2017

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Recommended Citation

Ransom, Elizabeth, Carmen Bain, and Iim Halimatusa'diyah. "Livestock-Livelihood Linkages in Uganda: The Benefits for Women and Rural Households?" *Journal of Rural Social Sciences* 32, no. 2 (2017): 37-68.

Journal of Rural Social Sciences, 32(2), 2017, pp. 37–68.

LIVESTOCK-LIVELIHOOD LINKAGES IN UGANDA: THE BENEFITS FOR WOMEN AND RURAL HOUSEHOLDS?

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ABSTRACT

Livestock are an important component of rural households and gendered livelihood practices throughout sub-Saharan Africa. Widespread within the development literature is the belief in the livestock ladder, with poorer households often owning small stock and wealthier households owning large stock, with the assumption that poor households can utilize livestock to build their asset base and overtime this would allow poorer households to expand from small stock to large stock, in so doing climb the livestock ladder. There is also an assumption in the literature that women are more likely to oversee small stock. In addition, some well-known agricultural development programs have sought to empower women and households through livestock development schemes, working on the assumption that livestock can play an important role in providing a pathway out of poverty. Our research engages with the growing concern that livestock-livelihood linkages and their relationships to gender are not well understood within the existing literature or at the empirical level. This is in part due to a lack of data on the topic, which includes an over-reliance on household-level data, which does not allow for an analysis of intra-household livelihood-livestock linkages. Utilizing four separate data sets, this article analyzes whether the livestock ladder exists in Uganda, especially in the central and eastern regions of Uganda. We find evidence that income contributes to total number of animals owned at the household level, but the evidence concerning small stock being the domain of poorer households and women, is mixed. By comparing empirical evidence with the existing literature we can not only better understand the ways in which rural development programs can affect gendered livestock-livelihood practices, but also inform current theorizing and policy practices surrounding livestock-livelihood linkages.

Livestock have long been recognized as playing a critical role in the livelihood strategies of rural households in Africa and Asia (Alary, Corniaux, and Gautier 2011; Ellis and Bahiigwa 2003; Meltzer 1995). However, only in recent years has attention shifted to better understanding the role of livestock *within* rural

[*]Funding for this project provided by the National Science Foundation, Sociology Program, Division of Social and Economic Sciences, Directorate of Social, Behavioral, and Economic Sciences, Award number 1458989. The authors would like to thank all the farmers who took the time to participate in our research, the staff of the EADD/Heifer Uganda office, and Research Associates of Uganda for their assistance with fieldwork. Thanks to two anonymous reviewers for their valuable feedback on an earlier draft of this manuscript. Please direct all communication to Elizabeth Ransom, 28 Westhampton Way, University of Richmond, VA 23173, 894-289-8068, Email: eransom@richmond.edu

households, with an emphasis on intra-household gender dynamics (Chanamuto and Hall 2015; Quisumbing et al. 2015). While there is great variability across regions, it is increasingly accepted that women play a large role in managing and caring for livestock even when they are not the owners (Kristjanson et al. 2014). Women have also in recent years also been the main point of emphasis in agricultural livestock development programs, as key recipients of livestock and/or for training in livestock production (Kristjanson et al. 2014; Njuki and Miller 2013; Quisumbing et al. 2015). While scholars clearly understand that livestock matters for most of rural people in developing countries, the actual linkages of livestock-livelihood strategies remain poorly understood and there is a largely untested assumption that women and poorer households exist within the so-called "livestock ladder" (Pica-Ciamarra et al. 2015).

The concept of the livestock ladder holds that poorer households often own small stock and wealthier households own large stock, with the assumption that poor households can utilize livestock to build their asset base and overtime this allows poorer households to expand from small stock to large stock, in so doing climb the livestock ladder. From this perspective, those on the bottom rung of the livestock ladder will benefit from receiving larger animals, such as cattle. Utilizing four data sets, we want to test if the livestock ladder exists in Uganda. While development programs operate on the assumption that the livestock ladder exists, to date there have been limited empirical studies and, of those done, the results have been mixed (Njuki and Mbura 2013; Pica-Ciamarra et al. 2015). In this paper we examine the benefits of livestock ownership for women in both male-headed households and in female-headed households and if those benefits conform to the assumptions of the livestock ladder. Based on the existing studies (Kariuki et al. 2013; Njuki and Mbura 2013; Pica-Ciamarra et al. 2015), we hypothesized that we would find evidence of a livestock ladder both in terms of total and type of animals owned, with female-headed households and females in male-headed households likely owning fewer animals and more small and medium livestock.

LIVESTOCK OWNERSHIP AND LIVESTOCK-LIVELIHOOD LINKAGES

Benefits of Livestock Ownership

Researchers have long noted that rural households benefit from livestock ownership in a variety of ways. Benefits include providing a meat and milk source for household consumption, as a fertilizer and labor source (draft animals) for smallholder farming, as a guarantee of cash, if needed livestock can be sold, as a source of cultural importance, and as a form of credit, which can be used to purchase agricultural inputs, for example (Alary et al. 2015:1638; Jodlowski et al. 2016; Meltzer 1995). The recognition by scholars of the diverse role that livestock play

has increasingly been associated with the concept of "livestock livelihoods" in the social sciences.

The livelihoods approach emerges from the work for Sen (1981) to recognize the diverse ways that people, particularly in developing countries, make a living (Scoones 1999), as opposed to a narrow framework of measuring income or employment status. Generally, the livelihoods approach acknowledges the role of assets, markets, and institutions in people's lives. Assets capture more than simply income, instead referring to stocks of financial, human, natural and social resources that can be acquired, developed, improved and transferred across generations (Njuki and Mburu 2013 citing Ford Foundation 2004).

Within rural development assets have received a significant amount of attention, both in policy and in practice, because assets are viewed as critical for increasing agricultural productivity and allowing people to move out of poverty (SOFA Team 2011; Njuki and Mburu 2013). Acknowledging assets at the household level became an important part of rural development policies (Ellis and Biggs 2001; Scoones 2009), but only recently has attention shifted to better understanding asset ownership within the household and the ways in which women do not always share the assets owned by the men (Deere and Doss 2006; Njuki and Mburu 2013). Livestock in particular has received attention as it is an important asset among rural households, but also one that is often highly gendered (Njuki and Mburu 2013; Quisumbing et al. 2015). Of the literature that has focused on differences in livestock ownership between male- and female-headed households, the general findings trend toward female-headed households own fewer total animals and more small stock than male-headed households (Debela 2016; SOFA Team 2011). The reasons for these differences include, female-headed households having smaller landholdings, which limits grazing, female-headed households having less access to credit and/or income that could be used for purchasing animals, and female-headed households having less need for certain types of animals, for example oxen to plow fields, as plowing is often a job allocated to men.

