar 2017).

Both young and adult women noted that women's dependence on men for agricultural labor was influenced by whether or not oxen were used, as animal draught power was seen to be the purview of men. These results may be explained by the lower access to and control over oxen by female heads of households, and also the local cultural norms that discourage the use of animal draught powered implements by women. Women heads of households are thus less likely to commit their scarce resources to the purchase of agricultural implements such as ploughs, rippers, and oxen, which they cannot routinely use themselves. Carney and Carney (2018) noted that the dominance of men in animal draft powered tillage systems is historical and is primarily explained by men having a comparative advantage when using the plough, due to the upper body strength required in its use. In the FGDs both men and women said that women could not use oxen as they are not as strong as men.

These findings are consistent with those reported in other studies on the gendered division of agricultural labor. Both Kalinda et al. (2010) and Jones et al. (2012) find that men are primarily responsible activities that require physical strength (such as land preparation, ploughing, and fencing) or use more expensive mechanical technologies. Meanwhile, women tend to undertake the more labor-intensive, un-mechanised work such as planting, watering, fertilizing, hand weeding, harvesting, processing, and storing the produce. Sakala (2000) reported claims that women did most of the hand hoe weeding because they have the virtue of patience, with the result that they can withstand long hours of doing the same thing better than men. This traditional division of labor, Kalinda et al. (2010) argue, places a disproportionate share of the workload on women. Jones et al. (2012) describe how these tasks take up a great deal of women's time during the day and throughout the year. In contrast, in their study among smallholder farmers in Kenya, van Eerdewijk and Danielsen (2015) report that pre-tillage land preparation and tillage — tasks which often used to be performed by men — were increasingly being performed by women in all of their study sites. Women took over ploughing from men who were absent from home for extended time periods. Women were also making major labor contributions during planting, weeding, and harvesting. This points to the dynamic nature of gender roles in a context of changing economic and socio-demographic circumstances (see Boserup 1970).

The men in our study explained that they prefer to offer more of their labor and to solely decide on how they used their own labor. As one man explained:

> *Women are slow and weak to handle certain agricultural tools such as axes. Women also engage part of their time doing house chores, so they would delay agricultural activities if men had to wait for them before making decisions*
> (FDG participant, Ngozi village, March 2016).

During the segregated FGDs, some young men and adult men said that that they participate in hand weeding either through their own labor or by hiring others. During the combined FDGs, however, some of the women disagreed with these claims. One woman retorted, "Not all men do that [hiring labor to assist women in weeding]; only a few men actually do that for their wives and families" (Personal communications of FDG respondents, Mgwazo village, Chipata district, March 2016). Most respondents and discussants agreed that men in relatively less resourced households were more likely to "help women" with hand weeding, than were men from better resourced households.

The discussants from the young men's group explained that during harvest periods, all household members participate in a variety of tasks, regardless of gender.

> *For example, in the case of maize, cutting of stalks in the field is done by the entire family: the head of household, the spouse and the children in the house. Stacking is also done by the entire family. Removing of cobs from stalks is done by men, women, and the youth of the community. Trans-*

> *porting is done by use of ox-carts. Only men undertake this activity because women do not have enough strength to handle the ox-carts. However, women participate in the loading of the ox-carts in the field. The men drive the ox-carts to the homesteads and offload them with the help of women in some instances. The women then load the maize into the granary. Shelling is done by the whole family. We also invite friends from the community to help especially, when we have bumper harvests and we want to sell most of the hybrid maize.*
>
> (FDG participant, Changa village, Chipata district, March 2016).

Winnowing is primarily understood to be women's job, as is the cleaning and packaging of maize (Table 2). If the maize is for sale, insecticides are not applied to it. For maize that is to be stored in bags, it is men that apply insecticides because of the general belief that they have the knowledge required for this task. This probably stems from men's relatively higher level of literacy, a requirement for reading instructions on how to use technologies such as insecticides, herbicides, and medicines for livestock. In Zambia, such instructions are written in English and are usually technical in nature. According to the 2010 Census Report for Zambia, males have a higher literacy rate (73.2 percent) than females (67.3 percent) (CSO 2013). This gender disparity in literacy is largely a result of societal values, norms, and belief systems, which give preference to educating boys over girls. Although countries across Africa have recently made great strides in achieving gender parity in schooling, the gender inequalities of previous decades continue to have an impact on today's gender productivity gap (World Bank 2014).

Our study reveals that men and women were both responsible for farming activities at stages such as land preparation and planting cash crops, whereas women were responsible for planting food crops, food storage, and food processing. Both adult women and adult men's discussants mentioned that when the maize is stored in the granary, it remained the responsibility of female household members to retrieve some for consumption, and to control access to the granary. The adult men and adult women further noted that, in the event that the man does not have a spouse, the eldest daughter or any adult woman in that household controls access to the granary. As one participant from the adult men FGD observed:

> *Traditionally the granary was the property of the woman. If a man was seen concerning himself with affairs of the granary he would be a laughing stock in the village, but now things are changing. The introduction of modern storage facilities is enabling us men to take control of maize because maize is already shelled so I do not need my wife to clean it*
>
> (FGD participant, Changa village, Chipata district, March 2016).

Another discussant from the adult men's FGD added, "We may build the granary for the household but it is viewed as a woman's property because of her gender roles of cooking and taking care of the family". Yet another from the same group continued, "As far as the community is concerned, the woman is the custodian of the food stock in the household. Access to and control over the granary is vested upon the women". This finding corroborates CIMMYT (2016), which noted that communities perceived the woman to be the custodian of the food stocks in the household.

