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The study was conducted to explore gender dimensions in the local chicken value chain in northern Uganda. Specifically, it focused on characterizing local chicken value chain actors, ascertaining level and determinants of gender participation as well as relationships between gender, access and control over income from local chicken enterprises. Primary data were collected using structured questionnaires administered in a cross-sectional survey of 200 randomly selected local chicken value chain actors. Data were analyzed using SPSS version 10 and StataSE 13 software from which simplified gross margins, descriptive statistics, correlations and a Logit regression model were estimated. Results revealed that majority of value chain actors were aged 20–48 years and males were dominant across most segments in the value chain. Men participated more in input supply, house construction, marketing and barbequing while women participated in production and stewing local chickens. Among actors, processors (UGX 1,911,274) and farmers (UGX 159,691) had the highest and least annual gross margin respectively. The Logit model revealed that age, education level, marital status and income control positively influenced (*Pr = 0.00*) gender participation. Men had more control over income than women. An engendered innovation platform could be established for training and empowerment of local chicken value chain actors.

Keywords: gender, gross margin, local chicken, participation, Uganda, value chain

Introduction

Gender dimension plays a key role in stimulating smallholder farming growth, especially in rural areas of developing countries where manual labour dominates production (FAO 2014). In Africa, gender participation in both farm and nonfarm activities vary depending on the country and culture (Ndiritu, Kassie, and Shiferaw 2014). This variation and unequal gender participation has had implications for agricultural development, especially in sub-Saharan Africa where farm productivity is still low compared to other countries in the world (FAO 2011). Gender participation is also considered a vital concept in determining the constraints and opportunities for technological innovations and adoption in East Africa (Mapiye et al. 2008). In Uganda, women contribute over 70% of the labour force required for agricultural-related activities (Meinzen-Dick et al. 2010). However, the concentration of women is mainly in the lower, non-remunerative nodes of the value chain (Coles and Mitchell 2011). Therefore, engendering the value chain provides tremendous opportunities for both men and women to participate in production activities, access better market linkages and employment (Waithanji, Njuki, and Bagalwa 2013).

Participation of both men and women in the value chain of local chicken production that is currently being promoted by various actors in the Omoro and Oyam districts as a vehicle for household poverty reduction is vital in ensuring sustainability and productivity (USAID 2010). This is because local chickens are highly adaptable to local conditions, require low capital investment and are found to be an attractive pro-poor enterprise (FOWODE 2012). As a result, various households have embraced local chicken production and marketing. However, the level of women's participation at each stage of the value chain is affected by a host of factors, which vary across countries and cultures, and include their access to resources like capital; their skills, capacities and ability to organize; and constraints on their mobility to access markets and information (Coles and Mitchell 2011).

According to Adeoye, Adeolu, and Ibrahim (2013), applying the value chain approach to poultry provides a proper understanding of the processes of creating value, and gives a good view of networks or connections among actors in the value chain. The operation of value chains may affect both men and women in that it takes advantage of the existing gender inequalities in bargaining power thus employing many women at lower levels of the value chain for relatively lower wages (Gammage 2009). Value chain analysis of gender participation is known to increase the visibility of the roles of men and women in the various nodes of the value chain (Mutua, Njuki, and Waithanji 2014). Hence, an engendered approach to village chicken production would bridge the gender gaps, increase production efficiency, reduce dependency of women on men, enhance family stability, and assist in poverty alleviation (Mapiye et al. 2008). Therefore, in order to tap the potential of local chicken production for livelihood enhancement in northern Uganda, it is important to understand interventions that reflect the broader gender and value chain realities in the region.

Like other agricultural enterprises, women are likely to face difficulties in taking on profitable roles in the local chicken value chain, making them concentrate at the lower segments of the value chain (FOWADE 2012). Studies carried out in Kenya have shown that men tend to take over women-owned enterprises once they become profitable (KIT, Agri Pro-focus and IIRR 2012); it is also more likely that men would take control over the benefits from local chicken production in the study

area. There is a dearth of information on the characteristics of the local chicken actors and value added at the different segments of the value chain; level and determinants of gender participation; and gender relations in the local chicken value chain in the Oyam and Omoro districts. The study thus sought to provide answers to the following questions: What are the characteristics of the local chicken value chain actors and what value is added at each of the value chain segments? What is the level and determinants of gender participation in the local chicken value chain? What is the relationship between gender, access to and control over income earned from the local chicken value chain? These questions made the study pertinent in understanding the attributes of the local chicken value chain actors and how they influence their participation in the value chain; identification of the profitable segments of the value chain for investment; identification of gender gaps in the local chicken value chain; and ascertaining whether gender efforts in production translate into benefits received from the value chain. With this knowledge, policymakers, government workers and NGOs working in the area could design and implement support interventions that promote gender-sensitive participation and relations in the local chicken value chain.

Literature review

The poultry industry has grown tremendously in the last three decades (Rao and Natchimuthu 2015) and poultry meat production is projected to grow more vigorously compared to the rest of the meat production sectors worldwide (FAO 2016). Approximately 20 billion poultry exist worldwide (FAO 2007), and of these, 75% are found in developing countries. Local breeds make up 63% of the world's poultry and 80% of Africa's total poultry population (Gueye 2009). Poultry production plays a vital role in the East African economy due to the increasing demand for animal protein in the region with consumers demanding more indigenous chickens (USAID 2010). Local chickens are one of the most adaptable species of domestic birds and thus more rural households are directly involved in their production under free range systems (Nakkazi et al. 2014).

Poultry production contributes significantly to food security and poverty alleviation in Uganda by providing meat, eggs and income, as well as being a medium for barter trade (Alders and Pym 2009; FAO 2007; Upton 2000). Uganda's total poultry population was estimated at 45.901 million, consisting of nearly 40 million indigenous and about 6 million exotic birds (UBOS 2014). In northern Uganda, local chickens are preferred and used in a number of social-cultural functions like marriage and rituals.

Generally, women and men's involvement in different types of agricultural work depend mainly on the local customs as well as the social, cultural, and religious influence in most African communities (Tadelle and Ogle 2001). In sub-Saharan Africa, indigenous chickens are owned and managed mainly by women and children and are often essential parts of female-headed households (Ahlers et al. 2009). Promotion of indigenous chicken production, therefore, contributes to the economic

empowerment of rural women and youth (Gueye 2009). However, the role of women in farming and village chicken practices was, until recently, largely unrecognized. Similar findings have been observed in Zimbabwe, where the majority of local chickens kept in households are owned by women (Kusina and Kusina 1999; Muchadeyi et al. 2004). They dominate most of the activities around village chicken production such as feeding, watering, cleaning, and selling of chickens and eggs (Mapiye and Sibanda 2005).

