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Understanding intra-household gender disparities of smallholder livestock production in Zambia

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Despite the importance of livestock in smallholder livelihood, gender inequalities continue to persist. Studies on gender disparities in livestock ownership often base their analysis on the concept of headship, but this approach is limited as it fails to adequately account for women within male-headed households. By disaggregating households into i) those with both male and female adults, ii) only female adults, iii) only male adults, in this study we analyze livestock gender disparities in terms of cultivated land size, crop income, culture, and production activities, using survey data from 7,934 households and in-depth interviews with 271 households in Zambia. Our findings show that fewer female household members own livestock than male members, and more households with only male adults own livestock than those with only female adults. To understand intra-household gender disparities, it is necessary to address the structural challenges women face, to raise awareness about these issues, and to provide targeted livestock production support to households with only female adults.

Keywords: Gender Gap, Livestock, Land Size, Income.

Introduction

Livestock is an integral component of smallholder mixed production systems in Sub-Saharan African (SSA) countries, owing to the many livelihood benefits they offer to smallholder farmers. Livestock contributes to farmers' welfare through the sale of animals and animal products, while providing draft power and manure for crop production. In addition, owning assets such as livestock can enhance intra-household empowerment (Njuki and Mburu 2013; Kristjanson et al. 2014). Despite these benefits, however, studies show that in most of SSA, women own less livestock compared to men, although in some countries it is common for women to own small ruminants while men maintain control over large ruminants (SOFA Team and Doss 2011; FAO 2013a; Kristjanson et al. 2014). As such, women tend to have less decision-making power over livestock production and the revenue derived from its sale (Mulugeta and Amsala 2014).

Studies on gender disparities in livestock ownership tend to focus on household headship comparisons (male-headed versus female-headed households) (see for example, Yisehak 2008; Debela 2017). Studies focusing on intra-household and livestock dynamics, on the other hand, are scant in number (see, for example, Njuki and Mburu, 2013). While studies comparing male and female headed households have yielded valuable informa-

tion, most of these analyses do not account for the position of female household members in male-headed households. Focusing solely on headship may perpetuate existing social inequalities and prioritization of household responsibilities. This overlooks the different roles that determine household members' ability to own different livestock species and could be detrimental to women. To devise appropriate strategies that contribute to our understanding of gender gaps — and subsequently our ability to reduce gender gaps — it is essential to focus on individual male and female household members' ownership of livestock within both female and male-headed households. It is also necessary to understand the gender disparities through the lens of household gender dynamics, because the ownership patterns and the challenges that women face in acquiring livestock may be affected by household composition.

The gendered household dynamic concept disaggregates households based on (a) households with both male and female adults (18+ years); (b) Households with male adults only — those with at least one male adult and no female adult; and (c) Households with Female adult(s) only — those with at least one female adult and no male adults. Using this approach, this study addresses the following research questions: i) how do livestock ownership patterns change within different gendered household types with regards to the size of land cultivated and crop income? The study focuses on the land and crop income based on field

observations, which revealed a strong interaction between crop enterprise and livestock ownership. ii) How do livestock production activities by household members shape livestock ownership patterns?

A better understanding of these aspects of gendered livestock ownership can inform the design and implementation of stakeholder development interventions that aim to bridge the gender gaps in livestock ownership. This study focuses on large and small ruminants, specifically cattle and goats. Cattle and goats are common types of livestock owned by smallholder households in Zambia. These livestock species provide a range of benefits to the farmers as they can sell live animals or products such as meat and milk to meet various family needs, notably farm inputs and educating children. Additionally, literature shows that smallholder households have a comparative advantage in raising ruminants as compared to raising non-ruminants, which compete with human beings on feed resources (McDermott et al. 2010).

Literature review

Owning livestock is critical to the wellbeing of smallholder farmers as it offers a lot of benefits. First, livestock contributes to the nutritional needs (from meat, eggs, and milk), and household incomes from which they fulfil their health, education, and other household needs (Assan 2014; Kristjanson et al. 2014; Namonje-Kapembwa, Chiwawa, and Sitko 2016; Tui et al. 2018). Second, livestock is a valuable asset. According to Lubungu and Mofya-Mukuka (2012), livestock in Zambia accounts for 20 percent of the smallholder households' productive assets and up to 40 percent in provinces (Eastern and Southern), where livestock production is highest. Third, smallholder farmers use livestock for transportation, manure, and as a cushion against climatic shocks such as droughts (Dejene et al. 2011; FAO 2013a; Meinzen-Dick et al. 2014; Tadesse et al. 2014; Emama, Mohammed, and Mohammed, 2015; Braimoh et al., 2018). At the individual level, owning livestock increases one's self-esteem, and strengthens decision-making and economic power within the household and the community (Rota, Sperandini, and Hartl 2010; Kristjanson et al. 2014; Patel 2016; Djurfeldt 2018; Tui et al. 2018). It also acts as a fallback in the case of household dissolution due to separation, divorce, or death. Equally, livestock has cultural connotations as in some communities, they use livestock to pay for bride price. Lastly, livestock ownership provides critical pathways out of poverty (Patel et al. 2016). With the rising demands for livestock products resulting from rapidly increasing urban populations, livestock offers an opportunity for women and men to increase their incomes (Filmer et al. 2014; Ekele and Obademi 2018).

Despite the importance of livestock, women in SSA lag behind in livestock ownership. A survey of 665 households randomly drawn from four districts in Ethiopia showed that female-headed households own significantly less livestock (and other strategic resources) than male-headed households (Henry et al. 2016). This is not to say that women never own large animals (see Assan 2014; Kristjanson et al. 2014), but men still dominate in this domain. In Zambia, 33.4 percent of male-

headed households owned cattle in 2015, compared to only 23.2 percent of female-headed households (CSO/MAL/IAPRI 2015). Male-headed households were similarly far ahead in terms of goat ownership, which fell at around 37.6 percent compared to only 26.8 percent of female-headed households. The same pattern can be observed in the case of all other small livestock, such as chickens, sheep, pigs, ducks and geese, guinea fowl, and rabbits (CSO/MAL/IAPRI 2015). Interestingly, a panel study (2002-2015) by Djurfeldt (2018) based on the gender of the farm manager, concluded that gender gaps are minimal in areas where livestock was of limited importance, but more sizeable in those regions with the high level of livestock ownership. Djurfeldt's (2018) demonstrates that in regions where livestock ownership is high, such as Mazabuka district of Zambia and the Upper East in Ghana, households with male farm managers have higher access to several types of livestock (both cattle and small livestock). This clearly exemplifies the disadvantaged social and economic position that women occupy.

In most SSA countries, women's and men's access, ownership, and control over resources such as livestock is strongly gendered due to social norms. Structural challenges that determine women's access to resources, and the roles that they perform in societies and within their own families — such as unpaid domestic chores including childbearing and caring, preparing meals, fetching firewood and water, and cleaning their houses — account for their limited ability to own and maintain livestock. Unlike their male counterparts, most women have limited access to resources such as land, finances, knowledge, skills, mobility, participation in decision-making, and policy development (Bwalya and Akombelwa 1999; SOFA Team and Doss 2011; Patel et al. 2016; Djurfeldt 2018). In cases where women have accessed resources, they usually have no control over them, which in itself compromises their ability to acquire livestock (Meinzen-Dick et al., 2014; Henry et al., 2016). Women's contribution to livestock production activities is nonetheless significant. In many societies, women tend to care for and feed family animals and birds and take care of their health and security (Kristjanson et al. 2014; Galiè et al. 2017; Ekele and Obademi 2018). In most parts of India for instance, women perform most of the livestock production functions such as fodder collection, feeding, watering, management, milking and household-level processing, value addition, and marketing (Patel et al. 2016).