Focus group discussants' knowledge on management of agricultural activities in the households was higher among the older women and older men compared to the youths. It was lowest among the young women, who were reported to be far more dependent on men for successful crop production. The young women were disadvantaged because of local cultural norms. According to them, young women do not attend agricultural meetings because they have to stay at home performing various tasks such as cooking, doing laundry, washing dishes, and providing child care. They argued that this negatively impacts their knowledge on agricultural production. They thus find it prudent to let the men dominate agricultural related decision making because the men have more knowledge. Young women are more likely to have young children in need of child care than older women whose children are usually older and either away at school during the day, or have households of their own and are no longer under their parents' care. This frees the older women to attend community meetings and participate in other community activities. These findings resonate with those articulated by Warner et al. (1997). In their study of the Dagomba of northern Ghana, the authors observed that junior Dagomba women, both married and unmarried, bore a particularly heavy work load in preparing food, collecting water, caring for children, maintaining the household, and farming; while the senior married women had fewer reproductive roles and thus were able to dedicate more time to income earning opportunities and exercised control over agricultural sales.

Access to and control over agricultural income

Nearly half (48 percent) of the respondents from male-headed households reported that they engaged in joint decision making over how agricultural income was spent (Figure 4). Over a third (37 percent) of the men in the male-headed households made individual decisions on how to spend agricultural income while 15 percent of the women in the male-headed households made such decisions individually. For female-headed households, joint control occurred in only 19 percent of the cases. This was most probably because the adult men in these households were not spouses of the women household heads but merely dependants, and thus some of the women household heads may not have felt the need to consult them over what they essentially perceived to be their (the women's) homes. In the cases where consultations were made, it was reportedly out of respect for the men's contributions in terms of labor, especially for chores that are considered to be in the men's domain.

Over half (58 percent) of the women in female-headed households controlled their household's agricultural income. This was much higher than the percentage of men (37 percent) that singly controlled agricultural incomes in male-headed households. The young men and adult men FGDs revealed that in many households, men preferred to have their spouses keep and control the agricultural income for the good of the household, as women

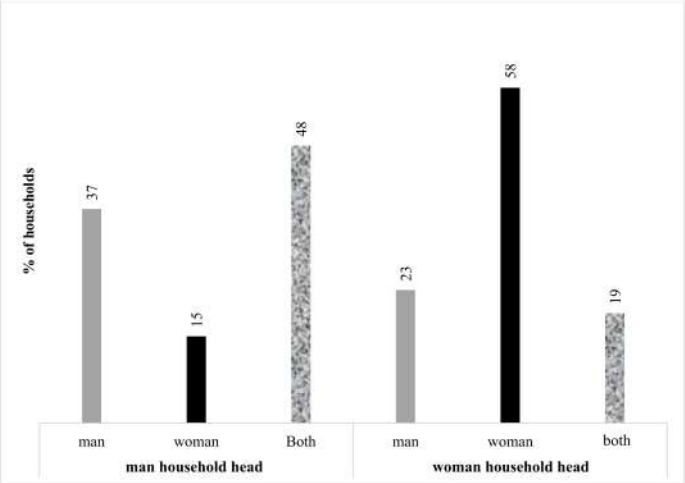

Figure 4 Decision making over agricultural income among male and female-headed households.

are perceived to be more reliable and trustworthy. Furthermore, young men discussants acknowledged that they were poor managers of household finances, often spending money for their own benefit particularly on alcohol and at times on girlfriends as "it is prestigious to have a girlfriend besides a wife". Both young men and young women discussants noted that couples were usually in conflict over monies needed for the schooling of children, and the assurance of household food security. They attributed these conflicts to men having little concern over household issues such as food, clothes, or children's needs. This finding supports that by the World Development Report (World Bank 2012), which claims that increasing the share of household income controlled by women — either through their own earnings or cash transfers — changes spending in ways that benefit children. Similarly, Jones et al. (2012) contended that although women may not be able to make final decisions over household incomes, they play a significant role in keeping incomes earned by other household members; they are generally the guardians of household money, with men giving most or sometimes all of their income to wives for safekeeping. This was largely attributed to the perception by the men that women are better able to save money and resist temptation to spend money on personal luxuries. In their role as managers of the family's income, women are able to exercise some authority over spending, however, this authority is still limited. While women are able to purchase food and small items from the family's supply of income, they must seek permission from the men to purchase larger household items.

Women in both the young and adult women FGDs explained that men often did not use the income from cotton for household food security purposes. Some women focus group discussants expressed frustration that major decisions on crops marketing being made by their husbands. They lamented that they did not know how the money realized from cotton sales was spent or even how much was realized from such sales. Conversely, the men, while in their single gender FDGs, claimed that they used the income from cotton for buying assets such as iron roofing sheets, agricultural implements, and medicines and vaccines for livestock. However, during the household interviews with men it was clear that most men were in the habit of using the income from cotton on personal items and not on goods and services for the benefit of the whole family. Studies by Haggblade and Tembo (2003) similarly showed that cash crops were often under the men's domain.

Some discussants in the combined FGDs asserted that men were nowadays more willing to engage in joint-decision-making with their wives although they generally still considered themselves to be the household heads. It was agreed that joint-decision-making results in a more rational use of resources. The access to and control over resources by men and women in the study area is summarized in the access and control profile in Table 3. Some of the key informants interviewed about the gender relations between men and women on access to and control over agricultural income explained that women do a lot of work in the fields, yet men undertake all the marketing activities. For example, one key informant explained that the men take the front seat in crop marketing but tend to misuse the money on other women.

One key informant contended that it was difficult for women to take control over agricultural incomes because they are not educated, and their culture is such that they are supposed to rally behind their men. The key informant further asserted that women could not take any decisions concerning agricultural income in the absence of their men. This meant that fields often times failed when men were absent for extended periods. Another key informant averred that women had no say in investment decisions.