Many positive effects are attributed to the reduction of the gender asset gap. Positive impacts include increases in a women's say in household decisions making, her bargaining power and her overall empowerment (Njuki and Mburu 2013). In addition, women who have more assets have been found to increase the expenditures they invest in their children's education and health (Allendorf 2007; Njuki and Mburu 2013). For all these reasons, many development programs have targeted women with livestock interventions, with the goal of increasing women's assets within a household.

Livestock-Livelihood Linkage in Development Programming

Livestock are seen as playing an important role in providing a "pathway out of poverty and malnutrition" (Rawlins et al. 2014: 203; also Alary et al. 2011; Jodlowski et al. 2016) and they are therefore commonly given to the poor as part of asset-based poverty alleviation development programs (Kim and Sumberg 2015; Krishna, Poghosyan, and Das 2012; Rawlins et al. 2014). The premise of giving livestock to the poor is nested within the assumption of the livestock ladder. This is the idea that smaller animals are generally associated with poorer households, while larger animals are associated with wealthier households. Similarly, there is a gendered association, with smaller animals more likely associated with female labor and female oversight, while larger animals, especially cattle, are associated with male labor and male oversight. Programs that give livestock to households or to women within households, there is the idea that the poor can utilize the livestock to build their asset base with a progressive accumulation, thereby enabling a household to expand from small stock to large stock, in so doing climb the livestock ladder (Kim and Sumberg 2015). Despite these general assumptions, empirical support for this thesis has been limited.

While several studies have focused on the impact of animal ownership on various health and nutritional outcomes, only recently have a handful of studies focused on the impact of livestock donations, or livestock asset transfer programs, and their impact on nutrition and health (Jodlowski et al. 2016; Rawlins et al. 2014). In both types of studies, animal ownership and livestock donations, the findings generally support the view that there is a positive relationship between animal ownership and household and child nutrition. Jodlowski et al. (2016:106) study establishes causality, noting that households who received a goat or a cow directly increased "the probability of consuming an additional food group each day by 43–65%." Unfortunately, neither Rawlins et al. (2014) nor Jodlowski et al. (2016) directly engage with gender as it relates to the livestock transfer development programs.

Other studies of asset transfer programs have found gendered impacts in terms of asset ownership and decision-making in the household, as well as time allocation. Das et al. (2013:27) found in Bangladesh that livestock transfers significantly increased the well-being of households and increased the decision making women had over some dimensions, such as important household assets and women's perceived sole ownership of cash. However, they also found several dimensions where women's roles are reduced, including control over their own earnings and purchases, and their study found a disproportionate increase in men's assets, considerably more than joint ownership or female sole ownership.

Risks of Livestock Ownership for Women

Organizations like Heifer International, FARM-Africa, and Land O'Lakes have provided livestock to women throughout the developing world (Kristjanson et al. 2014). However, less often discussed is the concern over providing livestock without the needed resources and social support to facilitate women's successful care of the newly acquired livestock. Livestock in developing countries are often raised in high risk situations, in that environments can be harsh and resources limited (Kim and Sumberg 2015; Krishna et al. 2012; Kristjanson et al. 2014). Our own field visits reveal stories of many animal deaths due to a lack of money, training and/or a lack of proper resources (adequate feed, access to veterinary services). We also heard more informal suggestions of an increase in domestic disputes, some escalating to violence, due to women's new found milk income causing disputes between the husband and wife.

There is also concern that livestock asset programs put more labor demands on household members who are already stretched thin. Specific for dairy cows, increasing intensive dairy production through programs like zero-grazing requires increased labor, either from household members or hired labor, to cut and carry fodder and bring water to the animals. Women are often the targeted recipients of Zero-grazing programs since it is presumed that they can care for cows near the home to their other daily household chores. Unfortunately, this can also lead to time poverty, especially for women in a household (Bain, Ransom, and Halimatusadiyah 2016).

Moreover, there are the very real concerns that as income or benefits from livestock ownership increase. Men take over control of female's assets (Kristjanson et al. 2014). Njuki and Mburu (2013:36) state "care must be taken, however, to ensure that women do not lose ownership and control of the cattle, as evidence shows that larger animals are more likely to be controlled by men than by women." Similarly, women may be limited in the types of assets they can obtain from livestock, such as only selling the milk, but when it comes to selling of the animal, the money goes to the men (Simiyu and Foeken 2013). Well aware of such concerns, some organizations, like Heifer, are known for working to better integrate women into the livestock value-chain and simultaneously work in communities to modify gender relations within communities (see Kristjanson et al. 2014 for an overview of some Heifer initiatives).

Household Level Data versus Intra-Household Data

Studying gendered livestock livelihoods has been limited not only due to a lack of awareness of the gendered dimensions livestock, but also due to the limited empirical data (Njuki and Sanginga 2013). Generally, most surveys are taken at the household level, which means the potential differences in intra-household dynamics of caring for livestock and the use of livestock products has historically been

ignored or assumed to be similar across the household members. However, household level data remains the most widely available data and as such, when using household level survey data, contrasting female-headed households to male-headed households have been the mainstay of understanding gendered livestock-livelihoods.

In our own analysis we compare male-headed to female-headed households across all data sets to see if any livestock ownership patterns differ between female and male-headed households in comparison to the pattern suggested in the literature. In the literature, researchers have argued that female-headed households will have fewer large livestock than male-headed households. This is due not only to the gendered pattern of livestock ownership, but also due to the assumption that female-headed households have fewer assets than male-headed households (SOFA Team 2011). We then move to an analysis of data that provides a glimpse into possible intra-household gender dynamics surrounding livestock ownership. Our research contributes to building an empirical understanding of the ways in which the livestock ladder, as a form of gendered assets, differs for Ugandan women, especially those residing in different types of Ugandan households, compared with women in other countries or regions.

STUDY CONTEXT

This research grows out of our interests in assessing women's empowerment within a large agricultural development project occurring in East Africa. The East African Dairy Development (EADD) initiative was started in 2008 in three countries, Kenya, Rwanda, and Uganda. EADD Phase I was a four year (2008–2012) poverty reduction project focused on moving smallholder farmers out of poverty by improving their incomes through participation in the dairy value chain. EADD was funded by the Bill and Melinda Gates Foundation with Heifer International as the lead implementing agency, with other partners including: Technoserve (TNS), African Breeders Services - Total Cattle Management (ABS –TCM), International Centre for Research in Agroforestry (ICRAF) and International Livestock Research Institute (ILRI). While the dairy sector in Uganda has had several development interventions beginning in the late 1980s (Balikowa 2011:5), when EADD began in 2008 it was among the largest, privately funded agricultural development assistance program in history (Bill and Melinda Gates Foundation 2008; Salazar 2011).