Even though women contribute their labor to livestock production activities, Fletschner and Kenney (2014) report that men are usually the decision-makers. In some societies, women are barred or discouraged from performing socially constructed gender roles that are considered the domain of men — such as herding cattle and handling as well as guiding them when cultivating fields (Bwalya and Akombelwa 1999; Henry et al. 2016) — partly because such tasks threaten men's position of power in society and within the household. Henry et al. (2016) also contend that women's lack of control over livestock forces them to enter into share-cropping arrangements with men, who provide labor and oxen while acquiring larger shares of the produce, leaving female-headed households food insecure.

The design of interventions aimed at improving women's lives requires cognizance of the existing livestock ownership norms

and patterns, as they play a role determining how and whether women are able to maintain control over resources including livestock. According to Kristjanson et al. (2014), women’s access to, and control over, household assets increases household food security, enhances children’s nutritional status and access to education, and improves women’s wellbeing. Further, in some communities, women are commonly involved in the marketing of livestock products. However, their participation tends to be threatened by increasing commercialization of such products (Kristjanson et al. 2014). It is therefore critical for governments to institute policies and programs that integrate gender aspects into livestock production and retain women in the business.

Assan (2014) contends that livestock production strategies that take into account gender differences and women’s rights are prone to succeed in enhancing food security. Further, interventions that involve women in training on livestock handling, can help increase their confidence to own cattle. Equally, social capital (relationships, networks, institutions, attitudes, and values) enables women and men to cooperate and gain access to knowledge, information, management practices, credit, and contacts that can facilitate acquisition of livestock (Chianca, Balcom, and Robertson 2011; Meinzen-Dick et al. 2014; Patel et al. 2016; Ekele and Obademi 2018). Women, especially those in married households, are usually excluded from development interventions and often rely on information passed on to them by their male relatives (Gebremedhin et al. 2016), which hinders them from accessing resources necessary to acquire livestock.

It is critical to recognize that households are heterogeneous, with different members possessing different levels of power and ability to own livestock (Njuki and Mburu 2013). Some literature demonstrates that livestock ownership differs across various categories of people. A study by Galiè et al. (2015) found that in Tanzania, widows generally own larger livestock (such as cattle, goats, and sheep) while married women are more likely to own smaller livestock (like chickens). Young unmarried women and men generally own resources together with their parents. Boogaard et al. (2015) found that in Mozambique, men in male-headed households keep goats for the longest period, followed by women in male-headed households, while females in male-headed households keep goats for the shortest period. Women in male-headed households rarely have control over income from goat sales. An earlier study by Buhl and Homewood (2000) among Fulani herder families, showed younger women, second and third wives, and daughters, have less freedom in decision making over assets than older women, first wives, and mothers in law. These studies indicate the importance of considering household gender dynamics in livestock production.

As we have outlined, the literature on intra-household gender dynamics in livestock production is limited, as most of it is based on analyses of livestock ownership of women in general or at the household level. This study, therefore, contributes to this discourse by analyzing the gender differences in ownership of livestock across and within households, with a specific focus on cattle and goats. We hypothesize that:

- i. Cultural differences determine levels of gender gaps in livestock ownership.

- ii. Gender disparities are lower among households cultivating larger parcels of land.
- iii. Households with higher crop incomes have lower gender disparities.
- iv. Gender roles determine the type of livestock owned by men and women respectively.

Data and methods

The study employs a mixed-methods approach, utilizing both quantitative and qualitative data. The primary quantitative data used in this study stem from nationally representative household surveys — the Rural Agricultural Livelihood Survey (RALS) — conducted by the Central Statistical Office (CSO), together with the Ministry of Agriculture (MoA) and the Indaba Agricultural Policy Research Institute (IAPRI) in Zambia. The survey was conducted in 2015, and 7,934 farm households were interviewed. The sample is weighted by population to reflect national statistics of about 1.5 million smallholder farmers. For details on the sampling and data collection procedure, the reader is referred to IAPRI (2016). In 2015, of the 1.5 million smallholder households, 35 percent owned goats and 31 percent owned cattle (IAPRI 2016). In addition to the 2015 RALS data, we collected information on decision-making and livestock-related activities from 271 households who participated in the 2015 RALS. This supplementary information was obtained during a cattle household survey conducted in 2016. The cattle survey was part of doctoral research by a Ph.D. candidate from the University of Hohenheim with the assistance of CSO staff. These households were followed in Chibombo, Mbala, Kalomo, Namwala, and Petauke Districts of Zambia.

We interacted with farmers and key informants and collected qualitative data in eight districts namely Chibombo, Mbala, Choma, Kalomo, Namwala, Sesheke, Petauke, and Chongwe (see Figure 2) in October and November 2016. We selected these districts based on the percentage of households keeping cattle and goats, computed from CSO/MAL/IAPRI (2015) RALS survey data. Figure 3 shows the geographical distribution of households keeping cattle and goats by the district.

To collect the qualitative data, the study utilized the Gender and Development (GAD) analytical framework. This framework involves, among other things, analyzing the access and control profile on any activity either at the household or community

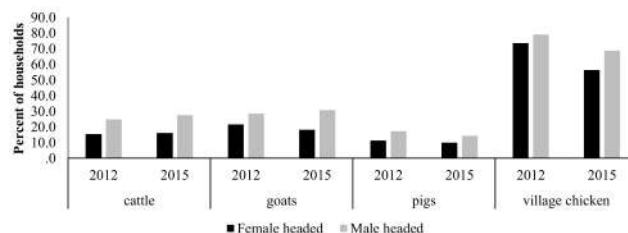


Figure 1 Ownership Patterns of Livestock within the Gender of the Household Head in Zambia. (Source: CSO/MAL/IAPRI RALS 2012 and 2015 survey data: 7,254-panel households.)

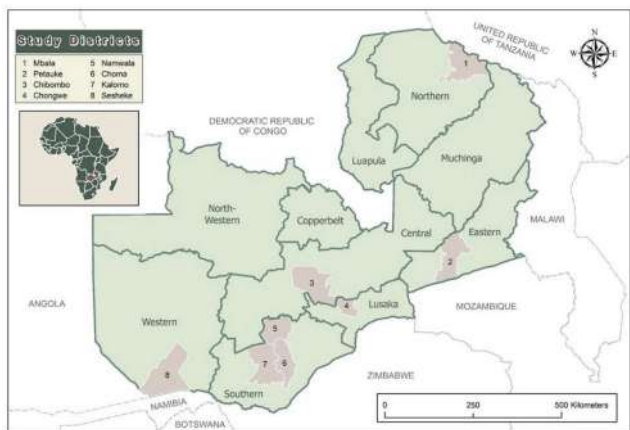


Figure 2 Map of the Districts Visited in Zambia. (Source: Authors.)

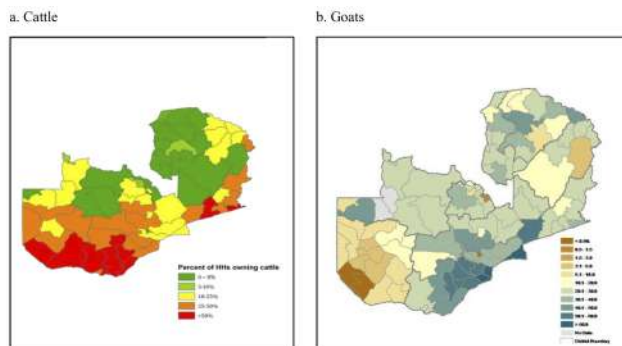


Figure 3 Geographical Distribution of Households Owning Cattle and Goats in Zambia. (Source: a-Lubungu, Sitko, and Hichaambwa, 2015; b-Namonje-Kapembwa, Chiwawa, and Sitko, 2016.)

level (Fernando and Starkey 2004). This tool was necessary for this study, as it helped in analyzing the roles women, men, and youth play in livestock production, management, and realization of associated benefits.