As household heads, men have the responsibility to provide for the family. They therefore focus on money making activities, dominating cash generating activities such as crop sales. As observed by Aboudou and Fok (2019) in the West African context, the norm is that a man's duty is to meet the needs of household members in terms of staple food and all fees related to the running of the household. This obligation is seen as the direct corollary of his authority over his household.

Men are also responsible for large livestock management, including finding pasture and water. Since this involves spending time away from home, it is reserved for men and boys. Women only look after livestock that are near the homestead such as cattle kept in a kraal or goats when they are tethered nearby, as well as poultry. Consequently, men control livestock income.

Women have decision making authority over the production, processing and use of food crops. This is because food preparation is considered to be squarely under their reproductive gender roles and thus women are responsible for ensuring that food is cooked for the family. While the men are responsible for ensuring that the household has the staple food (maize), it is the duty of the woman to find the rest of the foods, used as complements to the maize. Women more commonly control income from the sale of food crops while men generally control income from maize, tobacco, and cotton. This has been similarly observed by Orr et al. (2015) for groundnut production and income in eastern

Resources	Access		Control	
	Men	Women	Men	Women
Agricultural land	All male respondents owned land.	Women mainly accessed land through men.	Men made most of the decisions regarding land.	Decisions regarding agricultural land were made by the husband, or by the woman head in female-headed households.
Livestock Cattle goats	Livestock was owned by men in most cases.	Women accessed livestock through men.	Men made major decisions regarding livestock (e.g. whether to sell, or to vaccinate).	Decisions as to whether/when to sell livestock were either made jointly, or women were not involved.
Poultry	Few men reported having access to poultry.	The majority of women had access to poultry.	The few male poultry owners made decisions over the fate of this livestock.	Women had decision making authority, especially when they owned the poultry.
Crop income	Men mostly left the money with women, but could access it anytime.	Women kept the money but needed permission from the men to use it.	In male-headed households, men made decisions about crop income jointly with spouses.	Control over crop income was much higher for women heads of households. Women had decision making power on smaller household purchases.
Livestock income	Men had access to livestock income.	Women had limited access to livestock income.	Men dominated decisions over how livestock income was used.	Women had little control over livestock income.
Large farming implements	Men owned the large farming implements.	Women rarely used large farming implements.	Men made most decisions regarding large farming impliments.	Women were not involved in decision making over large farming implements.
Food crops	Men left the women to look after food crops.	Women had unfettered access to food crops.	Few men engaged in decision making over food crops.	Women almost always made all the decisions regarding food crops, except for maize which was meant for sale.
Cash crops	Men dominated cotton and tobacco production.	Women dominated maize, and groundnut production.	Men dominated decision making regarding cash crops.	In some male-headed households, men dominated the decision making regarding cash crops. Men engaged in joint decision making in other households.

Table 3 Access and control profile. (*Source: Field data, 2016.*)

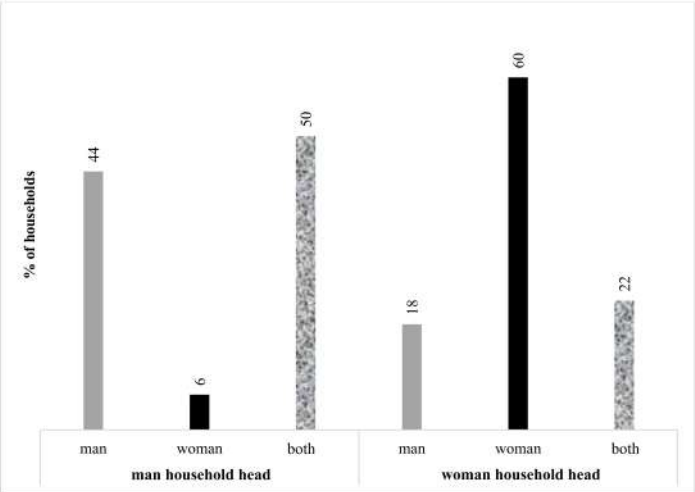

Figure 5 Decision making over crop production choices among male and female-headed households.

Zambia, and by Shipekesa and Jayne (2012) for maize production and income across Zambia.

Decision making in crop production choices

In half the interviewed households headed by men, respondents reported that decisions over which crop to produce were made jointly by the couple (Figure 5). Women in male-headed households rarely decided which crops to grow on their own, but men did this much more frequently. The key informants opined that male heads of households generally made all the decisions regarding what crops to plant. Very little discussion with other household members was conducted, though women usually offered advice.

The general views of the key informants were that crops such as cotton, tobacco, and sunflowers — essentially cash crops — were under the men's domain. Therefore, men decided if, and how much of these crops to grow. The key informants further averred that men were usually in control of the income from cotton and tobacco, and therefore, took a keen interest in making decisions concerning the production of such crops. The key informants essentially repeated what Doss (2001) noted was the standard explanation for the division of crop by gender; that men are responsible for providing cash incomes and to this end grow cash and export crops, while women are responsible for feeding the family and thus prefer to grow subsistence crops. However, results from the household interviews show that for households headed by men, decisions on crop sales were predominantly made jointly, as 90 percent reported the man and his spouse decided together whether or not to sell some or all of a particular crop. Interestingly, both men and women — in FGDs and interviews — respondents independently reported joint decision making, while the key informants did not. It could be argued that key informants were merely perpetuating common gender stereotypes, while respondents reported what actually happens in their households. These results suggest that joint decision making is more prevalent than commonly assumed.