According to Waithanji, Njuki, and Bagalwa (2013) and Alinyo and Leahy (2012), capital and technology have an influence on the participation of people, especially women, in value chains. Furthermore, women often have limited access to capital and technology which minimizes their participation in value chains, especially those segments with the highest economic returns, thus reducing their access to the benefits from the chains (FAO 2011; Fletschner and Kenney 2011). Sebstad and Manfre (2011) suggested that factors such as a conducive environment that includes time availability, short geographic distances and access to communication technology influence gender participation. The main socio-cultural and economic factors that affect gender participation include land tenure, gender roles, perception and beliefs, labour and capital (Kunihira 2014).

The income level of men and women directly affects their participation since the majority of women normally have low levels of income (Boodhna 2011) and are unable to invest in the local chicken value chain. Education also plays a significant role in gender participation since it is a vital component in shaping a person's ability to meet and enjoy opportunities (KIT-SNV 2015). Education (both formal and informal) on various enterprises within the local chicken value chain, its profitable segments and cost-benefit analyses encourages active participation of both men and women. However, in most cases, women are not given the opportunity to attend such education sessions and are thus less educated than men (Combaz 2013).

Ahlers et al. (2009) and FOWODE (2012) also argued that women have limited access to and control over resources like land, which could negatively affect their ability to keep indigenous poultry because they do not have land on which to construct poultry housing. In addition, women are primarily concerned with the welfare of their families and thus spend most of their time ensuring that their families are secure. They also often have so much household work that they have too little time to spend on income-generating activities like local chicken production and marketing (Combaz 2013).

The distribution of benefits from value chains by gender varies depending on location (Coles and Mitchell 2011). Waithanji, Njuki, and Bagalwa (2013) pointed out that the benefits accruing from different levels of the value chain vary for men and women since women occupy the lower nodes and men the higher nodes. Amartey et al. (2013) added that women and men may work together to bring wealth and resources into the family, but this does not determine the division of wealth between them. This is often attributed to the

social norms that privilege men, making them hold more power than women, and thus wielding more control over assets and expenditure (Farnworth 2011; FOWADE 2012; Sebstad and Manfre 2011; Sen 1990). However, studies conducted in Kenya by Ngeno, Langat, Wendi, and Kipsat (2011) showed that women were the dominant gender in charge of local chicken enterprises and they made decisions on the use of poultry products, received the income if chickens were sold and decided on the use of the cash income. Their findings confirmed that women spent the income generated from chicken production directly on nutrition, health and education of the family and therefore to some extent control and access production resources and benefits from village chicken production (Muchadeyi et al. 2005).

Conceptual framework for gender participation in the local chicken value chain

In this conceptual framework, the factors influencing gender participation (independent variables) are in every segment (production, input supply, processing and trading) of the value chain. The dependent variable is gender participation represented by individual women and men as illustrated in Figure 1. This framework positions the individual men and women at its heart. It recognizes the assortment of women and men as value chain actors with unique characteristics, abilities and aspirations. Each individual, whether a woman or a man, is part of a household in which specific changes and power relations are in place. Gender roles and responsibilities are assigned within the household and they determine how and to what extent household members are involved in the value chain, as well as who makes decisions and controls the benefits of this participation.

The bidirectional arrows in Figure 1 illustrate the way in which the factors affect an individual's ability to participate in the value chain as well as access to and control over benefits the individual is able to receive. Significantly, the arrows always pass through the household level, since this dimension largely determines who participates in and benefits from a value chain.

The factors may appear at one level, but have underlying causes at another. Frequently, these causes lie at the individual (attitude, level of education, income level, among others) and household level (culture, gender roles and responsibilities, access to and control over resources), since these are fundamental to determining access to productive resources and decision-making power. At the same time, the extended value chain and the enabling environment levels greatly influence the participation of women and men involved in different nodes of the chain, often creating or emphasizing the factors.
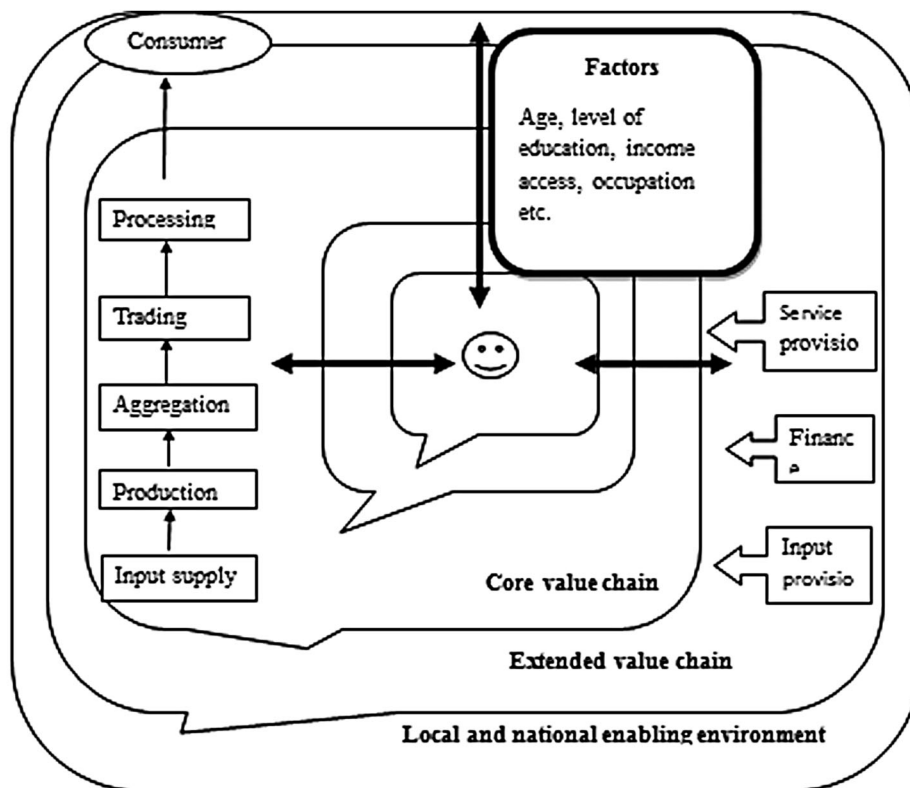

Figure 1: *Conceptual framework for gender participation in the local chicken value chain*

⬅➡   Factors affecting gender participation

(Adopted and modified from FAO, (2014))

Figure 1: Conceptual framework for gender participation in the local chicken value chain.