Qualitative data collection used a combination of tools. First, in-depth interviews were carried out with selected households from the 271 who participated in the 2016 cattle household survey. These interviews were done to gather information about the timeline of livestock acquisition (chronology of how households acquired their initial stock and the major events related to the increase or decrease of the herd size) and the roles each household member performs in livestock-related activities. These in-depth interviews helped us understand the dynamics involved in the ownership and management of cattle and goats. Second, the key issues and concerns raised during individual household interviews were further explored through a total of 10 Focus Group Discussions (FGDs), each comprising of five to ten farmers in Kalomo, Namwala, Petauke, and Mbala districts. Separate discussions were held with three men’s groups and seven women’s groups that included youth. During the FGDs, access and control profiles on different livestock species and the daily activity sched-

ule were captured. Third, to gain greater insight into alternative ways of changing the status quo of women in livestock production, we visited Twelekeshe Women’s Club in Chongwe District which is involved in goat keeping and benefited from the World Bank livestock matching grant project. Lastly, we conducted key informant interviews with seven District Veterinary Offices in the Ministry of Fisheries and Livestock (MFL) in their respective districts, and with Chief Mukobela of Namwala District of Southern Zambia. To analyze the quantitative data, we employed descriptive statistics. Content analysis was used to analyze qualitative data. Content analysis is an analytical approach used to interpret the meaning of qualitative data (Hsieh and Shannon 2005).

Results and discussion

This section presents and discusses the findings of the study. It begins with a discussion of the gender differences in ownership of cattle and goats — with respect to cultural differences, the size of land cultivated, and crop income — and ends with a discussion on how the gender roles affect ownership of livestock.

Cultural differences, gender dynamics, and ownership patterns of livestock

Research has shown that in many societies, men and women tend to own different animal species. Men usually own cattle and other larger animals, while women own smaller animals, such as goats and poultry (Deere, Alvarado, and Twyman 2012; Yisehak 2008). Ownership patterns of livestock are, however, more complex than these general claims capture, and are strongly related to livestock production systems, as well as social and cultural factors. In this section, we use district-level information represented by various ethnic groups as a proxy of cultural differences, to understand the ownership pattern of cattle and goats within different gendered household types (Tables 1 and 2). The Lenje speaking people dominate Chibombo District, while the majority of the inhabitants of Petauke are Chewa. In Mbala, the majority belong to the Bemba ethnic group, and the Tongas and Ilas dominate Kalomo and Namwala districts respectively.

The results in Table 1 show variation in cattle ownership. The districts in the Southern Province (Kalomo and Namwala) have the highest proportion of households owning cattle and the Mbala district of Northern Province has the least.

The results show that across districts, the percentage of households with only female adults who owned cattle is the lowest among the gendered household types compared. The inter-headship comparison reveals that more male household members in the female-headed households own cattle than female household members in male-headed households in almost all the districts.

Though various factors could explain the observed disparities, social and cultural differences across the districts could also, in part, account for the variation in the ownership patterns. Historically, cattle ownership has been important specifically among

	Districts				
	Chibomb	Petauke	Mbala	Kalomo	Namwala
Percent of households owning cattle					
All Households	48.2	57.9	24.1	69.4	67.7
Gendered Household Type					
HHs with Male and Female adults	53.4	59.8	24.4	72.8	67.7
HHs with Female adult(s) only	0	38.8	20.8	52.7	41.5
HHs with Male adult(s) only	10.8	100.0	-	77.2	96.6
Female-headed households					
Female HH members owning cattle	7.9	28.8	4.5	23.5	39.6
Male HH members owning cattle	17.8	13.3	15.5	28.3	23.7
Male-headed households					
Female HH members owning cattle	8.9	6.4	0.4	19.1	30.6
Male HH members owning cattle	49.7	60.9	24.9	71.7	65.5

HH = household. “-” means that there were no households with male adults only in that particular district. Zero percent means there were no households who owned cattle within that gender category in that particular district.

Table 1 Cattle Ownership Patterns — Gender Dynamics by Study Districts in Zambia During the 2013/14 Season. (Source: CSO/MAL/IAPRI’s RALS 2015 survey data.)

the Ila and Tonga speaking people, who are both located in the Southern Province of Zambia. Their agricultural lifestyle revolves around cattle, and the animals are not only economic assets but are considered a source of pride and identity. The more cattle one owns, the more they feel respected in the community. Apart from using cattle for draft power, transportation, traditional ceremonies, and funerals, cattle are highly favored as the payment of *lobola* (bride price). Though cattle are used for dowry or “damage” (paid by a man who impregnates a woman before marriage) payments, there are differences in the number of the animals paid across cultural groups. Among the Ilas for example, dowry payments attract a minimum of eight heads of cattle while in Tonga land of Kalomo district, at least four animals are paid. In cases where a man impregnates a woman outside marriage, in both districts he pays even more “damage”, since this is regarded as a punishable offence. In Mbala district, one or two animals are enough for dowry payment. In Petauke, dowries are paid not in the form of cattle, but households request one or two cattle for “damage” payments. Due to the differences in the value attached to cattle ownership and dowry payments, the majority of households in the Southern Province keep cattle.

The high proportion of females owning cattle in Namwala District is due in part to women being given a share of the cattle acquired through the payment of bride price. However, Mizinga (1990) points out that historically, women rarely go with their livestock to their husband upon marriage, as they feared they might lose them to the husband’s relatives. To date, the practice is still prevalent in the Southern Province, as confirmed by participants in the FGDs, individual household interviews, and Chief Mukobela of the Ila speaking people. The negative implication of this practice, however, is that despite having an opportunity to own cattle, most women still have limited control over their cattle, which contributes to their low levels of cattle ownership. Women can, however, keep goats and chickens with her in the marital home. If a woman is divorced after accumulating livestock together with her husband, she usually returns to her maternal home without any livestock, unless her

husband elects to give her some (it is not an entitlement). The women in our study perceive this cultural practice to be difficult to change, except through the involvement of the local courts. In their view (particularly in Petauke District), the courts are helping to change the culture and are promoting equal sharing of the property upon divorce.

The mode of cattle acquisition could also explain the cattle ownership differences between female and male household members. In Petauke District, for example, under a practice called *chibeta* (herd boy), boys acquire cattle by working for other families on a three to a four-year contract, after which they are paid a cow. This arrangement, dating back over half a century, increases the rate of cattle ownership among male household members. Male members also do more rewarding off-farm activities such as selling firewood and often use the proceeds to buy cattle or goats.

Household members equally acquire cattle through gifts and inheritance from parents. Culturally, this system tends to favor males as large livestock is passed on to them while their parents are still alive, or through inheritance upon the death of their parents. Joint ownership — meaning both spouses having full bundles of rights (use and decision making) — of livestock is not common among the households interviewed. In Namwala District, parents give cattle to young men who are ready to marry, to help them pay dowry and to start their home (or farm). As time passes, the accumulated cattle become the property of the young men and are not necessarily jointly owned with their new wives. In elaborating this point, Chief Mukobela stated:

It is difficult to own livestock (cattle) jointly with their spouses because cattle were acquired through one’s extended family system. The extended family members are ‘sleeping partners’ in livestock ownership, and they have an interest in it. In that case, you cannot own the livestock jointly.