To improve dairy income EADD has focused on improving on-farm production and market access. According to Njuki et al. (2016:6), "the project is designed to alleviate two main constraints that dairy smallholders in East Africa face: low availability of affordable and high-quality inputs and services, and cash constraints to these inputs and services." EADD specifically set out to target women, wanting

30 percent female representation at all stages of the value chain. Similar to Kenya, in Uganda, in Phase I a hub model was utilized, where farmers were organized around community-based milk bulking and collection center. However, in reality many of these bulking and collection centers did not succeed financially in Uganda, as prices offered at the hub were often the same as prices the farmer could earn selling from the farm gate. Nonetheless, some functions of the hub remained, as many of these farmer cooperatives did successfully set up a vet store, where farmers could purchase drugs and supplements for their livestock, often on credit, depending upon how much milk a farmer brought to the hub.

Our analysis in this article is primarily focused on the central and eastern regions of Uganda. Our focus on these two regions is due to the EADD livestock intervention development programs that seek to integrate women and gender. The central and eastern regions have the second and third largest number of milk cows in Uganda (376,000 and 310,000, the western region has the most with 413,000) and the central region is the second largest producer of milk in the country (341.89 million liters in 2010; 31.6 percent) (Balikowa 2011). Both regions are generally composed of traditional milk production systems. This means that milk production is often defined by small herd sizes composed mainly of indigenous cattle, small land holdings, low animal productivity, a dependency on family labor, and informal milk markets (Balikowa 2011:viii). The central and eastern regions also contain some households with small scale, zero grazing dairy production, which is an "intermediate system" that has components of both traditional (e.g., family labor) and commercial production (e.g., more inputs and higher milk production) (Balikowa 2011).

METHOD

Data

To try to empirically assess the livestock ladder, not only at the household level, but also at the intra-household level, there are four data-sets used in this analysis (see Table 1). The first data set is the FAO RIGA data for Uganda, which is a household level survey administered randomly throughout Uganda in 2011-12. We draw on only the rural households in Uganda as a mechanism to assess if there are collection.[1] The final two data sets are two different iterations of the WEAI

[1]The first wave of survey data collection occurred in June 2015 in three locations in Uganda, two of which have been a part of the EADD program in Phase I (Figure 1). The third site was selected to provide a baseline comparison, as in theory, these households and individuals within the households have not directly benefited from EADD or, as the implementing partner, Heifer programing.

TABLE 1. TYPES OF ANIMALS ASKED ABOUT ACROSS DIFFERENT DATA SETS.

	FAO-RIGA	DAIRY WEAI	WEAI PILOTS
Small.	Poultry	Chicken, ducks, turkey, pigeons	Chicken, ducks, turkey, pigeons
Medium	Pigs, sheep	Small livestock (goats, sheep, pigs)	Small livestock (goats, sheep, pigs)
Large	Cattle	Large livestock (not dairy cow; e.g., oxen, cattle); milk cows	Large livestock (oxen, cattle)

surveys piloted by the developer of the WEAI survey instrument in Uganda.[2] WEAI Pilot 1 was completed in 2012 and WEAI Pilot 2 was completed in 2015. These final two data sets allow us to compare intra-household livestock ownership and assess if our Dairy WEAI data set, which contains households that were recipients of a dairy cow by the development project we are studying, differs systematically at the intra-household level from other rural households. However, these final two data sets include rural households that are not only in the central and eastern regions of Uganda (where our study in situated), but also households in the northern region of Uganda, a region that differs in socio-economic composition than the eastern and central regions. The northern region is included in our analysis otherwise the sample size would be too small.

Three of our four data sets draw on the WEAI, which was made public in 2012. The WEAI is an index that measures the empowerment, agency, and inclusion of women in the agriculture sector to identify ways to overcome obstacles and constraints for women (IFPRI 2012). The use of the WEAI allows us to measure intra-household livestock ownership, in a way that most household level data sets do not. The WEAI consists of a primary household survey and individual survey(s) (with female-headed households having only one individual survey, while in male-headed households, two individual surveys are administered, one to the male head and one to the female head of the household). Following the methodology of the WEAI (Alkire et al. 2013), for the individual survey, respondents are interviewed separately, with the goal of ensuring individuals give responses that are not directly influenced by the presences of the others.

[2]https://www.ifpri.org/publication/womens-empowerment-agriculture-weai-pilot-ii-uganda

For the Dairy WEAI data set, household and individual level surveys were administered at two different "hub" or dairy cooperative locations, one in an eastern region of Uganda and one in the central region of Uganda (see Figure 1). In the central region, household and individual surveys were also administered to individuals who were not members of the hub, to assess if the program participants differ from non-program participants. Due to time constraints, surveys were not collected from non-program households in the Eastern region of Uganda, and secondary data sources serve as a point of comparison. Households were selected using purposive sampling, in that only households that had a dairy cow within the past 12 months were selected, and for the purposes of analyzing the EADD programs, in two of the three sites, households must also have at least one member of the dairy cooperative or "hub." We oversampled female-headed households in all three site locations, to ensure we had a reasonably large sample of female-headed households.

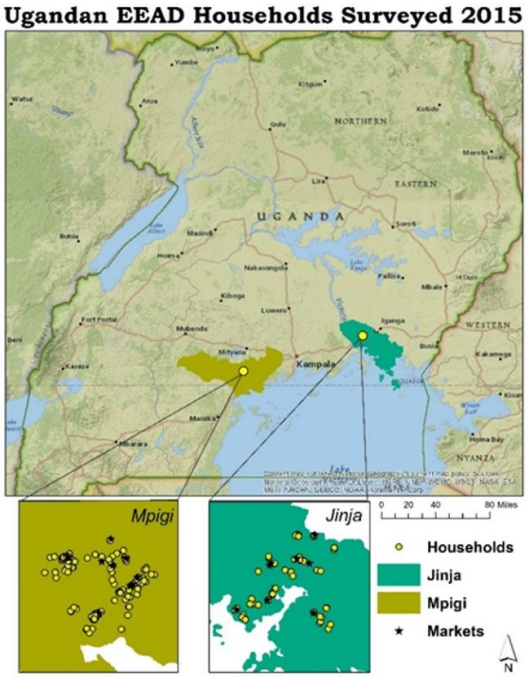

FIGURE 1. DAIRY WEAI HOUSEHOLD LOCATIONS

One drawback of using four data sets is that the types of animals asked about on each survey are not identical (see Table 1). Despite these differences, the primary categories for analyzing the concept of the livestock ladder remains intact. That is our interest in small (e.g., chicken, ducks, etc.), medium (goats, pigs, sheep etc.) and large (e.g., cattle, dairy cows) animal ownership can still be calculated across the data sets, even if types of animals or categories of animals vary slightly. For clarity

we have adopted the language of "small," "medium," and "large" livestock, although generally in the literature the terminology of small stock often refers to the animals that we have labeled medium in this paper, while poultry is simply called poultry.