Materials and methods

The study was carried out in the Omoro and Oyam districts of northern Uganda (as shown in the maps) between 2015 and 2017 (Figure 2).

A cross-sectional survey was carried out to collect data from local chicken value chain actors, including farmers, traders (wholesalers and retailers), processors and input dealers. The study employed multistage sampling techniques: first, purposive sampling was used to select the two districts and two sub-counties from each district. Second, random sampling was used to select two parishes from each sub-county and two villages from each parish. The 30 processors, 30 input dealers and 30 local chicken traders from the four sub-counties were selected purposively since they were among the few to provide representative samples. However, random sampling was used to select 180 local chicken farmers from the list obtained from local council representatives. Using Excel software and running the command 'rand between', a sample size of 11 farmers was randomly generated from each village.

A structured questionnaire was used to collect data from local chicken value chain actors. The instrument was pre-tested for content validity to make sure of flow of responses and reliability to ensure consistency of respondents in answering questions. Statistical Package for Social Scientists (SPSS) and STATA software were used for data analysis. Descriptive statistics, correlations and regressions were used for analysis. Value added at every stage in the local chicken value chain was analyzed using simplified gross margin which is given by:

$$\text{Simplified gross margin }\% = \frac{\text{grossmargin}}{\text{turnover}} \times 100$$

The determinants of gender participation in the local chicken value chain were analyzed using the Logit regression model. The model is specified as: $Y_i^* = X_i\beta + \varepsilon_i$, where Y_i^* is a latent variable that is generated by a classical regression model and β is the corresponding vector of explanatory variables. The model errors ε_i are assumed to be independent, $N(0, \sigma_2)$ distributed, conditional on the X_i. The observed Y_i is defined as 1 if $Y_i^* > 0$ and 0 if $Y_i^* \leq 0$. The Logit regression model that was used in the study is presented as follows: $Y_i^* = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \dots \beta_{12}X_{12} + \mu$; where $\alpha =$ intercept term, $Y_i^* =$ gender participation in the local chicken value chain, $X_{1,2 \dots 12} =$ factors affecting gender participation (Table 1) and $u =$ Error term. The relationship between gender, access to and control over income from local chicken was analyzed using correlation and regression.

Results

Characterizing the actors in the local chicken value chain in the Omoro and Oyam districts

The characteristics of local chicken value chain actors used in the study included age, level of education, household size, farm size, experience in local chicken production and marketing, and number of local chicken kept and sold. Other characteristics included marital status, occupation, group membership, access to income and information. The value chain actors consisted of farmers, traders, processors and input dealers (Table 2). Our results reveal that in terms of participation in various activities in the local chicken value chain, men and women participated disproportionately. Men participated more in production (68%), trading (83%) and processing (60%) of local chickens compared to women. The results further showed that irrespective of their gender, the majority of the farmers, traders, processors and input dealers were in the age bracket of 18−30 years. In terms of education attainment, a greater percentage of farmers (50%) and processors (63%) had completed their basic primary education while the majority of traders (53%) and input dealers (47%) had completed secondary and postsecondary education, respectively. Most of the farmers (58%) and traders (57%) had bigger household sizes ranging from 6−10 people per household compared to the majority of processors (50%) and input dealers (67%) whose household sizes ranged from 2−5
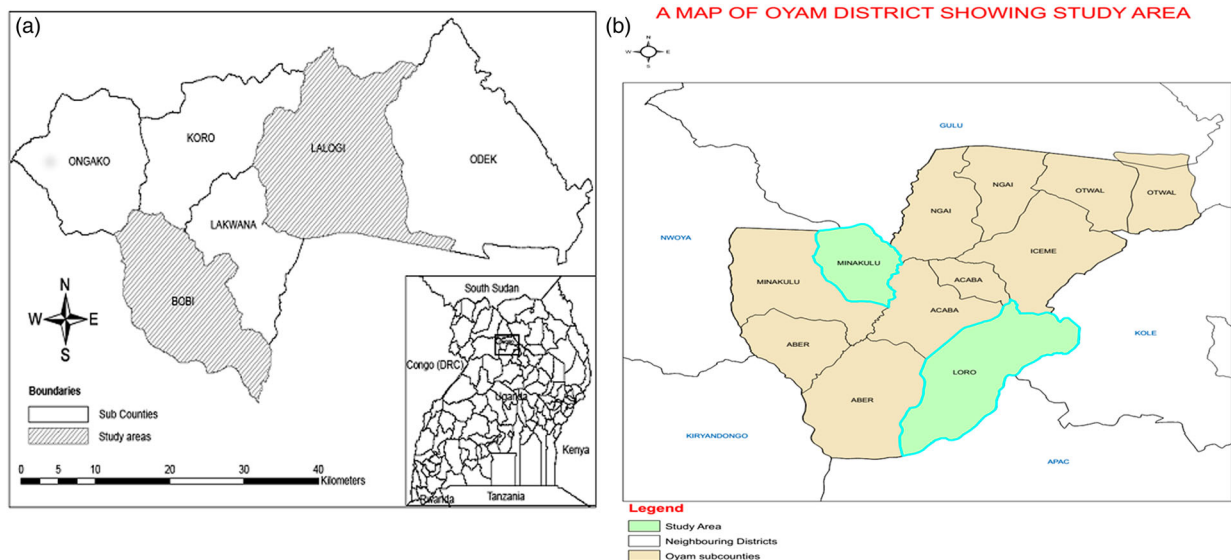

Figure 2: Map showing the study area: (a) Omoro district and (b) Oyam district.

Table 1: Summary of expected results of explanatory variables.

S/N	Variables	Measurement	Apriori sign	Citations
1	Age	Years	+	KIT (2015)
2	Farm size	Acres	+	FOWODE (2012)
3	Marital status	Dummy 1 = married 0 = Not married	+	FAO (2010)
4	Sex of household head	1 = Male 0 = Female	+	Combaz (2013)
5	Income level		+	Boodhna (2011)
6	Education	Years	+	KIT (2015)
7	Household size	Persons	±	KIT (2015)
8	Occupation	Farming		
	Trading			
	Civil service	±		Combaz (2013)
9	Credit access	Dummy 1 = yes, 0 = no	+	Alinyo and Leahy (2012)
10	Income control	Dummy 1 = yes, 0 = no	+	Agri-focus (2015)
11	Information access	Dummy 1 = yes, 0 = no	+	Esiobu, Onubougu, and Okoli (2014)
12	Experience	Years	+	KIT et al. (2014)

Table 2: Socioeconomic characteristics of local chicken value chain actors.