Gender relations are not cast in stone but show a dynamism based on local circumstances. For instance, men dominate the selling of agricultural produce at larger markets that are distant from their villages, not necessary because they have sole control over such agricultural produce and the income derived from it, but because of poor transportation infrastructure and transport services. This is discussed in detail in a subsequent section. Women also engage in the production of cash crops in fields that are considered to be under their control. In the eastern province of Zambia, it is very common to find women growing cotton under contract farming with Cotton Company, under their own cognisance. Men also grow groundnuts, a crop that is an important food crop but also a cash crop. Thus, the dichotomy of "men's crops" versus "women's crops" is quite fuzzy in this context. This is similar to results from Ghana on gender patterns of cropping which indicated that women are involved in cash cropping, albeit to a lesser extent than men (Doss 2001).

Access to and control over livestock income

Livestock ownership was not very common among the respondents. Only 27 percent of male-headed and 6 percent of female-headed households owned livestock. For the male-headed households that owned livestock, men were responsible for animal husbandry, sale, and control of income in 89 percent of the cases. For the rest (11 percent), both husband and spouse had control over livestock income. Only 6 percent of the female-headed households owned livestock, and in all cases, a male household member was in control.

The young women FGDs explained that they only sold livestock and livestock products when their men were willing to let them do so. They noted that it was rare to find both men and women deciding on livestock marketing; it was usually the decision of the male household head. Across all of the FGDs, it was reported that that the more valuable the livestock, the smaller the likelihood that women were the decision makers regarding their purchases and sales. In addition, if the livestock served a purpose which was in the women's realm of responsibilities (e.g. feeding the family), her influence on decision making was greater than for livestock that largely fulfilled farming purposes, such as draught oxen. In contrast, McPeak et al. (2011, cited in Doss 2013) reported that even among pastoralists in northern Kenya and southern Ethiopia — groups who are usually considered to be very patriarchal — women reported owning large animals, including both cattle and camels. Kristjanson et al. (2004) meanwhile, observed that when higher production and marketing activities become more important, women often lose their control over livestock products and income. Thornton et al. (2002, cited in FAO 2011) noted, that within pastoralist and mixed farming systems, livestock play an important role in improving the financial situation of women, who tend to be heavily engaged in the sector. The Sudan Consortium (2016) reported that women in Sudan lack authority in making livelihood decisions, clearly manifested in the sale of livestock and management of cash, which are key resources in times of scarcity. This renders women more vulner-

able, as decisions regarding livestock and cash use rest almost entirely in men's hands, even when men are further removed from their families and less familiar with their needs.

Decision making over household expenditure

When it came to expenditure on household goods, there were a variety of responses from the respondents. Men make the decisions on what to purchase in about a quarter of the households in which they were heads (Figure 6). In the rest, decisions are either made jointly, or are made by the women. The situation is different in the households headed by women, in which women dominate the decision making (Figure 6). General household expenditure includes the purchase of goods such as food, cooking utensils, clothes, solar panels, and roofing sheets. Expenditure on agriculture relates to the purchase of fertilizer, hybrid seeds, and farming implements (e.g. ploughs, axes, hoes, rippers, and ox-carts). This is similar to results by Mubanga and Ferguson (2017) that smallholder farmers in southern Zambia spent their crop agricultural income on buying inputs for the next season, and domestic needs such as children's school fees, provision of additional foods not produced by the household, the repair and upgrade of houses, and recreation.

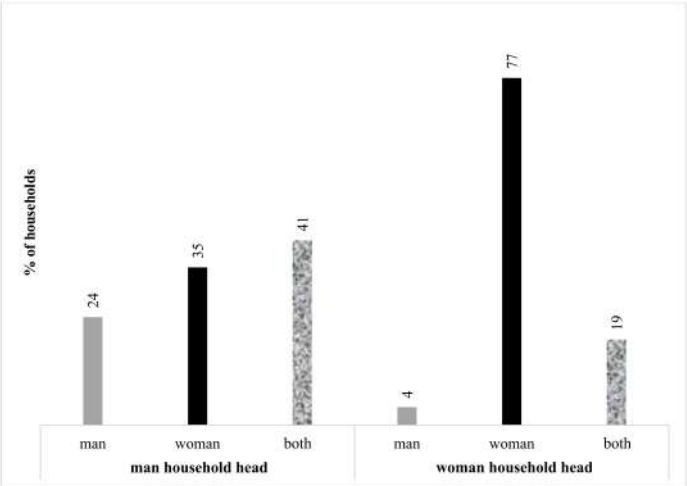

Figure 6 Decision making over household expenditure among male and female-headed households.

It is uncommon for men in female-headed households to influence household expenditure. As earlier noted, some women heads were unlikely to consult adult men that they perceived to be their dependents. Decision making in households is influenced to a large extent by local norms on gender roles. These are discussed further in the next section which explores influencing factors to complete the three profiles of the Harvard Analytical Framework.

Influencing factors and their effects on access to and control over agricultural income and labor

Influencing factors shape gender relations and determine different opportunities and constraints for men and women. From our study area, we identified community norms and practices pertaining to household headship, women's reproductive roles, and land inheritance as the most influential factors. These work synergistically with the state of infrastructure and the bio-physical environment to produce context specific gendered practices and norms that have an influence on the access to and control over agricultural labor and income by men and women smallholder farmers.

i. Reproductive gender roles influence control over mobility and agricultural income

As heads of household, it is commonly accepted that men will make some decisions unilaterally concerning the running of the household, including about agricultural activities. In exchange for this right to make decisions, the responsibility to find money for meeting household needs and wants is placed squarely on men. It is common for men to take agricultural produce to urban markets or periodic markets that are far (over 50km) from their homes. Periodic markets are markets that are set up at given frequencies (e.g. on Mondays only at particular places). Men are expected to ride bicycles, ox-carts, or derelict trucks for long distances to reach the more lucrative urban or periodic markets, sometimes being away from home for days.