Variables and Measurements

The Dependent variables in this study include: the number of small livestock (poultry), medium livestock (goats, pigs, sheep), large livestock (cattle) and total animals (livestock) owned by the households. Besides these variables, this study also uses household dietary diversity as another dependent variable. Household dietary diversity is measured from the number of food groups consumed within seven days by the households. The food groups include cereals, white tubers and roots, vegetables, fruits, meats, eggs, fish and other seafood, legumes, nuts and seeds, milk and milk products, oils and fats, sweets, spices, condiment and beverages (Kennedy, Ballard, and Dop 2011; Sraboni et. al. 2014). However, since our data does not have spices and condiment and beverages, the household dietary diversity in our study does not include those two food groups. Based on the number of food groups consumed by the household we then categorized them into two categories: high diversity when the food groups consumed consists of more than eight items and low dietary diversity when they are less than eight food groups.

The Independent Variables in this study include: *household characteristics* such as household types (male-headed household/MHH or female-headed household/FHH), total number of household members, total number of children less than five years old, total number of female household members. *Sociodemographic characteristics of household head* are also other independent variables used. They include age, educational level, employment status and main occupation of household head. Additionally, this study also uses *socioeconomic characteristics of household* as independent variables. These include access to electricity, lighting source for the household, water source, floor material, land size and cash income owned by household. Furthermore, *livestock access* is another independent variable used in the study. It includes who owns livestock and who can decide about selling the milking cows. Finally, since some households were part of Heifer/EADD programming and others were not, we distinguished them as *treatment and control groups* respectively. Details of the variables used in this study can be seen in Table 2 and 3.

Model Specification

To examine the effects of household characteristics, sociodemographic characteristics of household head and socioeconomic status of household on the households' livestock ownership, we estimate the following equation:

$$\mathbf{f} = \beta_0 + \beta_1\mathbf{x} + \beta_2\mathbf{h} + \beta_3\mathbf{c} + \beta_4(group) + \varepsilon,$$

TABLE 2. DESCRIPTIVE STATISTICS (n=168).

	MEAN	SD	MIN	MAX
DEPENDENT VARIABLES				
No. of lrg livestock (cattle and milk cows) owned	2.76	1.91	0	12
No. of lrg & med livestock (cattle, milk cows & goats) owned	6.67	5.77	1	36
No. of lrg & med livestock (cattle & goats) owned	4.75	5.53	0	34
No. of animals owned	101.40	784.02	1	10081
INDEPENDENT VARIABLES				
Household characteristics				
Household type (0 = FHH, 1 = MHH)	0.74	0.44	0	1
Tot. No. of household members	7.12	2.59	1	15
Tot. no. of children under 5	0.80	0.86	0	4
Tot. No of females in household	3.61	1.71	1	8
Sociodemographic characteristics of household head				
Age of household head	53.28	12.05	24	90
Education level of household head (0=no formal ed, 1=primary, 2=secondary, 3=post-secondary)	1.67	0.84	0	3
Employment status of household head (0=no work, 1=work for pay, 2=work without pay)	1.70	0.59	0	2
Main occupation of household head (0=non-farming, 1=farming)	0.79	0.41	0	1
Socioeconomic status of the household				
Access to electricity (0=no, 1=yes)	0.40	0.49	0	1
Lighting source for the hh (0=lantern, 1=electricity/solar/generator)	0.52	0.50	0	1

TABLE 2. DESCRIPTIVE STATISTICS (*continued*).

	MEAN	SD	MIN	MAX
Water source (0=unimproved, 1=improved)	0.67	0.47	0	1
Floor material (0=earth/mud, 1=concrete)	0.77	0.42	0	1
Log of land size owned by hh in acres	1.66	0.91	-1.25	4.72
Log of case income of hh in dollar	3.38	2.03	0	7.63
Group (0=control, 1=treatment)	0.82	0.38	0	1

TABLE 3. DESCRIPTIVE STATISTICS (n=291).

	MEAN	SD	MIN	MAX
DEPENDENT VARIABLE				
Dietary Diversity (0=low, 1=high)	0.64	0.48	0	1
INDEPENDENT VARIABLES				
Household characteristics				
Household type (0=FHH, 1=MHH)	0.85	0.36	0	1
Tot. No. Of household members	7.21	2.57	1	15
Tot. No. Of children under 5	0.80	0.84	0	4
Tot No. Of females in household	3.56	1.68	1	8
Sociodemographic characteristics of household head				
Age of household head	53.3	12.2	24	90
Education level of household head (0=no formal ed., 1=primary, 2=secondary, 3=post-secondary)	1.72	0.84	0	3
Employment status of household head (0=not work, 1=work for pay, 2=work without pay)	1.70	0.59	0	2
Occupation of household head (0=non-farming, 1=farming)	0.78	0.42	0	1

TABLE 3. DESCRIPTIVE STATISTICS (*continued*).

	MEAN	SD	MIN	MAX
Socioeconomic status of the household				
Access to electricity (0=no, 1=yes)	0.42	0.49	0	1
Household light source (0=lantern, 1=electric/solar/generator)	0.54	0.50	0	1
Water source (0=unimproved, 1=improved)	0.66	0.47	0	1
Floor material (0=earth/mud, 1=concrete)	0.78	0.41	0	1
Log of land size owned by hh in acres . . .	1.73	0.91	1.25	4.72
Log of cash income of hh in dollars	3.57	1.99	0	7.64
Livestock (milk cows) ownership (0=others, 1=self, 2=spouse, 3=self and spouse jointly)	1.58	1.18	0	3
Who decides on selling milk cows (0=others, 1=self, 2=spouse, 3=self and spouse jointly)	1.98	1.19	0	3
Group category (0=control, 1=treatment).	0.83	0.38	0	1

Where f is a vector of the outcomes of the number of livestock owned by the household, β_i are the coefficients to be estimated, x is a vector of household characteristics, h is a vector of the socio-demographic characteristics of household head, c is a vector of socioeconomic status of household, and group is the dummy variable of treatment and control groups.