Variables	%			
	Farmers (*n* = 180)	Traders (*n* = 30)	Processors (*n* = 30)	Input dealers (*n* = 30)
Sex				
Male	68.3	83.3	60.0	73.3
Female	31.7	16.7	40.0	26.7
Age (years)				
18–30	26.7	43.3	50.0	83.3
31–48	48.9	53.4	40.0	16.7
49–58	15.0	3.3	10.0	0.0
>59	9.4	0.0	0.0	0.0
Level of education				
Non – formal	3.3	0.0	0.0	0.0
Primary	50.0	46.7	63.3	16.7
Secondary	41.1	53.3	30.0	36.6
Post-secondary	5.6	0.0	6.7	46.7
Household size				
2–5	33.9	40.0	50.0	66.7
6–10	58.3	56.7	43.3	33.3
>10	7.8	3.3	6.7	0.0
Farm size (acres)				
1–5	51.1	53.3	63.3	66.7
6–10	35.6	36.7	26.7	33.3
>10	13.3	10.0	10.0	0.0
Experience (years)				
1–5	31.7	53.3	63.3	73.3
6–10	22.8	36.7	33.3	20
>10	45.6	10.0	3.3	6.7
Number of local chickens produced per year				
1–10	1.7	36.7	43.3	43.3
11–20	3.3	26.7	36.7	46.7
21–30	9.4	10.0	6.7	10.0
>30	85.6	26.7	13.3	0.0
Number of local chickens sold per year				
1–10	58.9	0.0	0.0	–
11–20	22.8	0.0	0.0	–
21–30	6.7	0.0	0.0	–
>30	11.7	100	100	–
Marital status				
Married	85	83.3	83.3	63.3
Single	5.0	16.7	6.7	36.7
Widowed	10.0	0.0	10.0	0.0
Major occupation				
Farming	77.0	0.0	0.0	30.0
Trading	23.0	100	100	36.7
Civil service	0.0	0.0	0.0	33.3
Group membership	65.8	86.7	76.7	80.0
Access to information	54.3	69.5	86.7	90.3

Source: Field survey, 2017

people. In addition, a bigger percentage of farmers (58%), traders (53%), processors (63%) and input dealers (60%) had farm sizes ranging from 1−5 acres. With respect to experiences that the local chicken value chain actors gained in production and/or marketing, the majority of the traders (53%), processors (63%) and input dealers (73) were in the range of 1−5 years while farmers (46%) had over 10 years of experience.

Average number of local chickens kept and sold in one year in Omoro and Oyam was 83 and 18 birds, respectively for farmers. Traders sold 1,296 birds and 918 birds were sold by processors per year. Results also revealed that 54%, 70%, 87% and 90% of farmers, traders, processors and input dealers respectively had access to information regarding local chicken production. With respect to marital status, 85%, 83%, 83% and 63% of farmers, traders, processors and input dealers respectively were married. The majority of farmers, traders, processors and input dealers were involved in groups (66%, 84%, 77% and 81%, respectively) as well as farming and trading.

Analysis of value added at the different local chicken value chain segments

Value added at different segments of the local chicken value chain was analyzed. The segments included farm gate, local markets, retail, stews in restaurants and barbeques. Value was added as local chickens passed at every segment of the value chain by direct actors who included farmers, traders and processors (Table 3). Value was added in various ways, including change of form, time and place of sale of local chickens and the products. This was done through transportation to the market and processing into stew and barbeques. There were also unquantifiable risks associated with value added that required payment, such as risks associated with transporting local chickens to markets or for processing. After production, farmers mainly sold local chickens at farm gate or at the nearby local markets. At farm gate, the average gross margin or value added by farmers was UGX 159,691. At market sales, the mean gross margin of UGX 259,451 was obtained by farmers. At retail sales of local chicken, the mean gross margin of UGX 1,415,351 was obtained and UGX 961,682 and 1,911,274 were gained by processors selling stew in restaurants and barbeques, respectively (Table 3).

Level of gender participation in the local chicken value chain

Analysis of the level of gender participation in the local chicken value chain is important in determining the degree of involvement of men and women in various activities of the local chicken value chain. The activities have been grouped into input supply, production, marketing and processing. Input supply mainly included supply of feeds, stock, vaccines, building materials and equipment. Men (48%) and women (52%) participated almost equally in the supply of feeds for local chickens while 82% of males and 18% of females reported participation in supply of breeding stock (Table 4). Most men were involved in supply of vaccines (94%) compared to women (6%) while building materials for local chicken house were mainly supplied by males (95%) with women participating minimally at only 5%. Men also dominated the supply of equipment for local chicken production (81%) while women participated at only 19%.

Production as an activity in the local chicken value chain mainly included house construction, cleaning, feeding and watering, and vaccination. Mostly men participated in the construction of local chicken houses (95%) compared to women (5%) with a highly significant (p-value = 0.000) difference. Mainly women (89%) participated in cleaning local chicken houses and equipment while only 11% of men participated with a highly significant (p-value = 0.000) difference. Mostly women participated in feeding and supply of water to local chickens (90%) compared to men (10%) with a highly significant (p-value = 0.000) difference. The majority of men (93%) participated in vaccination compared to women (7%) with a highly significant (p-value = 0.000) difference.

Farmers mainly sold local chickens at farm gate and in local markets within the Omoro and Oyam districts. Both men (57%) and women (43%) participated in the sale of local chickens at farm gate, though men participated slightly more than women. The small difference between men and women in farm gate sales of local chicken was moderately significant (p-value = 0.023). The majority of men (86%) participated in selling local chickens in local

Table 3: Average value added at the different local chicken value chain segments per year.