Women are expected to keep a clean house, look after the children, and cook for the family. These roles demand that women spend a lot of their time at home or not far from home. Because they are responsible for daily child care and cooking activities, there are strong local norms that discourage women from taking part in activities that take them away from home for long periods. These activities include participation in marketing and agricultural trainings outside of their locales. Women thus focus on the production of crops for home consumption or are restricted to selling crops either from their homes or local markets, even when this entails selling at lower prices and over longer periods. For instance, while a 50kg bag of maize sells for ZMW 70 in markets, the women reportedly sold at ZMW 40 to local buyers. This suggests that local cultural norms about gender roles influence women's mobility, and their ability to earn incomes in their own right and exercise control over it.

Women are less likely to take part in marketing of produce in areas with poor road infrastructure and unreliable transportation services. Women find it difficult to board large trucks — a common option for transporting bulky agricultural produce — and trucks are often the only available mode of transportation. The trucks normally have high trailers which are loaded with even higher loads. Women that engage in such marketing activities face more challenges because they depend on men to help them with the loading and offloading of produce. These men charge the women higher rates for their services because women are perceived to be in a hurry to complete their business and go back home. Women traders are also perceived to be worse at negotiating lower rates for services and goods they buy, and negotiating higher prices for their produce, compared to their male counterparts. In order to avoid all these challenges, most women prefer to let their men take control of the produce marketing. The downside is that their men do not bring back all the monies raised from their marketing adventures. Men concealing

agricultural income were a complaint made in all the women's FGDs and during informal conversations during the course of this study. It was also hotly debated during the mixed gender FDGs. Similar results were reported research on the pigeon pea value chain in Malawi by Me-Nsope and Larkins (2016), who noted that cultural restrictions on women's mobility and gender disparities in transportation assets exclude women from participating in markets, thereby giving men more access to pigeon pea sales revenue.

Men's dominant roles in agricultural produce marketing should however not be assumed to mean that they have sole control over agricultural income. During our research, there were heated debates in the mixed gender FGDs, in which women accused men of not being honest about how much they made from agricultural produce sales when they reported to their spouses. There was no indication by any discussant that men did not report back to their spouses or that men made decisions on how to spend such income unilaterally. Some women discussants explained that if the men ever failed to bring back the income from crop sales, "the women would refuse to work in the fields for that crop the following agricultural season".

ii. Customary land access norms influence control over land and labor

Patrilineal land inheritance patterns favor the acquisition of land by men. According to the *Ngoni* custom, upon marriage, the woman moves to her husband's village where she gains access to his land; essentially clan land given to him by his parents. Unless she is from the same village as him, the woman does not bring any land into the household. It is implicitly known that the man has the final say over what happens on and to "his land", rendering the woman's decision-making authority over the land, limited. Women have joint control over land when it is purchased by the couple during marriage. Independently purchased land is considered to be jointly owned and the couple is free to sell it if they so wish, without seeking approval from the clan. However, it is uncommon nowadays for couples to purchase land from within the chiefdom as land sales are banned by traditional authorities. As *de facto* custodians of customary land, Chiefs exercise a lot of control over what happens to land in their chiefdoms (see Chitonge and Umar 2018 on the role of chieftaincy in customary land governance in Zambia).

Smallholder farmers in Zambia are highly dependent on rain for their agricultural activities and our study area is no exception. This means that farming operations must be synchronized with seasonal rainfall patterns. Smallholder farmers have to till the land, plant their crops, weed them, and hope they reach physiological maturity within the crop growing period. This influences how household labor is allocated during particular farming operations. Decisions also have to be made about which fields, and crops receive (often limited) inputs such as mineral fertilizers and herbicides. Such resource allocation decisions are generally made by the household head, either unilaterally or in consultation with the spouse and other adult members of the household. When household heads are away from home at such critical times, agricultural production usually suffers.

Conclusions

This study has established that for households with access to animal draught power, only men were reported to use them. This means that households with limited access to male labor depended more on tillage systems that make disproportionate use of women's labor. None of the female-headed households ripped their fields and only a small minority ploughed their fields. Female-headed households largely make use of hand hoes to perform their tillage and weeding operations. The drudgery associated with such manual systems limit both crop production and productivity, and thus exacerbate the pervasive gender gap in agriculture.

Within households, men tend to have different spending priorities from women. Men are more likely spend for personal reasons, while women in general, seek first to ensure that household food and other needs — especially children's needs — are met. While both men and women expend their labor on agricultural activities, it is mostly the men involved in the sale of agricultural output, for various reasons including distance to markets and local norms which entrench women's reproductive roles and restrict their mobility. Men's higher participation in regional markets is not indicative of unilateral control over income from crop sales conducted from such markets. Adult women are more likely to enjoy higher levels of control over crop income and their own labor compared to young women because the former have relatively fewer reproductive responsibilities.

We have demonstrated the interesting nuances in intra-household decision making. Within households, a range of decisions are made including those regarding which crops will be planted, which inputs purchased, and how much of the harvest will be sold and retained for household consumption. While many decisions are made jointly by married couples, men tend to dominate decision making concerning farming operations which are traditionally considered to be the male domain. The results of our study suggest that joint decision making among married couples is more common than routinely assumed, and assignment of control over agricultural resources is vested based on household headship, and not primarily gender. Our work points to the importance of micro-level studies to inform agricultural program design and implementation as blanket recommendations based on assumptions of unilateral decision making by male household heads may be at variance with local practice. Joint decision making is under reported because it does not usually happen in the public sphere, but within households.