Additionally, to examine the effects of household characteristics, socio demographic characteristics of household head and socioeconomic status of household, and livestock access on the household dietary diversity, we run logistic regression with the following equation:

$$L_i = ln\left(\frac{P_i \quad = E\ (y_i = 1|Z_i)}{1 - P_i = E\ (y_i = 1|Z_i)}\right) = \beta_0 + \beta_1\mathbf{x} + \beta_2\mathbf{h} + \beta_3\mathbf{c} + \beta_4\mathbf{d} + \beta_5(group)$$

Where L is the log odds for a given household dietary diversity, P is the probability of high dietary diversity of the dependent variable (y) over the

probability of low dietary diversity (1-*P*) and *Z* is the predicted variable, β_i are the logit estimates, x is a vector of household characteristics, h is a vector of the socio-demographic characteristics of household head, c is a vector of socioeconomic status of household, and group is the dummy variable of treatment and control groups.

Besides the regression models, we also used chi-square test of independence to examine the relationship between livestock ownership and gender and two-sample t-test to examine the mean difference between FHH and MHH on the livestock ownership.

GENDERED LIVESTOCK LIVELIHOODS

Evidence of the Livestock Ladder by Household Type (Male- vs Female-Headed)

Within WEAI Dairy, we found there were no statistically significant differences between female-headed households (FHH) and male-headed households (MHH) as to the types of animal owned (Table 4), which runs counter to the mainstream literature. This result tentatively suggests that EADD/Heifer programming is having an impact on economically empowering FHH, either through giving them milk cows or through training and support, thus enabling them to improve their economic standing.

Moving to the FAO-RIGA data, we find that there are many more statistically significant relationships between animal ownership and types of households. There is a very strong statistically significant relationship between household type and sheep (medium) and poultry (small) ownership (Table 5). Meaning, female-headed households are much less likely to own sheep (medium) and poultry (small). FHH also own fewer pigs (medium) and cattle (large), and overall, FHH own fewer animals. Since, the results of the FAO Ugandan data at the national level are so different from our WEAI Dairy data, we then analyzed the FAO data within the central and eastern regions where we conducted our surveys (Table 5). In the central region, FHH are less likely to own two types of medium stock, sheep and pigs. Though not statistically significant, the data also suggests FHH are also less likely to own poultry (small), although both MHH and FHH households report owning a few poultry in the central region. There was no statistical significance for cattle (large) or for overall numbers of animals owned by household type. In the eastern region, the statistically significant relationships were for sheep (medium) and poultry (small), with FHH less likely to own the same amount as MHH. It is worth noting the Western region of Uganda contain the most dairy cows (large), so we also ran t-test for this region and found similar results, with statistical significance for MHH likely to own more sheep (medium) and poultry (small). However, no other differences reported (results not shown).

TABLE 4. T-TEST FOR MEANS DIFFERENCE OF FHH AND MHH ON LIVESTOCK OWNERSHIP.

	TREATMENT				
LIVESTOCK OWNED	OBS.	MEAN	SE	SD	2-TAIL PROB.
Goat					
MHH	104	3.88	0.47	4.82	0.67
FHH	33	3.42	1.04	5.99	
Pigeons					
MHH	103	1.16	0.28	2.84	0.55
FHH	33	1.09	0.47	2.72	
Poultry					
MHH	104	35.38	10.79	110.03	0.85
FHH	33	15.09	9.00	51.71	
Cattle					
MHH	104	0.97	0.15	1.56	0.72
FHH	34	0.79	0.23	1.36	
Dairy cows					
MHH	104	1.85	0.12	1.23	0.91
FHH	34	1.53	0.16	0.96	
Total livestock					
MHH	104	139.39	97.14	990.62	0.69
FHH	34	50.76	30.53	178.04	

Moving to the two WEAI Pilot data sets, the results from the pilot data provide different results (Table 6). WEAI Pilot 1 reveals FHH are more likely to have large livestock and small stock, (poultry), but that there is no statistically significant difference between MHH and FHH in terms of medium stock. For WEAI Pilot 2 the only statistically significant relationship is large livestock where FHH are more likely to have large livestock than MHH.

When comparing FHH with MHH our analysis shows that the livestock ladder is highly variable within Uganda. While much of the literature associates small

TABLE 5. T-TEST FOR MEANS DIFFERENCE OF FHH AND MHH ON LIVESTOCK OWNERSHIP, UGANDA (FAO-RIGA DATA).

	ALL OF UGANDA					CENTRAL REGION					EASTERN REGION				
LIVESTOCK OWNED	OBS.	MEAN	SE	SD	2-TAIL PROB.	OBS.	MEAN	SE	SD	2-TAIL PROB.	OBS.	MEAN	SE	SD	2-TAIL PROB.
Sheep															
MHH	1546	0.26	0.02	0.60	0.00***	387	0.13	0.02	0.45	0.01**	408	0.23	0.03	0.52	0.05*
FHH.	689	0.16	0.01	0.30		201	0.07	0.01	0.17		148	0.17	0.02	0.26	
Pigs															
MHH	1546	0.08	0.01	0.27	0.03*	387	0.15	0.02	0.36	0.04*	408	0.07	0.01	0.21	0.65
FHH.	689	0.06	0.01	0.20		201	0.10	0.02	0.25		148	0.06	0.02	0.21	
Poultry															
MHH	1546	0.06	0.00	0.11	0.00***	387	0.04	0.01	0.12	0.08	408	0.08	0.01	0.13	0.05*
FHH.	689	0.04	0.00	0.07		201	0.03	0.00	0.05		148	0.05	0.01	0.05	
Cattle															
MHH	1546	1.25	0.24	9.45	0.03*	387	1.65	0.91	17.79	0.21	408	1.33	0.17	3.45	0.14
FHH.	689	0.66	0.12	3.04		201	0.49	0.20	2.81		148	0.91	0.24	2.87	
Total livestock															
MHH	1546	1.66	0.24	9.58	0.04*	387	1.96	0.91	17.85	0.17	408	1.73	0.20	3.97	0.12
FHH.	689	0.92	0.12	3.18		201	0.68	0.21	2.92		148	1.22	0.25	3.09	

NOTES: $^{*}p \leq 0.05$, $^{**}p \leq 0.01$, $^{***}p \leq 0.001$

TABLE 6. T-TEST FOR MEANS DIFFERENCE OF FHH AND MHH ON LIVESTOCK OWNERSHIP UGANDA (WEAI PILOT 1 AND 2)