Segments	Total revenue	Total variable cost	Gross margin/ value added
Farm gate	266,482	106,791	159,691
Local market	376,482	117,031	259,451
Retail	1,939,733	524,382	1,415,351
Stews in restaurants	2,260,227	1,298,545	961,682
Barbeques	3,718,642	1,807,368	1,911,274

Source: Field survey, 2017

Table 4: Level of gender participation in the local chicken value chain

Activity	Level of gender participation (%)		Chi square	*P* value
	Females	Males		
Input supply				
Feed supply	51.7	48.3	2.7	0.8
Stock supply	18.4	81.6	143.1	0.0
Vaccine supply	6.1	93.9	281.1	0.0
Supply of building materials	4.5	95.5	300.3	0.0
Equipment supply	18.9	81.1	142.7	0.0
Production				
House construction	3.9	96.1	307.4	0.0
Cleaning	88.9	11.1	225.4	0.0
Feeding and watering	90.5	9.5	231.5	0.0
Vaccinating	7.2	92.8	263.9	0.0
Marketing				
Farm gate sales	43.3	56.7	13.05	0.0
Market sales	13.9	86.1	205.4	0.0
Processing				
Barbequing	1.7	98.3	341.2	0.0
Stewing	95.0	5.0	295.5	0.0

Source: Field survey, 2017.

markets compared to women (14%) with a highly significant (*p*-value = 0.000) difference.

Processing mainly involved barbequing and stewing in the Omoro and Oyam districts. Mostly men participated in barbequing (98%) compared to women (2%) with a highly significant (*p*-value = 0.000) difference between men and women. Mainly women participated in stewing local chickens in restaurants at 95% while men participated at 5%. The difference between men and women in respect to stewing of local chickens was highly significant (*p*-value = 0.000).

Determinants of gender participation in the local chicken value chain

The logit regression model was used to find out the determinants of gender participation in the local chicken value chain. In terms of model goodness of fit, the log likelihood was 132.18 and was large enough, meaning that there is a high likelihood that the observed coefficients represent the population parameters. The psuedo R^2 was equal to 0.21, meaning that this model explained 20% of the variations in gender participation. The overall chi (χ^2) was significant at ($p = 0.00$), showing that overall this model with these explanatory variables is better than the alternative model with no predictors. In addition, $y = pr = 0.73$, meaning that the probability of men's participation was 0.73 and that of women was 0.26. Age, education level, sex, marital status and income control by the household head were positively and significantly related to gender participation, while experience of the household head was negatively related to gender participation in the local chicken value chain (Table 5).

Gender and access to income from local chickens

Access to income is one of the key attributes that influenced gender participation in the local chicken value chain. Analysis of gender and access to income was done to find out whether both male and female value chain actors were benefiting from the labour and efforts they invested to generate income in the local chicken

Table 5: Determinants of gender participation in the local chicken value chain.

Variables	Coef.	Std. Err.	Dy/dx
Age	0.03*	0.02	0.01*
Level of education	0.14***	0.05	0.03***
Household size	−0.07	0.06	−0.01
Farm size	0.02	0.03	0.00
Sex of household head	1.99***	0.72	0.45***
Access to information	0.04	0.36	0.01
Access to credit	−0.21	0.41	−0.04
Control of income	1.82***	0.69	0.42***
Marital status	0.96*	0.47	0.21*
Market proximity	−0.03	0.06	−0.01
Experience in farming chickens	−0.03*	0.02	−0.01*
Group membership	−0.11	0.37	−0.02
cons	−5.36	1.37	***

Notes: Logistic regression, Number of obs = 270, LR chi^2 (13) = 67.19Prob > chi^2 = 0.0000, Log likelihood = -132.18, Pseudo R^2 = 0.21y = Pr (Sex = Male) = 0.73, (*) dy/dx is for discrete change of dummy variable from 0 to 1.
Source: Field survey, 2017

value chain. Male (87%) farmers had more access to income than females (13%) with a highly significant difference between the two. With regards to traders, processors and input suppliers, both men and women almost equally accessed income from local chicken production (Table 6).

Gender and control of income from local chickens

This study compared how income generated from the local chicken value chain was being controlled by both men and women actors. Control of income from local chicken production varied and depended on gender and power relations in a households, the latter allowing one to easily make decisions regarding local chicken production and marketing (Table 7). There was a strong positive correlation (0.82) between gender and control of income generated from local chicken production by farmers. This implied that gender had an influence on the control of income from local chicken production.

Discussion

The high number of males in rearing local chickens could be associated with ownership of assets in the study area where men own the majority of household assets, including local chickens. This implies that men owned and made major decisions regarding local chickens like selling, consumption, and how to use the income, among others. This finding is in line with FOWADE (2012) who reported that mostly men owned and made decisions to sell local chickens. However, our finding contradicts the results of Abubakar, Ambali, and Tamjdo (2007) who asserted that women control over 50% of local chickens reared under free range systems. In addition, Ochieng, Owuorb, and Omedo (2013) in their work in Kenya also found that the majority of the local chicken farmers were females, accounting for up to 74% of the total.

Our findings also highlight that fewer women were involved in trading local chickens and this we attributed to the fact that women's mobility is restricted by their traditional norms, which limits their ability to participate in local chicken marketing. Sometimes they are not even allowed to interact freely with their male counterparts. This result is in line with the findings of KIT, Agri Profocus and IIRR (2012) in northern Kenya which reported that women were not allowed to travel far from home, thus limiting their ability to take their products to the market. In addition, Issa et al. (2015) also stated that women were rarely involved in the trading of local chickens. However, the findings of Gueye (2003) contradict this

Table 6: Level of gender access to income from the local chicken value chain.

Actors	%		X^2	Significance
	Male	Female		
Farmers	87.3	12.7	76.3	0.00
Traders	52.0	48.0	4.1	0.86
Processors	55.0	45.0	4.9	0.94
Input dealers	51.7	48.3	3.4	0.89

Source: Field survey, 2017

Table 7: Relationship between gender and control of incomes from local chickens marketing.