(Interview, Chief Mukobela of Namwala district, 16 December 2016)

	Districts				
	Chibombo	Petauke	Mbala	Kalomo	Namwala
	Percent of households owning goats				
All households	51.3	27.3	38.1	54.4	46.6
Gendered household type					
HHs with Male and Female adults	54.8	29.2	38.5	60.8	44.7
HHs with Female adult(s) only	38.7	20.7	34.4	37.0	96.1
HHs with Male adult(s) only	0.0	9.6	-	13.9	7.2
Female-headed households					
Female HH members owning goats	52.5	13.5	16.7	16.2	40.6
Male HH members owning goats	1.0	6.6	18.4	7.3	0.0
Male-headed households					
Female HH members owning goats	22.1	5.3	5.8	20.2	16.2
Male HH members owning goats	46.7	23.8	34.4	54.3	39.4

HH = household. “-” means that there were no households with male adults only in that particular district. Zero percent means there were no households who owned cattle within that gender category in that particular district.

Table 2 Goat Ownership Patterns — Gender Dynamics by Study Districts in Zambia During the 2013/14 Season. (Source: CSO/MAL/IAPRI’s RALS 2015 survey data.)

	All Households	Land Cultivated (ha)		
		0 to 1.99 ha	2 to 4.99 ha	5 to 19.99 ha
	Percent of households owning cattle			
All households	31.1	22.0	47.4	61.8
Gendered household type				
HHs with Male and Female adults	32.7	22.5	48.8	63.5
HHs with Female adult(s) only	21.2	18.8	31.9	36.4
HHs with Male adult(s) only	35.8	27.4	50.8	65.6
Female-headed households				
Female HH members owning cattle	16.7	13.9	27.1	34.7
Male HH members owning cattle	7.4	6.3	12.3	10.4
Male-headed households				
Female HH members owning cattle	6.8	4.7	8.4	17.1
Male HH members owning cattle	31.4	21.0	46.6	61.8

HH=household. The statistics reflect the percent of households who owned goats within each gender category within that particular land size category.

Table 3 Land Cultivated and Cattle Ownership by Gender Dynamics in Zambia During the 2013/14 Season. (Source: CSO/MAL/IAPRI’s RALS 2015 survey data.)

Parents rarely give cattle to female household members as they are destined to be married off in the future. This sentiment was echoed by respondents across all the districts visited.

Namwala district had the highest proportion of households who owned goats among households with only female adults (Table 2). The results also show a comparatively higher proportion of females owning goats in female-headed households than those in male-headed households. In Namwala district, keeping goats is referred to as “a poor person’s activity” or “a woman’s undertaking” hence women’s domination in this domain. In addition, while cattle rearing requires owners to take the animals away from the homesteads for grazing, particularly during the feed-scarce period (May–December), goats can roam about the homesteads and can be easily managed by women. They are also economically affordable.

Land cultivated, gender disparities, and livestock ownership patterns

To examine the role of land cultivated in the livestock ownership patterns and gender disparities, we divide land cultivated into three categories. These groups include households who cultivate less than 2 hectares, 2 hectares to 4.99 hectares, and those who cultivate more than 5 hectares but less than 20 hectares (Table 3). Overall, 31.1 percent of the 1.5 million smallholder farmer households in Zambia owned cattle during the agricultural reference season of 2013/2014. Cattle ownership was more prominent among households who cultivated more than 5 hectares (61.8 percent) than among those who cultivated less than 2 hectares (22 percent). The correlation matrix shows a significant positive relationship between the amount of land cultivated and cattle

	All Households	Land Cultivated (ha)		
		0 to 1.99 ha	2 to 4.99 ha	5 to 19.99 ha
		Percent of households owning goats		
All households	35.1	31.3	41.2	50.1
Gendered household type				
HHs with Male and Female adults	36.8	32.7	42.6	51.1
HHs with Female adult(s) only	26.7	25.3	31.5	40.4
HHs with Male adult(s) only	29.1	28.6	25.4	43.4
Female-headed households				
Female HH members owning goats	21.3	19.7	26.7	34.5
Male HH members owning goats	6.3	5.8	7.7	10.2
Male-headed households				
Female HH members owning goats	11.2	9.6	12.2	19.3
Male HH members owning goats	32.6	29.1	36.6	46.4

HH = household. The statistics reflect the percent of households who owned goats within each gender category within that particular land size category.

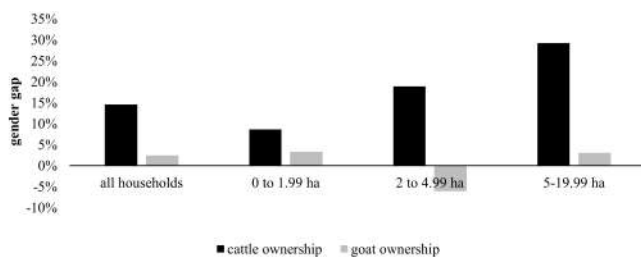
Table 4 Land Cultivated and Goat Ownership by Gender Dynamics in Zambia During the 2013/14 Season. (Source: CSO/MAL/IAPRI’s RALS 2015 survey data.)

ownership (Appendix 1A) and similar results are discernable even among goat owning households (Table 4 and Appendix 2A).

Disaggregated results based on the gendered household type, reveal that the percentage of households owning cattle was highest among the households with only male adults followed by households with both male and female adult members (Table 3). Households with only female adults had the lowest percentage of cattle ownership. This result is also consistent with the results obtained within each size of the land cultivated category.

Within each gendered household type, the percentage of households owning cattle increases with the increase in the size of land cultivated. Thus, even households with female adults only are more likely to own cattle as their size of cultivated land increases. Likewise, results in Table 4 show that households with only female adults have the lowest proportion of goat ownership, even within each land size cultivated category. However, we note that gender disparity is higher with cattle ownership than goat ownership (Figure 4).

We also disaggregate the analysis based on the gender of the



HH = household. The gender gap is computed as the difference between the proportion of households with male adults only and the proportion of households with female adults only

Figure 4 Gender Gaps, HHs with Male Adults Only vs. Female Adults Only by Land Size Cultivated in Zambia During the 2013/2014 Season. (Source: CSO/MAL/IAPRI’s RALS 2015 survey data.)

household head. The results in Table 3 show that the proportion of male household members who own cattle within female-headed households is higher than the percentage of female members who own cattle within the male-headed households. These results suggest that female household members are less likely to own cattle within male-headed households compared to male household members within female-headed households. It is important to note that the proportion of female household members who own cattle within male-headed households is higher among the households who cultivate more than 5 hectares compared to those who cultivate less. These results are consistent with information gathered during the FGDs.

Crop income, gender dynamics, and livestock ownership patterns

The majority of smallholder farmers in Zambia grow one or more crops either for subsistence, or commercial sale to meet household needs such as education, healthcare, and food. Equally, smallholder farmers use the surplus income to purchase livestock as an investment or saving option. In this section, we discuss the relationship between crop revenue and livestock ownership with respect to household gender dynamics.

Results in Tables 5 and 6 and in Appendix 1A and 2A show a positive association between income earned from crop sales and ownership of cattle or goats, indicating the importance of crop income especially in the acquisition of initial stock as indicated by the majority of the FGD participants.