	WEAI PILOT 1					WEAI PILOT 2				
LIVESTOCK OWNED	OBS.	MEAN	SE	SD	2-TAIL PROB.	OBS.	MEAN	SE	SD	2-TAIL PROB.
Large livestock										
MHH	542	1.62	0.02	0.49	0.004**	292	1.56	0.03	0.50	0.001***
FHH.	75	1.78	0.05	0.41		43	1.88	0.05	0.32	
Medium livestock										
MHH	542	1.41	0.02	0.49	0.51	292	1.36	0.03	0.48	0.90
FHH.	75	1.45	0.06	0.50		43	1.35	0.07	0.48	
Small poultry (chicken, turkey, pigeon, duck)										
MHH	542	1.28	0.02	0.45	0.001***	292	1.28	0.03	0.45	0.13
FHH.	75	1.48	0.06	0.50		43	1.39	0.08	0.49	

NOTE: $^{*}p \leq 0.05$, $^{**}p \leq 0.01$, $^{***}p \leq 0.001$

stock with being predominantly female owned, this is not supported by the FAO-RIGA data when analyzed by household type and region. At the national level, FHH were less likely to have small stock and this was also true at the regional level (although the central region was not statistically significant). Across all four data sets only WEAI Pilot 1 showed FHH likely to own more small stock at statistically significant levels. The one pattern that one would expect to find based on the literature that FHH will own fewer large livestock, cattle, neither holds true in all three WEAI data sets, nor in the FAO RIGA data at the regional levels. Only at the FAO RIGA data national level is their evidence of FHH owning fewer large livestock. The likelihood of FHH being more likely to own large livestock, but not small stock compared with MHH is an unexpected finding, a point we will discuss further in the conclusion section. The findings suggest that the livestock ladder, at least for FHH versus MHH, is less predictable at the regional level.

Evidence of the Livestock Ladder within Intra-Household Ownership

Moving to the intra-household level, we draw on the three WEAI data sets. Due to differences in questions asked, our data analysis is limited to a chi-square test of independence for questions concerning types of animals owned through self-reporting by men and women within households. Through a basic chi-square test of independence we find that in the two pilot WEAI data sets men are more likely to own large livestock than women and that this is statistically significant (Table 7). We do not find this result in the WEAI Dairy data. However, as evidence of the presence of the livestock intervention program we were studying, the WEAI Dairy data does show a statistically significant relationship in females reporting more ownership of dairy cattle than males. This fits with the development program objectives, as women were targeted for receiving dairy cows. Since dairy cows are not specifically asked about in the WEAI Pilots, but are grouped under the broader category of large livestock, our results do suggest that the development program has had an impact on disrupting traditional gendered patterns of ownership of larger livestock by giving women dairy cows.

The results for medium stock and small stock across the three WEAI data sets are a bit more mixed. For medium stock, WEAI Pilot 1 and WEAI Dairy reveal that women are more likely to own medium stock compared with men, however only in the WEAI Dairy is this a statistically significant relationship. For small stock, again the WEAI Pilot 1 and WEAI Dairy reveal that women are more likely to own small stock, but only in Pilot 1 is this a statistically significant relationship. In contrast, WEAI Pilot 2 suggests that men are more likely to own all types of animals. In summary, an analysis of data at the intra-household level using the WEAI suggests the presence to some degree of a livestock ladder, at least in terms of large livestock, but the data is far from conclusive.

TABLE 7. CHI-SQUARE TEST OF INDEPENDENCE CONCERNING THE RELATION BETWEEN LIVESTOCK OWNERSHIP AND GENDER.

	WEAI PILOT 1		WEAI PILOT 2		DAIRY WEAI	
LIVESTOCK OWNED	WOMEN %	MEN %	WOMEN %	MEN %	WOMEN %	MEN %
Large						
Self	24.79	37.38	21.74	56.25	23.08	25.00
Spouse	28.21	8.41			15.38	10.71
Self and spouse jointly	32.38	30.84	37.50	53.62	32.31	35.71
Others	14.53	23.36	24.64	6.25	29.23	28.57
	$\chi^2(3,224)=16.93^{***}$		$\chi^2(2,133)=19.31^{***}$		$\chi^2(3,121)=0.65$	
Medium						
Self	35.15	33.76	37.70	48.39	37.40	14.77
Spouse	20.79	13.38			5.69	23.86
Self and spouse jointly	22.77	25.48	47.54	45.16	24.39	21.59
Others	21.29	27.39	14.75	6.45	32.52	39.77
	$\chi^2(3,359)=4.46$		$\chi^2(2,215)=4.75$		$\chi^2(3,211)=23.09^{***}$	

NOTE: $^{*}p\leq0.05$, $^{**}p\leq0.01$, $^{***}p\leq0.001$

TABLE 7. CHI-SQUARE TEST OF INDEPENDENCE CONCERNING THE RELATION BETWEEN LIVESTOCK OWNERSHIP AND GENDER (*continued*).

	WEAI PILOT 1		WEAI PILOT 2		DAIRY WEAI	
LIVESTOCK OWNED	WOMEN %	MEN %	WOMEN %	MEN %	WOMEN %	MEN %
Small						
Self	37.02	18.37	36.09	37.86	31.06	9.68
Spouse	11.06	14.29			5.30	24.73
Self and spouse jointly	25.96	30.61	51.88	58.25	22.73	18.28
Others.	25.96	36.73	12.03	3.88	40.91	47.31
	$\chi^2(3,431)=18.76^{***}$		$\chi^2(2,236)=5.03$		$\chi^2(3,225)=27.70^{***}$	
Large – dairy cows						
Self					36.54	17.54
Spouse					12.82	14.04
Self and spouse jointly					30.13	29.82
Others.					20.51	38.60
					$\chi^2(3,270)=16.06^{***}$	

NOTE: $^{*}p\leq0.05$, $^{**}p\leq0.01$, $^{***}p\leq0.001$

Evidence of the Livestock Ladder by Socioeconomic Indicators

Livestock are said to be a measure of socioeconomic standing in a community, and, in line with the livestock ladder, the literature argues that wealthier households are more likely to own more animals and larger animals (e.g., cattle). Utilizing just the WEAI Dairy data, we see that wealthier households (as indicated by floor material, land log and reported income) are correlated with the likelihood of owning cattle and medium stock (Table 8). This also holds true when looking at total animals owned. There is also a relationship between whether the household is male-headed (HH type) and the land owned by the household. This connection is mentioned because land rights in Uganda are very weak for women, with land passing through the patrilineal line (Kes, Jacobs, and Nanny 2011). The lack of land rights has significant gendered consequences, which include the inability to use land as an asset for receiving loans and purchasing more livestock, which has consequences for the women who want to acquire more animals (Kristjanson et al. 2014).