Actors	Correlation coefficient	X^2	Significance
Farmers	0.82	68.40	0.000
Traders	0.42	5.17	0.020
Processors	0.34	2.96	0.813
Input dealers	0.22	13.14	0.001

Source: Field survey, 2017
Post estimation tests

```
. vif

    Variable |      VIF     1/VIF
-------------+----------------------
      Farmer |     3.26    0.307133
   Processor |     2.14    0.466268
      Trader |     2.02    0.494567
     RespAge |     1.85    0.540228
 ExpLoChicken|     1.70    0.587592
  RespMarital|     1.62    0.618478
 RespHheadSex|     1.59    0.629432
    RespEduc |     1.41    0.709825
 CreditAccess|     1.36    0.734444
   RespHHsize|     1.34    0.744910
  GpMembershp|     1.23    0.810470
  InfoAccess |     1.23    0.813516
 IncomeCont~l|     1.20    0.833820
        Dist |     1.17    0.858168
 RespFarmSize|     1.11    0.900115
 MktProximity|     1.09    0.913859
-------------+----------------------
    Mean VIF |     1.58

. vce

Covariance matrix of coefficients of regress model

       e(V) |    RespAge     RespEduc   RespHHsize   RespFarm~e   RespHhea~x   InfoAccess   CreditAc~s   IncomeCo~l   RespMari~l   MktProxi~y
------------+----------------------------------------------------------------------------------------------------------------------------
    RespAge |   .00001132
   RespEduc |    .0000103    .00007623
 RespHHsize |  -9.716e-06  -7.834e-06    .00018441
 RespFarmSize| -1.030e-06  -3.315e-06  -8.378e-06    .00001827
RespHheadSex |   .00001817    .00011986    .00008053  -.00004583    .02003187
 InfoAccess |  -.00001685  -.00012997    .00004286  -9.988e-06  -.00115123    .00583328
CreditAccess |   .00001411      .000065  -.00015632    .00001795    .00159851  -.00102509    .00706485
 IncomeCont~l|  -.00003045  -.00022981  -4.836e-06    -.0000381    -.0024155  -.00022534    -.0031238    .0236052
 RespMarital |   .00003976  -.00004825  -.00013122  -.00001405  -.00861905    .00039736  -.00035265  -.00032547    .01213709
MktProximity |   7.849e-07  -2.778e-06   4.901e-06   4.174e-06    8.255e-06    .00001576    -.0000814    .00003475    -.0001407    .00017076
 ExpLoChicken|  -6.432e-06  -1.102e-06  -8.917e-06   2.497e-07    -6.000e-06  -1.445e-06     .0000237  -.00005726  -.00002715  -2.238e-06
 GpMembershp |  -.00001178  -.00005816    .00008106    .00002272    .00013972  -.00052476  -.00208719  -.00011749  -.00080931  -.00005905
     Farmer |  -.00001511    .00020253  -.00022427  -.00001986    .00378746    .00090547    .00195674    .00078109    -.0035129   -.0002021
     Trader |   6.572e-06    .00027934  -.00018744  -.00003026    .00147288    .00023611    .00176792  -.00045834  -.00199273   -.0003221
  Processor |   .00001159     .0003545   -.0002895  -2.702e-06    .00378207  -.00098896    .00259664  -.00180433  -.00312255   -.0002915
   o.Input  |           0           0           0           0           0           0           0           0           0           0
       Dist |  -7.452e-06  -.00010138    .00014438    .00004065  -.00067899    .00085851  -.00019325    .00111993  -.00059184    .00013889
      _cons |  -.00036753   -.0008752  -.00041297    .00004527  -.01384639  -.00113291  -.00297576  -.01424401    .00238155  -.00011734

                                                            o.
       e(V) |  ExpLoChi~n  GpMember~p     Farmer       Trader    Processor     Input        Dist        _cons
------------+--------------------------------------------------------------------------------------------------
 ExpLoChicken|    .0000183
 GpMembershp |  -.00002993    .00659023
     Farmer |  -.00006853    .00027719    .01607652
     Trader |   .00002116  -.00094993    .01262025    .02246341
  Processor |   .00004985  -.00039811     .0130926    .01287911    .02382675
   o.Input  |           0           0           0           0           0           0
       Dist |  -4.610e-06    .00031688    .00022302  -.00058639  -.00037762           0    .00511438
      _cons |   .00023584  -.00172771  -.01554411  -.01279249  -.01419418           0  -.00349317    .06527538

. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
        Ho: Constant variance
        Variables: fitted values of Sex

        chi2(1)      =     22.40
        Prob > chi2  =    0.0000
```

finding by reporting that 74% of the women in Botswana were involved in trading of local chickens. On the other hand, the greater number of men involved in local chicken processing could be due to the fact that processing was mainly a street vending business, especially chicken barbeques, and therefore favoured mostly men. However, the findings of Njaya (2014) in Zimbabwe are in contention with our results as that study reported that women constituted the largest percentage of street vendors.

The population of local chicken value chain actors consisted of people who were young, energetic and capable of providing the labour force required for local chicken production and marketing. This was also in line with the average age obtained in the UBOS (2016) survey, which showed that majority of the working population in Uganda are in the age bracket of 20 to 59 years. In addition, younger people were also known to be very flexible and could easily adopt a new technology to improve the productivity of local chickens. Enete and Igbokwe (2009) also reported similar findings.

Farmers and processors were the least educated among the local chicken value chain actors while input dealers were the most educated. Overall, a large percentage of the actors had completed their basic primary education. This finding agrees with UBOS (2016) which reported that the majority of the population in northern Uganda had completed primary education (seven years). Comparable studies such as Kyarisiima, Kugonza, and Twesigye (2004) also reported the same level of education for local chicken farmers. The level of education reported for farmers and processors was quite low and could be associated with the slow development of local chicken production and trade in Omoro and Oyam. This is because education is identified as one of the vital attributes in the growth and development of any enterprise (Mandal, Khandekar, and Khandekar 2006). Randella, Alemu, and Groenewald (2008) also reported that education provided a better understanding of marketing of products from any agricultural enterprise including local chickens. Education may also be a gateway to white-collar jobs and thus limit participation in the local chicken value chain (Kumar et al. 2013). However, the high level of education attained by input dealers may be due to the fact that input dealership is a knowledge intensive business and showed great potential for improvement of local chicken production and marketing in the Omoro and Oyam districts.

The household sizes for farmers and traders were higher than the national average number reported to be five persons per household (UBOS 2016) while the household size of traders of six people per household corresponded with the findings obtained by Kyazze et al. (2010). The large household sizes reported are a proxy for cheap labour availability provided for local chicken production and marketing and thus a higher marketable surplus. Similarly, Perssin (2009) and Osmani and Hossain (2015) in Bangladesh found that household sizes positively correlated with marketable surplus.

Given the nature of land tenure systems characterized by communal land ownership and land use practices where land is subdivided into smaller plots, this may not be sufficient for full-scale commercial local chicken production. Large farm sizes are associated with high number of local chickens produced. Gobena (2012) indicated that large farm sizes were associated with higher output. Abu, Osei-Asare, and Wayo (2014) also added that large farm sizes led to the enjoyment of economies of scale. However, this finding is in contention with Omiti and Maccullough (2009) who reported that the majority of households with large farm sizes participated less in commercial agricultural enterprises because they rented out their land and survived on rental incomes.