Despite the increase in the proportion of households owning cattle associated with higher crop income within each gender group, gender disparities are quite evident (Figure 5). Women consistently lag behind men in terms of cattle ownership, regardless of the crop income bracket. In contrast, the disparities are minimal with regard to ownership of goats (Figure 5). As shown in Table 6, we also find higher percentages of male household

Level of crop income (range per quartile-ZMW)	All Households	Crop income (ZMW)			
		1st Quartile	2nd Quartile	3rd Quartile	4th Quartile
		Less than 1,955	1,957–4,413	4,413–9,107	More than 9,107
		Percent of households owning cattle			
All households	31.1	17.1	26.4	36.0	49.8
Gendered household type					
HHs with Male and Female adults	32.7	17.7	26.8	36.5	51.0
HHs with Female adult(s) only	21.2	14.4	22.6	28.8	35.2
HHs with Male adult(s) only	35.8	23.2	41.2	47.2	39.3
Female-headed households					
Female HH members owning cattle	16.7	12.0	14.9	22.4	31.0
Male HH members owning cattle	7.4	3.8	8.2	9.3	15.5
Male-headed households					
Female HH members owning cattle	6.8	2.0	5.5	7.8	11.6
Male HH members owning cattle	31.4	16.0	25.8	35.0	48.5

HH=household; the statistics reflect the percent of households who owned cattle within each gender category, and within that, each income category

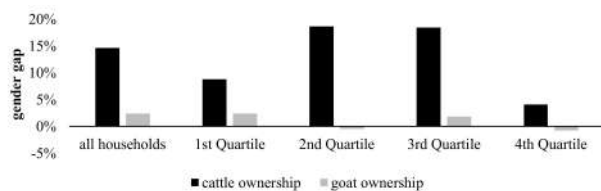
Table 5 Crop Income and Cattle Ownership by Gender Dynamics in Zambia During the 2013/14 Season. (Source: CSO/MAL/IAPRI’s RALS 2015 survey data.)

Level of crop income (range per quartile-ZMW)	All Households	Crop income (ZMW)			
		1st Quartile	2nd Quartile	3rd Quartile	4th Quartile
		Less than 1,955	1,957–4,413	4,413–9,107	More than 9,114
		Percent of households owning goats			
All households	35.1	23.9	34.3	37.1	48.3
Gendered household type					
HHs with Male and Female adults	36.8	25.3	34.9	38.5	49.0
HHs with Female adult(s) only	26.7	20.0	31.9	28.7	40.2
HHs with Male adult(s) only	29.1	22.4	31.4	30.5	39.4
Female-headed households					
Female HH members owning goats	21.3	15.2	24.5	24.2	30.1
Male HH members owning goats	6.3	4.8	6.3	5.3	14.0
Male-headed households					
Female HH members owning goats	11.2	5.6	10.2	11.2	17.8
Male HH members owning goats	32.6	22.2	31.2	33.5	43.3

HH =household

Table 6 Crop Income and Goat Ownership by Gender Dynamics in Zambia during the 2013/14 Season. (Source: CSO/MAL/IAPRI’s RALS 2015 survey data.)

members owning goats within the male-headed households as compared to female household members, regardless of their crop income levels. These findings are contrary to the conventional view that women dominate ownership of small livestock such as goats, though they are consistent with Djurfeldt’s (2018) findings, which show women’s disadvantaged position even ownership of small livestock.



HH=household; Gender gap is computed as the difference between the proportion of household with male adults only and the proportion of households with female adults only.

Figure 5 Gender Gaps, HHs with Male Adults Only vs. Female Adults Only by Crop Income Quartile in Zambia During the 2013/14 Season. (Source: CSO/MAL/IAPRI’s RALS 2015 survey data.)

Insights from FGDs and individual interviews revealed several reasons why men dominate cattle production, and women lag in relation to crop income. First of all, the livestock acquisition timeline discussions suggested that crop proceeds mainly finance the initial stock of animals. Households have at least one field in which all household members contribute their labor. Male members do most of the labor activities for land preparations, while female members tend to be responsible for the planting, weeding, and harvesting. This division of labor is in line with the work of Shipekesa and Jayne (2012), who found that male and female members equally contributed labor to the largest crop field, even though they perform different tasks. Despite this, the control of proceeds is not proportionally shared as women have less control over the earnings from crop income (IAPRI, 2016). Since men have the upper hand in terms of control over crop income, they decide on how income is used (IAPRI, 2016). If they choose to purchase an initial stock of animals, the men also assume ownership over these animals. During FGDs and individual interviews, when we asked participants to whom the animals belonged, both males and females said: “the livestock belong to the man”. Further probing revealed that women often respond in such a way

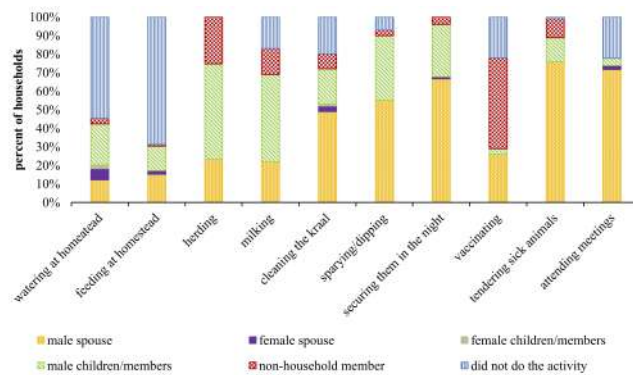
because men are the head of the households, or as they say in Cinyanja (a local language): “*Ndiye akulu a pa nyumba*” (because he is the head of the household). Women have little to say because they respect (fear) their husbands. One woman respondent said: “life in villages is different from town life”, implying that, in the cities, men and women reason and make decisions together, which is still uncommon in rural areas.

Though some women have separate fields or engage in gardening during the off-crop season from which they get personal income, they have less time to spend in these side fields because of their responsibilities in the main family fields. Moreover, FGDs revealed that women face challenges in gardening, such as scarcity of water (during the dry season) and animal encroachment. In the FGDs, most women felt they owned goats because the small ruminants were more affordable as compared to cattle. For example, when a woman produces and sells a few crops from her small piece of land, she can only afford to buy small livestock (chickens, ducks, and goats) and not cattle. Furthermore, goats do not require complicated management practices; thus, women find it easy to monitor goats, just as they do village chickens. The chairperson of the Twelekeshe Women’s Club in Chongwe District echoed these sentiments. The group applied for a matching grant under a World Bank program and started rearing goats because they are easier to manage than cattle.

Role of female members in livestock production

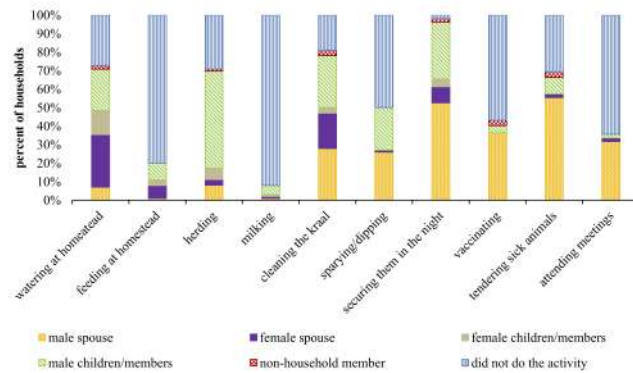
Livestock production involves various activities including herding the animals (cattle and in some cases goats), providing feed/fodder, drawing water, and securing them at night. Other activities include dipping, administering vaccines, tendering sick animals, and attending livestock-related meetings, settling disputes and training (Ayoade, Ibrahim, and Ibrahim 2009; FAO 2003). These activities differ depending on the type of livestock reared, as well as with the season of the year. Our study found that all members of the household play a role in these activities, which contribute to the maintenance and expansion of the herd.

In the districts we visited, large livestock such as cattle, mainly graze in areas distant from the farmer’s homestead, while goats roam both around the homestead, and in farther off places together with the cattle. We found that typically, males perform most of the activities relating to cattle production both at home and away (Figure 6). Male household members (male spouse and male children) perform activities that are considered technical (e.g spraying/dipping the livestock, constructing kraals, vaccinating and administering drugs to sick animals) or risky (securing livestock at night). Males (in particular boys) dominate not only in activities that take place away from the home — such as herding cattle and goats — but also in homestead activities related to cattle management such as watering (Figures 6 and 7). This finding on the division of labor is consistent with studies from other contexts, in which males perform livestock production activities that take place away from the homestead (Kristjanson et al. 2010). However, the case is different when it comes to milking and looking after sick animals. While in some places such as Ethiopia and Uganda these roles are performed by females (Rota, Sperandini, and Hartl 2010), in Zambia they are



The graph was generated using the 271 households that participated in the 2016 cattle household survey.