Moving to the regression analysis, we see that the relationship between higher socioeconomic status (e.g., flooring and amount of land) and the likelihood of owning more animals holds, although only floor material is statistically significant in relation to ownership of large livestock.[3] Households that had more children under the age of five present are less likely to own large and medium livestock (cattle, pigs, sheep, and goats). In contrast, households that have more people, but not less than five, were more likely to own more total animals (Table 9). If one considers the presence of household members that are older than five as an asset, given that the household has more labor power, the results fit within the livestock ladder. Curiously, in our sample, there is a significant relationship between members of households that have post-secondary education and small livestock ownership and total number of animals owned, but there is no relationship between education and ownership of large and medium livestock.

Ownership, Input and Control Over Resources

Part of our interest is to better understand what role livestock play in the lives of women and households. The gendered component of the literature has suggested that when livestock, dairy products, or income from dairy products are controlled

[3]All models use OLS regression. In terms of assumptions there is no problem of multicollinearity as all the independent variables are moderately correlated. VIF also show that here is no problem of collinearity. There is no significant outliers in the residuals. The issue of heteroscedasticity has been controlled using robust standard error. However, the scatter plot of observed and predicted values are not really linear and the R-square range is only 14.41%, 16.05% and 16.23% in explaining variance in the models respectively. It implies that other variables might explain more regarding small, medium, and large livestock ownership.

Table 8. Correlations on Animals Owned by HH and SEI of HH.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Lrg. & med. livestock (cattle & goats)																		
2. Chicken (small).....	0.14																	
3. Cattle (large).....	0.90*	0.03																
4. Animals	0.72*	0.61*	0.59*															
5. HH type.....	0.10	0.09	0.09	0.13														
6. No. of family members.	-0.07	0.12	-0.07	0.05	0.14													
7. Children under 5.....	-0.12	0.05	-0.07	-0.12	0.03	0.45*												
8. No. of females in hh ...	-0.11	0.01	-0.08	-0.08	-0.10	0.72*	0.41*											
9. Age of hh head	0.07	0.03	0.04	0.07	-0.03	-0.06	-0.13	-0.06										
10. Educ. of hh head	0.13	0.17*	0.08	0.15	0.24*	0.05	0.00	-0.05	0.03									
11. Employ of hh head ...	-0.14	0.09	-0.11	-0.03	-0.05	-0.05	-0.04	-0.09	-0.02	-0.21*								
12. Occ. of hh head	-0.20*	-0.01	-0.15	-0.11	-0.14	-0.02	-0.04	0.04	-0.04	-0.17*	0.61*							
13. Electricity	0.15	0.17*	0.13	0.15*	0.13	0.15	0.04	0.16*	0.04	0.22*	-0.09	-0.22*						
14. Lighting.....	0.13	0.11	0.12	0.16*	0.13	0.11	0.02	0.10	0.11	0.27*	-0.12	-0.23*	0.77*					
15. Water.....	-0.12	0.10	-0.09	-0.02	-0.05	0.02	-0.12	-0.04	0.00	-0.04	-0.01	0.07	-0.05	-0.13				
16. Floor.....	0.20*	0.12	0.14	0.18*	0.10	0.00	0.06	-0.06	0.15	0.08	-0.06	-0.14	0.24*	0.36*	0.13			
17. Log of land	0.22*	0.11	0.19*	0.22*	0.29*	0.05	-0.03	-0.06	0.30*	0.23*	-0.14	-0.18*	0.21*	0.25*	-0.04	0.23*		
18. Log of income.....	0.22*	0.10	0.23*	0.23*	0.34*	-0.06	-0.04	-0.10	-0.01	0.24*	-0.09	-0.27*	0.17*	0.16*	-0.01	0.19*	0.33*	
19. Group.....	0.08	0.05	0.13	-0.05	0.08	0.01	0.02	0.03	0.00	0.13	-0.10	-0.04	0.07	-0.01	0.07	-0.10	0.22*	0.17*

NOTES: *$p \leq 0.05$; There is no serious problem of multicollinearity since the variables are moderately correlated.

TABLE 9. OLS REGRESSION OF THE EFFECT OF SOCIOECONOMIC CHARACTERISTICS OF HOUSEHOLDS ON THE NUMBERS OF LIVESTOCK OWNED.

	CHICKEN (SMALL)	CATTLE & GOATS (LRG. & MED.)	ANIMALS
HOUSEHOLD CHARACTERISTICS			
Household type (MHH)	-0.01	-0.02	-0.03
	(0.13)	(0.23)	(0.33)
Total no. of hh members	0.18	0.03	0.23**
	(0.04)	(0.05)	(0.08)
Total no. of children under 5	0.06	-0.18***	-0.17**
	(0.08)	(0.09)	(0.15)
Total no. of females in hh	-0.13	-0.05	-0.14
	(0.06)	(0.09)	(0.14)
SOCIODEMOGRAPHIC CHARACTERISTICS OF HH HEAD			
Age of hh head	-0.03	0.06	0.01
	(0.01)	(0.01)	(0.01)
EDUCATION LEVEL OF HH HEAD			
Primary level	0.03	-0.02	0.15
	(0.17)	(0.21)	(0.39)
Secondary level	-0.06	0.08	0.13
	(0.24)	(0.28)	(0.48)
Post-secondary	0.22*	0.04	0.21**
	(0.29)	(0.28)	(0.49)
EMPLOYMENT STATUS OF HH HEAD			
Worked for pay	-0.04	0.04	-0.09
	(0.20)	(0.51)	(0.58)
Worked without pay	0.19	-0.07	0.01
	(0.27)	(0.37)	(0.46)
Occ. of hh head (farming)	-0.06	-0.02	-0.04
	(0.32)	(0.31)	(0.47)
SOCIOECONOMIC STATUS OF THE HH			
Access to electricity	0.17	0.18	0.13
	(0.22)	(0.37)	(0.55)

TABLE 9. OLS REGRESSION OF THE EFFECT OF SOCIOECONOMIC CHARACTERISTICS OF HOUSEHOLDS ON THE NUMBERS OF LIVESTOCK OWNED (*CONTINUED*).

	Chicken (small)	Cattle & Goats (lrg. & med.)	Animals
Lighting source for hh (safe) . . .	-0.07	-0.18	-0.08
	(0.22)	(0.38)	(0.57)
Water source (improved)	0.11	-0.15*	-0.03
	(0.15)	(0.18)	(0.30)
Floor material (concrete)	0.07	0.18**	0.11*
	(0.11)	(0.20)	(0.30)
Log of land size in acres	0.06	0.11	0.14*
	(0.65)	(0.12)	(0.15)
Log of cash income in dollars . .	0.04	0.07	0.15
	(0.05)	(0.05)	(0.09)
Group category (treatment) . . .	-0.01	0.05	-0.12
	(0.15)	(0.22)	(0.35)
Constant	-0.61	0.47	1.06
	(0.39)	(0.67)	(0.89)

by the wife this contributes to more dietary diversity in the household. Our results are mixed as to the impact of livestock ownership on dietary diversity.