The farmers' level of experience correlated with the number of local chickens kept and sold in the Omoro and Oyam districts. This is because the higher the farmers' experience, the higher their skills and knowledge that could increase local chicken production and marketing. Our findings are in line with Masuku and Dlamini (2012) who reported that a positive correlation exits between experience and an increase in output. Bellamate and Barette (2006) further asserted that experience was a known prerequisite to improve the ability to handle a business. However, a greater percentage of traders, processors and input dealers had less experience in businesses compared to their farmer counterparts.

The overall mean for the number of local chickens sold per year by each farmer was lower than the average number of 1,242 chickens per household per year reported by Tobias et al. (2011). Kyazze et al. (2010) also reported an average of 6,480 birds per trader per year in Kampala, which is much higher than the average reported in this study. This finding revealed that this sector was not fully developed, especially in northern Uganda. The majority of actors had limited access to information regarding local chickens. Limited access to information constrains decision-making at all levels, including market participation (Sigei, Bett, and Kibet 2014). The fact that farmers sold their chickens cheaply to intermediaries could be because they had limited information about the market and prices in particular (KIT et al. 2012).

Most of the local chicken value chain actors were involved in groups, implying that they were in a favourable position to bargain for higher quality inputs at lower prices and higher remunerative output prices. Groups also enable smallholders to leverage the group networks to access services like extension and credit, among others. This finding is in agreement with Ochieng, Owuorb, and Omedo (2013) in Kenya who found that majority (over 75%) of the household heads were involved in groups.

The gross margins obtained by farmers who sold their local chicken at farm gate were low, which can be attributed to the fact that farmers do not invest in the production and marketing of local chickens. Local chickens were mainly kept under free range system with limited use of purchased inputs. This result is in line with the findings of Kyazze et al. (2010) and Muchadeyi et al. (2005) who reported that the cost of producing local chickens was low since they mainly scavenged around the household, feeding on kitchen refuse, house scraps and vegetables. Most of the farmers also sold their chickens at farm gate and farm gate prices were always low,

contributing to low revenues. Contemporary studies elsewhere affirm that the majority of farmers sold their chickens at farm gate prices (Heise, Crisan, and Theuvsen 2015). The implication is that farmers should be organized into groups so that they can have a common voice to bargain for higher prices at farm gate.

Farmers who sold local chickens in local markets added value by meeting transport costs and market levies. As a result, they obtained more revenue compared to farm gate sales. This implied that farmers would get additional income by selling at the market. However, market sale revenues were still low, probably because the farmers needed the cash and sold the local chickens at whatever best price they could get. This finding is corroborated by Kyazze et al. (2010) who found that based on traditional practices, farmers sold local chickens to intermediaries when they needed money.

Higher gross margins were obtained by traders at market sales and this is attributed to the fact that farmers sold their chickens cheaply to the traders who would then sell them expensively in urban markets. Studies by Mapiye et al. (2008) and Kyazze et al. (2010) indicated that most farmers sold their local chickens to intermediaries who bought them for onward transmission to urban markets where returns are higher. Our study highlighted that farmers gained an additional UGX1,255,660 by participating at this segment of the local chicken value chain. Farmers should be encouraged to work together in groups so as to enhance their bargaining power for higher prices for their local chickens.

Participation at processing level gave much higher gross margins compared to other segments of the local chicken value chains. Barbequing gave the highest gross margin and this meant that farmers would gain the most by participating at this segment of the value chain. Bun and Brewster (2015) also reported that processors received the highest gross margin compared to other actors in the local chicken value chain while farmers received the least, thus supporting this finding. Overall, the higher the participation at higher levels of the local chicken value chain, the more the value added and thus the more the income in the Omoro and Oyam districts. Therefore, engaging in more than one segment would yield increased income. Thus, efforts should be made to encourage farmers to participate at higher nodes of the value chain like processing of local chickens.

Participation of men and women in the value chain plays a significant role in the sustainability of the local chicken enterprise. It was evident that men dominated activities related to input supply since they controlled finances and other resources required for local chicken production. Mostly men participated in the construction of local chicken houses because, traditionally, house construction is the role of men and therefore most women are not involved (Farnworth 2011; Gelila, Meseret, and Teddy 2016). Mostly women participated in cleaning local chicken houses, feeding and supply of water to local chickens. This is attributed to the fact that the majority of rural women spent most of their time at their homesteads, making them suitable for these activities and as is expected of them in terms of their traditional gender roles. This was supported by Mapiye and Sibanda (2005), who suggested that women dominated most of the activities around village chicken production, particularly feeding, watering and cleaning.

The participation of more men than women in vaccination administration could be related to the technical skills and knowledge that the majority of women do not have in terms of vaccination of local chickens. This is in line with USAID (2015) which reported that women, especially in rural areas, have attained low levels of education and therefore have limited knowledge and skills. Mapiye et al. (2008) suggested that in addition to shelter construction, men also dominated the treatment and vaccination of birds. Consequently, women should be trained in the aspects of vaccination and administration of drugs to increase their participation in chicken production.

Mainly men carried out marketing of local chickens, both at farm gate and the market. This could be attributed to the fact that the majority of males owned the household assets, including local chickens, and therefore made decisions regarding their sales. FOWADE (2012) reported that women have little authority over marketing, saless, income, and spending of income from local chickens, confirming this finding. This was also affirmed by findings obtained by Okitoi, Ondway, Obali and Murekefu (2007) in Kenya who suggested that women participated in most of the production activities of local chickens while men participated mostly in the sale of local chickens. However, findings by Gelila, Meseret, and Teddy (2016) reported that women participated in marketing at 45% and Farnworth (2011) also indicated that mostly women were involved in farm gate sales of local chickens. Overall, women participated more in farm gate sales of local chicken while men participated more in distant market-based sales (FAO 2008).

Mostly men participated in barbequing due to the fact that it involved a lot of mobility and street vending which might not be very favourable for women. This is because culturally, women's mobility is restricted. Findings by World Health Organization (WHO) (2006) and Njaya (2014) in Zimbabwe contradicted this report by indicating that women formed the largest proportion of street vendors. The high participation of women in stewing local chickens in restaurants could be attributed to the fact that culturally, cooking is known as a woman's role and therefore very few men take part in it.