In line with our findings, we make the following recommendation: To ensure equitable access to and control over agricultural income and labor, agricultural development actors should ensure continued strengthening of gender mainstreaming strategies by identifying and addressing gender inequalities in relation to income and labor resources through the use of gender analysis, gender impact assessment, and gender-responsive program design and implementation processes. Further research should address women's access to and control over land, labor, income, and other productive resources, to inform policy and agricultural development interventions. For instance, research on labor saving technologies that are culturally appropriate and affordable

to women, especially the less resources female household heads. The study further recommends that gender-aware extension provision needs to be prioritized. Agricultural extension packages could be adjusted to reflect gender specific needs of men and women and use methods of delivery that fit those needs of men and women, be they young or much older farmers as these have different knowledge needs and resource challenges.

References

Aboudou, F. and Fok, M. (2019) 'Women's empowerment in cotton growing: a case in Northern Benin', *Journal of Gender, Agriculture and Food Security*, 4 (1), pp. 13–29.

Abdourahman, O. I. (2010) 'Time Poverty: A Contributor to Women's Poverty?', *The African Statistical Journal*, 11 (November), pp. 17–37.

AGRA. (2015) *Africa Agriculture Status Report: Youth in Agriculture in Sub-Saharan Africa*, Issue No. 3. Nairobi, KE: Alliance for a Green Revolution in Africa.

Ali, D., Bowen, D., Deininger, K. and Duponchel, M. (2016) 'Investigating the Gender Gap in Agricultural Productivity: Evidence from Uganda', *World Development*, 87, pp. 152–70.

Alkire, S., Meinzen-Dick, R., Peterman, A., Quisumbing, A., Seymour, G., Vaz, A (2013) 'The Women's Empowerment in Agriculture Index', *World Development*, 52, pp. 71–91.

Arora, D. (2015) 'Gender dierences in time-poverty in rural Mozambique', *Review of Social Economy*, 73 (2), pp. 196–221.

AWARD. (2014) *Gender Analysis Toolkit*. Nairobi, KE: African Women in Agricultural Research and Development.

Beintema, N. (2017) 'An assessment of the gender gap in African agricultural research capacities', *Journal of Gender, Agriculture and Food Security*, 2 (1), pp. 1–13.

Berry, S. (1989) 'Access, control and use of resources in African agriculture: An Introduction', Africa, 59 (1), pp. 1–5.

Beuchelt, T. D. and Badstue, L. (2013) 'Gender, nutrition- and climate-smart food production: Opportunities and trade-off ', *Food Security*, 5 (5), pp. 709–21.

Blackden, M. C. and Bhanu, C. (1999) *Gender, Growth and Poverty Reduction. Special Program of Assistance for Africa, 1998 Status Report on Poverty in Sub-Saharan Africa*, World Bank Technical Paper No. 428. Washington, DC: World Bank.

Blackden, M. and Wodon, Q. (2006) 'Gender, Time Use, and Poverty: An Introduction', in Blackden, M. and Wodon, Q. (eds.) *Gender, Time Use, and Poverty in Sub-Saharan Africa*. Washington, DC: World Bank, pp. 1–11.

Boserup, E. (1970) *Women's role in economic development*. London, UK: Earthscan.

Bryman, A. (2008). *Social Research Methods*, 3rd ed. Oxford, UK: Oxford University Press.

Brown, C.K. (1994). *Gender Roles in Household Allocation of Resources and Decision Making in Ghana*. Family and Development Programme (FADEP), Department of Geography and Resource Development, University of Ghana, Legon, Ghana

Carney, C. and Carney, M. H. (2018) 'Impact of soil conservation adoption on intra household allocations in Zambia', *Review of Development Economics*, 22, pp. 1390–1408.

CFU (2009). *Conservation Farming and Conservation Agriculture Handbook for Hoe Farmers in Agro-Ecological Regions I and IIa- Flat Culture*, 2009 ed. Lusaka, ZM: Conservation Farming Unit. Chapoto, A. and Zulu-Mbata, O. (2016) *2015 Rural Agricultural Livelihood Survey Report*. Lusaka, ZM: IAPRI.

Chitonge, H. and Umar, B. B. eds. (2018) *Contemporary Customary Land Issues in Africa: Navigating the Contours of Change*. Cambridge, UK: Cambridge Scholars Publishing.

CIMMYT (2016) *Annual Report 2015: Building Resilience to Risk*. Texcoco, MEX: International Maize and Wheat Improvement Center.

CSO (2013) *2010 Census of Housing and Population and Demographics projections 2011-2035*. Lusaka, ZM: Central Statistical Office.

Curtis, S., Fehringer, J., Hattori, A., Markiewicz, M., Barry, M., and Namonje, T. (2018) *Gender and Groundnut Value Chains in Eastern Province, Zambia*. Chapel Hill, NC: USAID and MEASURE Evaluation.

CSO/MAL/IAPRI (2015) *2012 and 2015 Rural Agricultural Livelihood Surveys*. Lusaka, ZM: CSO/MAL/IAPRI.

Deere, C. D. and Doss, C. R. (2006) *Gender and the Distribution of Wealth in Developing Countries*, Research Paper No. 2006/115. Helsinki, EE: UNU-WIDER.

Doss, C. (2001). 'Designing Agricultural Technology for African Women Farmers: Lessons from 25 Years of Experience', *World Development*, 29 (12), pp. 2075–92.

Doss, C. R. (2002) 'Men's Crops? Women's Crops? The Gender Patterns of Cropping in Ghana', *World Development*, 30 (11), pp. 1987–2000.

Doss, C. (2013). *Data Needs for Gender Analysis in Agriculture*, Environment and Production Technology Division Discussion Paper No. 01261. Washington, DC: International Food Policy Research Institute.