Figure 6 Labor Provision in Cattle Production in Study Districts by Household Members in Zambia, 2016. (2016 Cattle household survey data.)



The graph was generated using the 271 households that participated in the 2016 cattle household survey.

Figure 7 Labor Provision in Goat Production in Study Districts by Household Members in Zambia, 2016. (Source: 2016 Cattle household survey data.)

mainly a responsibility of men (See Figure 6 and Appendix 3A, which shows an example of the activity profile collected during FGDs in Petauke District).

While most men in Zambia perform cattle related activities, studies elsewhere show that in crop-livestock systems such as in the Ethiopian highlands, women are more involved in cattle production than in arable farming (Yisehak 2008). Women clean cow sheds, milk cows, look after calves and sick animals, cut the grass and supervise feeding and grazing of cows, make dung cakes, butter, and cheese, and sell these products. Men feed the oxen and take the animals for veterinary treatment, while boys and sometimes girls generally graze the ruminant livestock (Yisehak 2008; FAO 2013b). In Lafia Area of Nasarawa State of Nigeria, women are reported to feed and water animals, and clean pens and cages (Ayoade, Ibrahim, and Ibrahim 2009). Among the Dinka pastoralists of Sudan, men herd cattle while females look after sick animals and tender the calves (Yisehak 2008).

Apart from performing livestock-related activities, women and girls in Zambia, also perform other household chores such as drawing water, gathering relish, fetching firewood, and preparing meals for livestock herders, children, and other household members. Men and boys also participate in these activities though, to a lesser extent. According to the FGDs, women feel burdened with their domestic responsibilities, which tend to be continuous as evidenced by the activity profile presented in Appendix 3A. In contrast, men’s and boys’ activities (such as taking cattle and goats to the watering points) are generally performed only once each day, particularly in the dry season when cattle and goats are left to graze freely. This distribution of tasks shows that unlike men, women have much less time to rest (Pitamber 2006).

It is worth noting, that sharing gender roles in the household is not always problematic. The primary concern, however, is where the roles of a particular gender are valued and rewarded less or unfairly, compared to those of the other, as the case for women and girls in Zambia. This position disadvantages the females who end up without (or with minimal numbers of) livestock. Since livestock contributes to increasing farmer incomes, the result is high poverty levels among women.

The gender disparities in the allocation of livestock rearing activities are, on the one hand, a reflection of what most community members in the study areas perceived as “the physical nature” of women, and the demands of distinct roles in livestock production. In the opinion of some men in this study:

We do heavy tasks or risky activities such as herding cattle far away from home. A woman cannot perform such functions. It can also degrade their dignity.

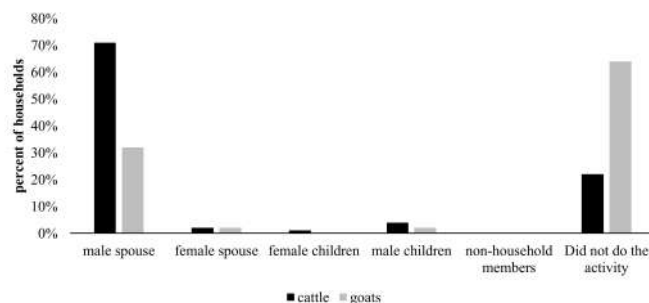
(Interview, with a group of young men, Namwala District, 24 October 2016)

It would seem, that men perceive women’s activities around the home as affordable and less demanding. These views may be true to some extent, as tasks such as herding cattle away from home could put the lives of women and young females in danger. For example, in Namwala (and parts of Chibombo Districts), men take their cattle to the *ku Butwa* (the plains) for grazing from May to December each year, when there is less pasture on the uplands. It takes two days of walking to reach the grazing area where the herders camp, and leave their animals to graze for weeks. This activity may be inappropriate for women and girls considering their safety.

While some of the livestock production activities may be inappropriate to women, in reality, women can undertake them, and doing so increases women’s capacity to acquire livestock (Bwalya and Akombelwa 1999; Henry et al. 2016). For example, women fetch firewood, sometimes from distant places including the very same bushes where men herd livestock. The main limiting factor is seemingly cultural, and linked to the patriarchal view that labels women as a weaker sex who cannot afford to undertake men’s tasks. Given the opportunity, some women can — and even do — hire labor to herd their livestock. Part of what shapes women’s acceptance of this activity allocation has to do with the way children are socialized. Societies and individual families assign specific tasks to boys and girls which determine their future roles in both the private and public domains. Girls

are usually assigned to undertake home-based activities while boys are expected to take up roles assigned to men. These activities are linked to and determine the future roles of males and females regarding livestock production. They also tend to determine what type of livestock a particular gender will own and even control.

Access to training and livestock information is critical in livestock production as it enables smallholder farmers to learn new technologies and improve their stock. Our findings reveal that in the study districts, there are fewer capacity building activities conducted on small ruminants, as compared to cattle (Figure 8). Most of the attendants at livestock production meetings are men, and even in cases where the opposite women predominantly perform the livestock activity being discussed— as earlier indicated in Figures 6 and 7 — men are more commonly the recipients of the training or expert advice relating to livestock production. This implies that skills may not be accurately passed on to the right people and in the long run, may adversely affect women’s ability to own livestock and contribute to perpetuating gender gaps. This finding is consistent with Galiè et al.’s (2017) finding that women have challenges in accessing livestock information compared to their male counterparts.



The graph is based on 271 households that participated in the 2016 cattle household survey; the female and male children categories include even non-biological children.

Figure 8 Attendance to Livestock Meetings and Training by Household Members in the Study Districts in Zambia, 2016. (Source: 2016 Cattle household survey data.)

Conclusions and recommendations

Conclusions

Understanding gender disparities is a topical issue in rural development, including livestock development. Our findings suggest that despite the important roles that women play in livestock production, fewer female household members own less livestock compared to their male counterparts. Similarly, more households with only male adults own livestock than households with only female adults. However, we find that a higher proportion of households with only female adults own goats than cattle. Even the percentage of female household members who own goats in male-headed households is higher compared to those who own cattle. The gender disparities are also quite evident

for cattle ownership within different household headships. Few female household members own cattle under male heads as compared to male household members under female headship. Conversely, female members are more likely to own goats under male headship.

The study concludes that cultural differences and the gendered social values attached to different livestock species play a major role in the observed gender gaps. Women play specific roles in livestock production, have less decision-making power, and limited access to information, as compared to their male counterparts, which in turn negatively affects their ability to own livestock. In addition, our results suggest a strong association between owning livestock and size of land cultivated as well as income from crop sales. This correlation was observed even among female household members in male-headed households and households with only female adults. Households mainly use crop income to finance the purchase of the initial stock. Even though more female household members own livestock as crop revenue and size of land cultivated increases, the gender gaps are still evident. The persistent gender disparities in livestock ownership need to be addressed as it contributes to women's perpetual dominance in the poverty trap.