The positive significant ($p < 0.1$) correlation between the age of household heads and gender participation in the local chicken value chain showed that as the age of household head increased, the probability of men's participation also increased. This further implied that a 1% increase in age increased the probability of men's participation by 1%, provided other factors are kept constant. This could be attributed to women's double roles of production and reproduction in a household that constrains their time to participate specifically in the local chicken value chain. This finding is in agreement with a study carried out by Combaz (2013) in Uganda that indicated how reproductive roles of women limited their participation in development activities.

The level of education of household heads had a positive significant relationship with gender participation in the local chicken value chain. Our results indicate that the higher the level of education, the higher the probability of men's participation in the local chicken value chain. This was because education is known to contribute significantly to the profitability of the chicken business because of the skills and the knowledge it provides. This is in line with Esiobu, Onubougu, and Okoli (2014) who reported that education attainment increased the level of information access for the actors in the chain which, in turn, led to higher participation and profitability. However, the high level of education was associated with the participation of men in the local chicken value chain. This is attributed to the fact that women's opportunity to access education is limited compared to their male counterparts. The literacy rate for females (68%) was lower than that of males (77%) (UBOS 2016). Overall, this limited the participation of women in the local chicken value chain and therefore efforts should put in place to increase the level of education of women by training local people to change their perception on girl-child education.

Being a male household head also significantly ($p = 0.01$) increased the probability of one's participation in the local chicken value chain. The probability of participation in the local chicken value chain also increases by 45% for male headed households, keeping other factors constant. This may be attributed to the fact that male household heads have control of and access over assets in a household that may be necessary for local chicken production and marketing. Combaz (2013) in Uganda revealed that the household heads were mainly men who owned almost all the household assets, giving them a privileged position compared to the women. Thus, this limited their participation in investment activities, including local chicken enterprises. However, Mapiye et al. (2008) in Zimbabwe posited results in contention with ours in that in their study 90% of the households were keeping local chickens that belonged to women and all the decisions regarding this enterprise were entirely up to them.

Marital status of household heads had a significant ($p = 0.01$) relationship with gender participation in the local chicken value chain. This meant that the probability of participation in the local chicken value chain increased with one's marital status. This is because in most rural households men are the household heads and therefore make major decisions regarding the household. FAO (2010) argued that the time women spent on productive activities negatively influenced family health, nutrition and child care due to the increased incidence of child labour where children drop out of school to take over domestic chores.

Level of experience of household heads in local chicken production and trade had a significant ($p = 0.01$) negative relationship with gender participation in the local chicken value chain. This meant that the more experienced the household head, the lower was the participation of men in the local chicken value chain and this thus implied increased participation of women.

Level of control of income from chicken sales also had a significant ($p = 0.01$) positive relationship with the participation of men in the local chicken value chain. The level of control of income increases the probability of men's participation in the local chicken value chain. Household income is a source of funds to pre-finance production and marketing activities. Most men, being household heads, have control over almost every form of income in their households, irrespective of whether the woman worked for it or they worked for it together. This is in line with Agri Pro-focus (2015), which suggested that women worked extremely hard but did not share equal benefits with men. In a comparable study by Combaz (2013), it further reported that women had limited authority over marketing, income and spending in a household. In addition, Rahman (2007) reported that the disparities in the ownership of and access to capital as an asset had a great effect on gender participation in the local chicken value chain. Therefore, having limited control over income restricted women's participation in the local chicken value chain.

In addition to having more control over incomes, male farmers also had more access to incomes. This could be due to the fact that majority of males were household heads who had the power to make major decisions in almost every household in the study area. Amartey et al. (2013) asserted that in most cases, the division of income coming into a household was not very dependent on how much each gender brought into the household but on their relative power. A study by Kunihira (2014) in southwestern Uganda also suggested that women have limited access to income or benefits from agriculture as a whole. Overcoming this disparity in access to income requires training and empowerment of both men and women to proportionately utilize incomes from local chickens. The equitable access by other actors in the local value chains has been supported by Ngeno et al. (2011) in Kenya.

In addition, although women are the custodians of money in most households, they do not spend it because they do not have control over income, since the men usually take and spend it without consulting them (Farnworth 2011). In general, mainly men make decisions on the control of benefits from local chicken production, while specifically in male-headed households women had the least control over income from local chicken production while men made most of the decisions regarding benefits obtained from the local chicken value chains. However, with regards to traders, processors and input suppliers, there was a weak and positive correlation between gender and control of income from the local chicken value chain, meaning that both men and women equally controlled incomes from local chicken production.

Conclusion

The majority of the value chain actors were young and energetic enough to provide labour in the local chicken value chain. Most of the actors had attained basic primary education with input dealers being more highly educated than the rest of the actors. Processors obtained the highest gross margin compared to the rest of the value chain actors, whereas farmers got the lowest gross margin. This shows that participation in the higher

segments of the local chicken value chain attracts more value-addition opportunities. Farmers therefore received the lowest gross margins because they participated at the lowest segments of the local chicken value chains. Gender participation in the local chicken value chain varied, depending on the activities involved which were gendered in line with the traditional roles of men and women. Men handled the technical and marketing roles while women took on the feminine roles of cleaning, feeding and cooking. The major determinants of gender participation in the local chicken value chain were age, education level, sex of the household head, occupation, marital status, experience, and control of income by household heads. Male farmers had more access to and control over incomes from local chicken production than women. Very few women, especially women household heads, had control over income from local chicken production. Male farmers therefore mainly decided on how income gained from local chicken production should be used in a household.

The findings of this study could make a significant contribution to the efforts of policymakers and development agents in designing policies and interventions to expedite equal participation of men and women in chicken production and thus in sharing of benefits from the local chicken value chain. Since the majority of the actors were young, strategies such as the national youth programme should focus on the local chicken value chain to help increase youth employment in the country. Adult and literacy programmes should be extended to improve the education levels of the actors for increased participation in the local chicken value chain. Programmes such as operation wealth creation should emphasize providing value-addition support services for farmers, especially women, to escalate their engagement in the higher segments of the value chain. There is also a need for holistic interventions such as group formation programmes, effective service provision and affirmative action to transform the behaviour and traditional norms that influence the roles of men and women in the local chicken value chain so as to enhance their participation. Therefore, in order to generate more interventions that will facilitate equal participation of men and women in the value chains, there is a need for gender-responsive research on other types of poultry and other value chains.

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