Fitting with the socioeconomic literature, households that have access to electricity (4.07 times higher) and have more land (in acres) (2.44 times higher) are more likely to have higher rates of dietary diversity (Table 10). Similarly, households with higher cash income have increased odds of having higher dietary diversity by 42%.

Specific to dietary diversity, we found that the higher the number of household members, the less dietary diversity, reducing the odds of having high dietary diversity by -41%. In contrast, the more children under the age of five years old in the household the higher the dietary diversity by 75%. Similar to children less than five, the higher the number of females in the household the more likely there is dietary diversity, increasing the odds by 43%. A high presence of females in a household would fit with a high presence of children less than five, which suggests that females are either more aware of the importance of dietary diversity to children and/or there is more female labor to work in the gardens that provide for the home consumption, thereby increasing dietary diversity.

For animal ownership, we found that the larger the numbers of large livestock (cattle and milking cows) the more likely that HH has higher dietary diversity,

TABLE 10. LOGISTIC REGRESSION OF THE EFFECT OF SOCIODEMOGRAPHIC AND ECONOMIC CHARACTERISTICS OF HOUSEHOLDS ON THEIR DIETARY DIVERSITY (n=266).

	DIETARY DIVERSITY	
HOUSEHOLD CHARACTERISTICS	ODDS RATIO	ROBUST STANDARD ERROR
Household type (MHH)	0.31*	0.20
Tot. no. of HH members	0.59***	0.07
Tot. no. of children under 5	1.75*	0.38
Tot. no. of females in HH	1.43*	0.24
SOCIODEMOGRAPHIC CHARACTERISTICS OF HH HEAD		
Age of HH head	1.00	0.02
Education level of HH head		
Primary	1.25	0.97
Secondary	1.95	1.62
Post-secondary	5.28	4.36
Employment status of HH head		
Worked for pay	1.36	1.49
Worked without pay	1.68	1.61
Main occ. of HH head (farming)	0.68	0.49
SOCIOECONOMIC STATUS OF THE HOUSEHOLD		
Access to electricity	4.07***	1.46
Water source (safe)	1.04	0.37
Floor material (concrete)	0.54	0.22
Log of land size owned in acres	2.44***	0.62
Log of cash income in dollars	1.42***	0.15
Livestock Access		
Tot. no. of livestock owned by HH	1.17#	0.11
Who owns livestock		

TABLE 10. LOGISTIC REGRESSION OF THE EFFECT OF SOCIODEMOGRAPHIC AND ECONOMIC CHARACTERISTICS OF HOUSEHOLDS ON THEIR DIETARY DIVERSITY (*CONTINUED*).

	ODDS RATIO	ROBUST STANDARD ERROR
Self	3.92**	2.42
Spouse	1.03	0.62
Self and spouse jointly	1.96	1.04
Who decides on selling milk cows		
Self	0.63	0.47
Spouse	4.25#	3.26
Self and spouse jointly	0.81	0.42
Group category (treatment group)	0.51	0.23
Constant	1.00	1.63
Peason χ^2		244.77
Hosmer-Lemeshow χ^2		4.86
Pseudo R^2		0.30

NOTES: #$p \leq 0.10$; *$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$

increasing the odds of dietary diversity by 17% (if alpha is 0.10). In looking at ownership of dairy animals, our results reveal that when milking cows are owned by self (individuals/could be male and female as we include all individuals in the models), household dietary diversity is more likely to be higher than when owned by others (whether inside or outside the household), improving the odds of having high dietary diversity by 3.92 times. Our results thus support that ownership of a dairy cow by the husband and/or wife improves household dietary diversity. Nevertheless, our data does not support the idea that the animal must uniquely belong to the female head of household to increase dietary diversity.

CONCLUSIONS

Recent studies have raised concerns over assuming the existence of the livestock ladder (Kim and Sumberg 2015; Njuki and Mburu 2013; Pica-Ciamarra et al. 2015), instead suggesting that "the attributes and asset-ness of specific livestock are not intrinsic, but linked directly to agro-ecological and social and institutional context"

(Kim and Sumberg 2015:131). Our analysis, does tentatively call into question some dimensions of the livestock ladder. Specifically, the WEAI Dairy reveals that socioeconomic status does play a role in total amount of livestock owned, but the types of animals owned tends to not fully conform to the livestock ladder. In other words, the assumption that poorer households (including female-headed households) will own small stock, like poultry, while wealthier households will own large stock, like cattle, does not seem to hold. Within the WEAI Dairy data, for example, those households where the husband or wife have a post-secondary education are more likely to own small stock (chickens), but not large (cattle) and medium stock (goats, sheep, or pigs).

In a similar vein, due to a lack of intra-household data available on gender dynamics and livestock ownership scholars have historically focused on household level data between male-headed and female-headed households (SOFA Team 2011). Based on these studies, we hypothesized that we would find evidence of a livestock ladder both for total and type of animals owned, with female-headed households likely owning fewer animals and more small and medium livestock. Unexpectedly, what we found was that the livestock ladder does not seem to hold, at least in the central and eastern regions of Uganda. One possible explanation is that most female-headed households have acquired livestock, especially cattle, through marriage and/or inheritance. However, this finding warrants further study, as livestock transfer development programming may need to consider if there are unique challenges for women depending upon household structure (e.g., widowed versus abandoned; polygamous versus monogamous, etc.).

The gender dimensions to intra-households dynamics of the livestock ladder remain poorly understood. Comparing our results with other studies focused on gender and livestock within households, our findings are not entirely in line with the existing literature. Our findings are similar to a Das et al. (2013) and Bandiera et al. (2012) in their studies of dairy intervention programs. They found increases in household-level well-being, as measured by ownership of various livestock and dietary diversity, but looking within the household, the programs had mixed effects. Das et al. (2013:28) found that while women increased ownership and input in certain dimensions, program interventions also increased males' sole ownership of many assets, typically considerably more than it increases joint ownership or female sole ownership of such assets, including land, most agricultural and nonagricultural productive assets, and most consumer durables. They also found that "in terms of control over income and saving and spending decisions, the program as a whole appears to reduce women's role" (Das et al. 2013:28). In our study, we did not find women's ownership of cattle or input in decision making as playing a significant role in household well-being as measured by dietary diversity. We did find having the presence of females in the household improves dietary diversity.

Finally, thinking about livestock livelihoods has interesting implications for livestock transfer development programming. The emphasis on considering context when assessing livestock needs, reinforces the premise of livelihoods broadly defined, of which assets are only one component. Development programming may need to revisit the types of livestock provided to understand and value assets within specific context.

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