Recommendations

Based on our findings, we put forth the following recommendations. Government ministries dealing with livestock, together with civil society organizations and private sector players, need to step up information dissemination and gender training of smallholder farmers (both men and women) on livestock production and management, to meet women's needs. Training and sensitization needs and opportunities, coupled with raising women's awareness to help them change their social environment, is essential. More specifically, there is a need to:

- i. Undertake efforts aimed at changing the attitudes of both men and women to promote joint cattle ownership among male and female household members in male-headed households. This approach would not only reduce gender inequalities in cattle ownership but also reduce poverty among women.
- ii. Provide targeted support to households with female adults only through finance (such as grants and micro-credit) as well as livestock production information to promote livestock ownership. Small ruminants need to be promoted as they are relatively less costly to acquire and easier for disadvantaged households and individuals to manage.
- iii. Female household members within male-headed households should be targeted, especially with capacity strengthening mechanisms. Even though they may have more access to resources than their counterparts in female-headed households, they have less decision-making power. These mechanisms should include facilitating their attendance at livestock production meetings and training together with their spouses, encouraging them to access livestock production information through telephones, radio, and to participate in associations that champion livestock production activities. Such mechanisms should be both cultur-

- ally and gender-sensitive so as not to jeopardize the advancement of such women in livestock ownership.
- iv. While much of the training and sensitization should be focused on women, men also need to be targeted (say, through men-only groups) to change their attitudes and tackle the structural underpinnings of the gender disparity, such as decision-making roles in livestock production at the community and household levels. Since changing attitudes takes a long time, initiatives such as cultural tours and field schools can be stepped up to promote learning and interaction of farmers from different locations to inspire each other to discard negative cultural norms in ownership and production of livestock while upholding positive ones. While working with traditional leaders, it is important to enable disadvantaged household members to undertake roles mainly played by males and accessing vital information related to livestock production through relevant channels.
- v. The positive association between livestock ownership and size of land cultivated and with crop income point to the need to promote efforts that help farmers increase the size of land cultivated as well as crop production and marketing, especially among female members of male-headed households. These could encompass the promotion of crop commercialization and the adoption of technologies such as mechanization.
- vi. Finally, though this study has provided useful insights based on descriptive statistics, more research is needed to isolate the factors affecting female household member ownership of livestock and the extent of their ownership. There is equally a need to conduct more research on what ownership means from a gender perspective.

References

- Ayoade, J. A., Ibrahim, H. I., and Ibrahim, H. Y. (2009) 'Analysis of Women Involvement in Livestock Production in Lafia Area of Nasarawa State, Nigeria', *Livestock Research for Rural Development*, 21 (12) [online]. Available at <http://www.lrrd.org> (Accessed 26 February 2018).
- Assan, N. (2014) 'Gender disparities in livestock production and their implication for livestock productivity in Africa', *Scientific Journal of Animal Science*, 3 (5), pp.126–38.
- Braimoh, A., Mwanakasale, A., Chapoto, A., Rubaiza, R., Chisanga, B., Mubanga, N., Samboko, P., Giertz, A., and Obuya, G. (2018) *Increasing Agricultural Resilience through Better Risk Management in Zambia*, Report No. 125784. Washington, DC: The World Bank.
- Boogaard, B., Waithanji, E., Elizabeth, P. J., Cadilhon, J. J. (2015) 'Smallholder goat production and marketing: a gendered baseline study from Inhassoro District Mozambique', *Wageningen Journal of Life Sciences*, 74–75, pp. 51–63.

- Buhl, S. and Homewood, K. (2000) 'Milk selling among Fulani women in Northern Burkina Faso' in Hodgson, D. L. (ed.) *Rethinking Pastoralism in Africa*. Oxford, UK: James Currey, pp. 207–26.
- Bwalya, G. M. and Akombelwa, M. (1999) 'Animal traction development and gender: Experiences from Western Province, Zambia. Animal Draught Power Promoter' in Starkey, P. and Kaumbutho, P. (eds.) *Meeting the challenges of animal traction*. London, UK: Intermediate Technology Publications, pp. 82–5.
- Chianca, T. K., Balcom, L., and Robertson, K. (2011) *External Impact Evaluation of Heifer International in Nepal*. Kalamazoo, MI: The Evaluation Center, Western Michigan University.
- CSO/MAL/IAPRI. (2012) *Rural Agricultural Livelihood Surveys of 2012*. Lusaka, ZWB: IAPRI and Government of the Republic of Zambia.
- CSO/MAL/IAPRI. (2015) *Rural Agricultural Livelihood Surveys of 2015*. Lusaka, ZWB: IAPRI and Government of Zambia.
- Debela, B. L. (2017) 'Factors Affecting Differences in Livestock Asset Ownership Between Male-and Female-Headed Households in Northern Ethiopia', *The European Journal of Development Research*, 29 (2), pp. 328–47
- Deere, D. C., Alvarado, G. E., and Twyman, J. (2012) 'Gender Inequality in Asset Ownership in Latin America: Female Owners vs. Household Heads', *Development and Change* 43 (2), pp. 505–30.
- Dejene, A., Midgley, S., Marake, M. V., and Ramasamy, S. (2011) *Strengthening capacity for climate change adaptation in agriculture: experiences and lessons from Lesotho*. Rome, IT: FAO.
- Djurfeldt, A. A. (2018) 'Assets, Gender and Rural Livelihoods' in Djurfeldt, A. A., Dzanku F. M., and Isinika, A. C. (eds.) *Agriculture, Diversification, and Gender in Rural Africa Longitudinal Perspectives from Six Countries*. Oxford, UK: Oxford University Press.
- Ekele, G. E. and Obademi, A. O. (2018) 'Strategies Required By Women Farmers In Ruminant Animal Production In Benue State, Nigeria', *European Journal of Social Sciences Studies*, 2 (11), pp. 28–41.
- Emama, B., Mohammed, H., and Mohammed, S. (2015) *A situational analysis of agricultural production and marketing, and natural resource management systems in the Ethiopian highlands*. Addis Ababa, ET: International Livestock Research Institute.
- FAO (Food and Agriculture Organisation). 2003. 'Livestock and Gender: The Tanzanian Experience in Different Livestock Production Systems', Links Project Case Study No. 3. Rome: FAO.
- FAO (Food and Agriculture Organisation). (2013a) *Understanding and integrating gender issues into livestock projects and Programmes: A checklist for practitioners*. Rome, IT: FAO.
- FAO (Food and Agriculture Organisation). (2013b). *Children's work in the livestock sector: Herding and beyond*. Rome, IT: FAO.
- Filmer, D., Fox, L., Brooks, K., Goyal, A., Mengistae, T., Premand, P., Ringold, D., Sharma, S., and Zorya, S. (2014) *Youth Employment in Sub-Saharan Africa*. Washington, DC: The World Bank.
- Fletschner, D., and Kenney, L. (2014) 'Rural Women's Access to Financial Services: Credit, Savings, and Insurance' in Quisumbing, A. R., Meinzen-Dick, R., Raney, T. L., Croppenstedt, A., Behrman, J. A., and Peterman, A. (eds.) *Gender in Agriculture: Closing the Knowledge Gap*. Dordrecht, NL: FAO and Springer.
- Fernando, P., and Starkey, P. (2004) 'Donkeys and Development; Socio-economic Issues', Fielding, D., and Starkey, P. (eds.) *Donkeys, People and Development. A Resource Book of the Animal Traction Network for East and Southern Africa*, Wageningen, NL: ACP-EU Technical Centre for Agriculture and Rural Cooperation.
- Galiè, A., Distefano, F., Kangogo, D., Mattioli, R. C., Wieland, B., and Baltenweck, I. (2017). Gendered perspectives on smallholder cattle production and health management in three sites in Tanzania. *Journal of Gender, Agriculture and Food Security*, 2 (3), pp. 43–65.
- Galiè, A., Mulema, M., Benard, M. A. M., Onzere, S. N., and Colverson, K. E. (2015) 'Exploring gender perceptions of resource ownership and their implications for food security among rural livestock owners in Tanzania, Ethiopia, and Nicaragua', *Agriculture & Food Security*, 4 (2).
- Henry, C. J., Idemudia, P. E., Tsegaye, G., and Regassa, N. (2016) 'A Gender Framework for Ensuring Sensitivity to Women's Role in Pulse Production in Southern Ethiopia', *Journal of Agricultural Science*, 8 (1), pp. 80–91.
- Hsieh, H. F. and Shannon, S. E. (2005) 'Three Approaches to Qualitative Content Analysis', *Qualitative Health Research*, 15 (9), pp. 1277–88.
- IAPRI. (2016) *Rural Agricultural Livelihoods Survey. 2015 Survey Report*. Lusaka, ZWB: IAPRI.
- Kristjanson, P., Waters-Bayer, A., Johnson, N., Tipilda, A., Njuki, J., Baltenweck, I., Grace, D., and MacMillan, S. (2010) *Livestock and Women's Livelihoods: A Review of the Recent Evidence*, International Livestock Research Institute Discussion Paper No. 20. Nairobi, KE: ILRI.
- Kristjanson, P., Waters-Bayer, A., Johnson, N., Tipilda, A., Njuki, J., Baltenweck, I., Delia G., and MacMillan, S. (2014) 'Livestock and Women's Livelihoods' in Quisumbing, A. R., Meinzen-Dick, R., Raney, T. L., Croppenstedt, A., Behrman, J. A., and Peterman, A. (eds.) *Gender in Agriculture: Closing the Knowledge Gap*. Dordrecht, NL: FAO and Springer.