Ehui, S. and Pender, J. (2005) 'Resource degradation, low agricultural productivity, and poverty in sub-Saharan Africa: pathways out of the spiral', *Agricultural Economics*, 32 (1), pp. 225–42.

Evers, B. and B. Walters (2000). 'Extra-Household Factors and Women Farmers', Supply Response in Sub-Saharan Africa.' *World Development*, 28 (7), pp. 1341–45.

FAO (2010). *The State of Food Insecurity in the World 2010: Addressing Food Security in Protracted Crisis*. Rome, IT: Food and Agriculture Organisation of the United Nations.

FAO (2011). *The State of Food and Women in Agriculture: Closing the Gender Gap for Development Agriculture 2010–2011*. Rome, IT: Food and Agriculture Organisation of the United Nations.

FAO (2016) *Developing gender sensitive value chains: A guiding framework*. Rome, IT: Food and Agriculture Organisation of the United Nations.

FAO (2017) *The state of food security and nutrition in the world. Building resilience for peace and food security*. Rome, IT: Food and Agriculture Organisation of the United Nations.

FAO (2018). *National Gender Profile of Agriculture and Rural Livelihoods — Zambia: Country Gender Assessment Series*. Lusaka, ZM: Food and Agriculture Organisation of the United Nations.

Farnworth, C. R. and Munachonga, M. (2010) *Gender Aware Approaches in Agricultural Programmes — Zambia Country Report*. Stockholm, SW: Swedish International Development Cooperation Agency.

Farnworth, C. R., Baudron, F., Andersson, J. A., Misiko, M., Badstue, L., and Stirling, C. M. (2016) 'Gender and conservation agriculture in East and Southern Africa: towards a research agenda', *International Journal of Agricultural Sustainability*, 14 (2), pp. 142–65.

Fischer, E. and Qaim, M. (2012) 'Linking Smallholders to Markets: Determinants and Impacts of Farmer Collective Action in Kenya', *World Development*, 40 (6), pp. 1255–68.

Forsythe, L., Posthumus, H., and Martina, A. (2016) 'A crop of one's own? Women's experiences of cassava commercialisation in Nigeria and Malawi', *Journal of Gender, Agriculture and Food Security*, 1 (2), pp. 110–28.

Government of the Republic of Zambia (2015) *National Youth Policy 2015: Towards a Skilled, Enlightened, Economically Empowered and Patriotic Youth Impacting Positively on National Development*. Lusaka, ZM: Ministry of Youth and Sport.

Haggblade, S. and Tembo, G. (2003) *Early Evidence on Conservation Farming in Zambia*. Washington, DC: International Food Policy Research Institute.

Huyer, S. (2016) 'Closing the Gender Gap in Agriculture', *Gender, Technology and Development*, 20 (2), pp. 105–16.

Jones, L., Meyers. L., Mazhawidza, P., Chiware F., Stern, M., and Saperstein, A. (2012). *Gender Analysis and Assessment for Feed the Future Programming Development*. Harare, ZI: ACDI/VOCA and Banyani Global.

Kalinda, T., Filson, G., Shute, J. (2010) 'Resources, household decision making and organisation of labor in food production among small-scale farmers in southern Zambia', *Development Southern Africa*, 17 (2), pp. 165–74.

Kristjanson, P., Krishna, A., Radeny, M., and Nindo, W. (2014) *Pathways out of poverty in Western Kenya and the role of livestock*. Pro-Poor Livestock Policy Initiative Working Paper No. 14. Rome, IT: Food and Agriculture Organisation of the United Nations.

Kumar, S. K. (1995) 'Adoption of hybrid maize in Zambia: effects on gender roles, food consumption, and nutrition', *Food and Nutrition Bulletin*, 16 (3), pp. 1–3.

Malapit, H. J. L., Kadiyala, S., Quisumbing, A. R., Cunningham, K., and Tyagi, P. (2015) 'Women's Empowerment Mitigates the Negative Effects of Low Production Diversity on Maternal and Child Nutrition in Nepal', *The Journal of Development Studies*, 51 (8), pp. 1097–1123.

March, C., Smyth, I., and Mukhopadhyay, M. (1999) *A Guide to Gender-Analysis Frameworks*. Oxford, UK: Oxfam.

Marenya, P., Kassie, M., and Tostao, E. (2015) 'Fertilizer use on individually and jointly managed crop plots in Mozambique', *Journal of Gender, Agriculture and Food Security*, l 1 (2), pp. 62–83.

Me-Nsope, N. and Larkins, N. (2016) 'Beyond crop production: Gender relations along the pigeon pea value chain and implications for income and food security in Malawi', *Journal of Gender, Agriculture and Food Security*, 1 (1), pp. 1–22.

Mehra, R., and Rojas, M. H. (2008) *Women, Food Security and Agriculture in a Global Marketplace*. Washington, DC: International Center for Research on Women.

Meijer, S. M., Sileshi, W. G., Kundhlande, G., Catacut, D., and Nieuwenhuisa, M. (2015) 'The Role of Gender and Kinship Structure in Household Decision-Making for Agriculture and Tree Planting in Malawi', *Journal of Gender, Agriculture and Food Security*, 1 (1), pp. 54–76.

Ministry of Gender and Child Development (2016) *Gender status report 2012—2014*. Lusaka, ZM: GRZ. Mofya- Mukuka, R., and Sambo, J. (2019) 'Women control over income, agricultural commercialization and dietary diversity: Analysis of rural households in Zambia', *Journal of Gender, Agriculture and Food Security*, 4 (1), pp. 1–12.

Mubanga, K. H. and Ferguson, W. (2017) 'Threats to food sufficiency among smallholder farmers in Choma, Zambia', *Food Security*, 9 (4), pp. 745–58.