- Lubungu, M., Sitko, N., and Hichaambwa, M. (2015) *Analysis of Beef Value Chain in Zambia: Challenges and Opportunities for Linking Smallholders to Markets*, Indaba Agricultural Policy Research Institute Working Paper No. 103. Lusaka, ZWB: IAPRI.
- Lubungu, M., and Mofya- Mukuka, R. (2012) *The Status of the Smallholder Livestock Sector*, Technical Report. Lusaka, ZWB: IAPRI [online]. Available at: <http://www.iapri.org.zm>
- McDermott, J. J., Staal, S. J., Freeman, H. A., Herrero, M., and Van de Steeg, J. A. (2010). 'Sustaining intensification of smallholder livestock systems in the tropics', *Livestock Science*, 130 (1–3), pp. 95–109.
- Meinzen-Dick, R., Johnson, N., Quisumbing, R. A., Njuki, J., Behrman, J. A., Rubin, D. Peterman, A., and Waithanji, E. (2014) 'The Gender Asset Gap and its Implications for Agricultural and Rural Development' in Quisumbing, A. R., Meinzen-Dick, R., Raney, T. L., Croppenstedt, A., Behrman, J. A., and Peterman, A. (eds.) *Gender in Agriculture: Closing the Knowledge Gap*. Dordrecht, NL: FAO and Springer.
- Mizinga, F. M. (1990) *Inheritance and Social Change among the Tonga of Southern Province, 1900–1989*. MA Dissertation. University of Zambia, Lusaka.
- Mulugeta, M., and Amsalu, T. (2014) 'Women's Role and Their Decision Making in Livestock and Household Management', *Journal of Agricultural Extension and Rural Development*. 6 (11), pp. 347–53.
- Namonje-Kapembwa, T., Chiwawa, H., and Sitko, N. (2016) *Value Chain Analysis of Goats in Zambia: Challenges and Opportunities of Linking Smallholders to Markets*, Indaba Agricultural Policy Research Institute Working Paper No. 117. Lusaka, Zambia: IAPRI.
- Njuki, J., and Mburu, S. (2013) 'Gender and Ownership of Livestock Assets' in Njuki, J. and Sanginga, P. C. (eds.) *Women, Livestock Ownership, and Markets: Bridging the Gender Gap in Eastern and Southern Africa*. London, UK and New York, NY: Earthscan Routledge.
- Patel, S. J., Patel, M. D., Patel, A. J., Patel, H. S., and Gelani, R. N. (2016) 'Role of women gender in livestock sector: A review', *Journal of Livestock Sciences*, 7, pp. 92–6.
- Pitamber, S. (2006) *Multi-Sector Country Gender Profile: Agriculture and Rural Development North East and South Region*. Abidjan, CDI: African Development Bank.
- Rota, A., Sperandini, S., and Hartl, M. (2010) *Gender and Livestock: Tools for Design. Livestock Thematic Papers Tools for Project Design*. Rome, IT: International Fund for Agricultural Development [online]. Available at: <https://www.ifad.org>
- Shipekesa, A. M., and Jayne, T. S. (2012) *Gender Control and Labor Input: Who Controls the Proceeds from Staple Crop Production among Zambian Farmers?*, Indaba Agricultural Policy Research Institute Working Paper No 68. Lusaka, ZWB: IAPRI.
- SOFA Team and Doss, C. (2011) *The Role of Women in Agriculture*. Food and Agriculture Organisation. Rome, IT: FAO
- Tadesse, Y., Urge, M., Abegaz, S., Kurtu, M. Y., Kebede, K., and Dessie, T. (2014) 'Husbandry, breeding practices, and production constraints of camel in the pastoral communities of Afar and Somali, Ethiopia', *Journal of Agriculture Environment for International Development*, 108 (2).
- Tui, S. H. K., Senda, T., Dube, T., and Van Rooyen, A. (2018) *Empowering Women in Integrated Crop Livestock Farming through Innovation Platforms: Experience in Semi-arid Zimbabwe*, Report. Hyderabad, IN: International Crops Research Institute for the Semi-Arid Tropics [online]. Available at: <http://oar.icrisat.org> (Accessed 18 July 2018).
- Yisehak, K. (2008) 'Gender Responsibility in Smallholder Mixed Crop-Livestock Production Systems of Jimma Zone, South West Ethiopia', *Livestock Research for Rural Development*, 20 (11) [online]. Available at: <http://www.lrrd.org> (Accessed 26 February 2018).

Appendix 1A. Correlations Coefficient Matrix between Cattle Ownership and Land Cultivated and Crop Income in Zambia

	Did the household own cattle?	Land size cultivated	Crop income
Did the household own cattle?	1		
Land size cultivated	0.327**	1	
Crop income	0.244**	0.667**	1

** . Correlation is significant at the 0.01 level (2-tailed).

Appendix 2A. Correlations Coefficient Matrix between Goat Ownership and Land Cultivated and Crop Income in Zambia

	Did the household own goats?	Land size cultivated	Crop income
Did the household own goats?	1		
Land size cultivated	0.183**	1	
Crop income	0.156**	0.667**	1

** . Correlation is significant at the 0.01 level (2-tailed).

Appendix 3A. Livestock-related Activity Profile

Activities	Location	Time	Cattle	Goats	Pigs	Chickens
Drawing and providing water for livestock at homestead	homestead	06:00-07:00, 15:00-17:00	Women/girls	Women	Women	Women
Feeding livestock at homestead	homestead	unspecified			Women	Women
Herding livestock	grazing area away from homestead	07:00-07:15, 15:00-18:00	Herder/boys	boys		
	rainy season	07:00-18:00	Herder	boys		
Milking	homestead		Herder/boys			
Cleaning the kraal/chicken house/removing cow dung from the kraal	homestead	06:30-10:00	Women			
Spraying/dipping	bi-weekly	06:30-09:00	Men			
Cooking for the family	homestead	12:30-13:30	Women/girls			
Having lunch	homestead	13:30-14:30	all			
Resting/leisure		14:30-17:00	Men			
Vaccinating animals (one-off)	homestead	06:30-09:00	Men			
Tendering sick animals	homestead	One-off	Men			
Attending/receiving training	community	One-off	Men			
Washing Plates	homestead	14:00-15:00	Women/girls			
Looking for firewood	community	15:00-17:00	Women			
Cooking for the family	homestead	17:00-19:00	Women/girls			
Ensuring that all the livestock are in the kraal in the night	homestead	17:30-18:00	Men			

Source: Authors based on field notes. The activity profile is based on the FGD conducted in Chilima village, Petauke District. This schedule is for dry season activities.