Namonje-Kapembwa, T. and Chapoto, A. (2016) *Improved Agricultural Technology Adoption in Zambia: Are Women Farmers Being Left Behind?*, Working Paper No. 106. Lusaka, ZM: Indaba Agricultural Research Institute.

Ngoma-Kasanda, E and Sichilima, T (2016) *Gender and Decision Making in agriculture: A Case Study of the Smallholder Groundnuts Sector in Zambia*. Lusaka, ZM: Musika Development Initiatives.

Njuguna, E. M., Liani, M. L. L., Beyene, M., and Ojiewo, C. O. (2016) 'Exploration of cultural norms and practices influencing women's participation in chickpea participatory varietal selection training activities: A case study of Ada'a and Ensaro districts, Ethiopia', *Journal of Gender, Agriculture and Food Security*, 1 (3), pp. 40-63.

Nyanga, P. H., Johnsen, P. H., Kalinda, T. H. (2012) 'Gendered impacts of conservation agriculture and paradox of herbicide use among smallholder farmers', *International Journal of Technology and Development Studies*, 3 (1), pp. 1–24.

Orr, A., Tsusaka, T., Kee-Tui, H. T. S., Msere, H. (2015) 'What do we mean by "women's crops"? Commercialisation, gender, and the power to name', 29th *International Conference of Agricultural Economists*, Milan, IT, 8–14 August.

Orr, A., Kee-Tui, S. H., Tsusaka, T., Msere, H., Dube, T., and Senda, T. (2016) 'Are there "women's crops"? A new tool for gender and agriculture', *Development in Practice*, 26 (8), pp. 984–997.

Quisumbing, A. R. and Pandolfelli, L. (2010) 'Promising Approaches to Address the Needs of Poor Female Farmers: Resources, Constraints, and Interventions', *World Development*, 38 (4), pp. 581–92.

Quisumbing, A. R., Rubin, D., Manfre, C., Waithanji, E., van den Bold, M., Olney, D., Johnson, N., and Meinzen-Dick, R. (2015) 'Gender, assets, and market-oriented agriculture: learning from high-value crop and livestock projects in Africa and Asia', *Agriculture and Human Values*, 32 (4), pp. 705–25.

Rao, S. (2016) *Indicators of gendered control over agricultural resources: A guide for agricultural policy and research*, Working Paper No. 1. Cali, CO: CGIAR Gender and Agriculture Research Network.

Sakala, E. (2000) 'Gender issues in animal draft power weeding technology in Zambia', in P. Starkey and T. Simalenge (eds.), *A resource book for the Animal Traction Network for Eastern and Southern Africa (ATNESA)*. Wageningen, NL: Technical centre for Agricultural and Rural Cooperation.

Shipekesa, A. M. and Jayne, T. S. (2012) *Gender Control and Labour Input: Who Controls the Proceeds from Staple Crop Production among Zambian Farmers?*, Working Paper No. 68. Lusaka, ZM: Indaba Agricultural Research Institute.

Sitko, N., Chapoto, A., Kabwe, S., Tembo, S., Munguzwe, H., Lubinda, R., Chiwawa, H., and Mebelo, M. (2011). *Technical Compendium: Descriptive Agricultural Statistics and Analysis for Zambia in Support of the USAID Mission's Feed the Future Strategic Review*. FSRP Working Paper No. 52. Lusaka, Zambia: Food Security Research Project. Available at http://fsg.afre.msu.edu/zambia/wp52.pdf

The Sudan Consortium (2016) *Gender under Bombardment: Gender Disparities in SPLM/A-North Controlled Areas of Nuba Mountains, Southern Kordofan*. Kampala, UG: The Sudan Consortium African and International Civil Society Action for Sudan.

Theriault, V., Smale, M. and Haider, H. (2017) 'How Does Gender Affect Sustainable Intensification of Cereal Production in the West African Sahel? Evidence from Burkina Faso', *World Development*, 92, pp. 177–91.

Umar, B. B., Aune, J. B., Johnsen, F. H., and Lungu, O. I. (2011) 'Options for Improving Smallholder Conservation Agriculture in Zambia', *Journal of Agricultural Sciences*, 3 (3), pp. 52–62.

Umar, B. B. (2017) 'Conservation Agriculture Promotion and Uptake in Mufulira, Zambia-A Political Agronomy Approach', *Journal of Sustainable Development*, 10 (1), pp. 156–69.

Umar, B. B. (2018) 'Formalisation of land rights and its effects on agricultural resource management: Lessons from Ethiopia, Malawi, and Ghana', in H. Chitonge and B. B. Umar (eds.), *Contemporary Customary Land Issues in Africa: Navigating the Contours of Change*. Cambridge, UK: Cambridge Scholars Publishing, pp. 184–207.

Wekesah, F. M., Mutua, E. N., and Izugbara, C. O. (2019) 'Gender and conservation agriculture in sub-Saharan Africa: a systematic review', *International Journal of Agricultural Sustainability*, 17 (1), pp. 78–91.

Whitehead, A. (1999) 'Lazy Men, Time-Use, and Rural Development in Zambia', *Gender and Development*, 7 (3), pp. 49–61.

World Bank (2012) *World Development Report 2012: Gender Equality and Development*. Washington DC: The World Bank.

World Bank (2014) *Levelling the Field: Improving opportunities for women farmers in Africa*. Washington, DC: The World Bank.

Warner, M. W., Al-Hassan, R. M., and Kydd, J. G (1997) 'Beyond Gender Roles? Conceptualizing the Social and Economic Lives of Rural Peoples in Sub-Saharan Africa', *Development and Change*, 28, pp. 143–68.

Warren, H. (2007) 'Using gender-analysis frameworks: theoretical and practical reflections', *Gender and Development*, 15 (2), pp. 187–98.