

Contribution of village chickens to the resource-poor households

by

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Declaration

I, **Mlungisi Petros Gwala**, declare that this dissertation has not been submitted to any other University other than the University of KwaZulu-Natal and comprised of my own original work conducted under the supervision of Prof. M. Chimonyo and Prof. I. V. Nsahlai. All the work of others and assistance to accomplish this work have been duly acknowledged.

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Abstract

Village chickens are reared by almost every rural household in low-income, food-deficit regions of the world, but their contribution to food security at both, household and national levels is not well understood. The study was conducted to determine distributions patterns of village chicken meat within resource-poor households. A total of 242 households participated in the survey. There was a strong association between village chicken and other livestock ownership ($P < 0.001$), large chicken flock owners reared other livestock species. Village chickens were kept mainly for home consumption. Adult members of the households ate more village chicken meat than broiler meat as compared to the youth ($P < 0.05$). Village chickens were mainly slaughtered during periods of transitory food shortages. Logistic regression identified gender of the head of household, income, religion and gender of the decision-maker as significant determinants to influence the consumption of preferred of village chicken meat cuts by adult males and females ($P < 0.05$). Children consumed less preferred portions (heads, necks and feet). Income received in the household, flock size and ownership of other livestock were significant determinants of households attaining adequate food throughout the year. It was important to assess factors that limit the consumption of village chicken meat to children.

There was a relationship between number of children and consumption of intestines in the households ($\chi^2 = 9.05$; $P < 0.05$). Increasing number of children in the households increased chances of consuming intestines. Gender of the head of household, household size and age restriction practice were significant predictors for an adult male to preferred meat cuts ($P < 0.05$). Village chicken flock size and season were significant predictors for an adult female to consume neck and thighs. Household size was a major predictor for head and liver consumption

by male children ($P < 0.05$). Household size was a significant predictor for a female child to consume meat from the head, feet and wing ($P < 0.05$). The number of village chickens slaughtered varied with seasons. As the household size increased, children, especially female children were likely to suffer from nutritional insecurity. Households did not fully utilise village chickens to optimise household protein intake among household members. Village chicken contribution to resource-poor households is not yet optimised to alleviate poverty in resource-poor households. The factors that affect meat consumption by household members should be considered for future programmes aimed to improve the contribution of village chickens.

Keywords: Children; Consumption patterns; Food adequacy; Less-preferred meat portions; Nutritional insecurity; Preferred meat portions; Protein consumption; Resource-limited farmers.

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To the National Department of Agriculture, Forestry and Fisheries this research would not have been a success without your financial support, I convey many thanks.

Dedication

I lift my hands to the Almighty for providing courage and strength to embark on this journey. To my daughter Sethulo Sibusisiwe Sizokwanda Gwala, for her future, I am willing to continue with the journey no matter the adversities. To my late grandmother and aunt, Ngoneni Bettina Gwala and Zodwa Gremma Gwala, respectively, I dedicate the fruits of my academic work.

UJehova uyakuyala isibusiso sibe phezu kwakho, ezinqolobaneni zakho nakukho konke obeka isandla sakho phezu kwakho. Akubusise ezweni uJehova uNkulunkulu wakho akunika lona (uDuteronomi 28: 8).

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Chapter 1: General Introduction

Village chickens are widely distributed across resource-poor households of Africa. These birds are reared by almost every rural household that is surviving below poverty line (Gueye, 2002). Thus poverty and hunger continue to adversely affect communal regions due to inefficient use of village chickens. So far, programmes focusing on village chickens to alleviate poverty and hunger and create wealth have received little attention, yet they play vital roles in rural livelihoods (Gueye, 2000). Wide distribution of village chickens highlights opportunities of these birds in hunger reduction. The contribution of village chickens to rural households depends upon reasons of rearing that can be demographical, socio-economic and cultural.

Village chickens require limited amounts of inputs such as land, feed, vaccination, housing and time. These birds are able to survive under poor management but are still able to produce meat and eggs that are used by farmers for various purposes such as income generation, basis of bartering, source of manure and consumption. Village chicken products have also obtained preference to many people mainly for better taste, freshness, colour of the carcass and yolk (Mtileni *et al.*, 2009). In Kenya, Tanzania and Ethiopia, rich households that do not own village chickens buy village chicken meat through food retail centres at premium price (Aklilu *et al.*, 2007). This indicates that resource-poor households should exploit advantages of rearing these chickens as they have short generation intervals for rapid increase of flock sizes, thus improvements can be realized in a short run.

Village chickens can be utilised to reduce and circumvent hunger. Mtileni *et al.* (2009) reported that over 50 % of households in Venda owned of village chickens and 10 % of the population obtained their living directly from these birds. This means that households are not effectively using these birds to improve food security status. On various occasions where village chickens are used they are ultimately consumed and shared among many people. Those occasions include weddings, preparation for guests, religious and cultural events and incentive for children when they have passed school grades, paydays and many other occasions. Therefore village chickens play an important role in the supply of protein to resource-poor households.

In spite of the large population of village chickens in rural areas their productivity is low (Bett *et al.*, 2013) due to high mortality rate especially to chicks. Many losses result from high prevalence of diseases such as Newcastle disease and fowl pox, however, losses are also due to low level of immunity in chicks. Diseases are mainly vectored by, for example, mixing of different livestock, free ranging behaviour that results in mixing of birds, lack of veterinary programmes and many others. Predation is another challenge that results in loss of stock ranging from eggs consumed by snakes to chicks that are preyed by hawks. Furthermore shortage of available feed resources results in these birds failing to perform to their genetic potential (Mtileni *et al.*, 2009). So far, there have been little institutionalised efforts to improve productivity these chickens such as capacity building to improve management skills, marketing and production of organic meat from village chickens as these can benefit rural communities.

Primarily, the purpose of rearing village chickens is consumption. Meat consumption patterns have, however, not been documented. Meat sharing patterns vary from one household to another and across events. Consumption patterns are highly influenced by culture, purpose of slaughtering and household size. Therefore, the value given to different meat portions varies across cultures and differs from ordinary consumption which is mainly for food. Generally, meat consumption is also affected by age and gender, resulting in head of the household having priority over the most nutritious portions of the meat such as drumstick, thigh and wings, while the remainder is shared among other members. This could lead to nutritional imbalances among household members especially children as they are highly vulnerable to malnutrition. Thus, contribution of village chickens to rural households to achieve zero hunger is not understood due to limited information that can be quantified.

1.1. Justification

Communal farmers primarily rear village chickens for consumption as they are easily accessible to them. Determining farmer perceptions on the contribution by village chicken will help to understand reasons for rearing, uses of and opportunities for village chickens to reduce hunger and poverty in rural regions. The meat consumption across households and sharing patterns within households has not been accorded the priority they deserve. It is often assumed that when a chicken is slaughtered, all household members benefit equitably. That assumption could be far from the truth. Furthermore, consumer perceptions are shifting to organic food production and this maximises the potential of utilising village chickens due to little/or no conventional inputs used in their production such as improved feeds, growth stimulators and many others. Once meat

consumption and household food and nutrition security is achieved, the focus can be put to income generation through trading of village chicken meat.

The work is expected to benefit rural households, civil organisations, government and research institutions. Rural households will benefit by developing of strategies that increase flock size thorough reduced chick mortality and predation of eggs and chickens. Ultimately, meat consumption patterns will thus be determined and non-food opportunities from these chickens may also be realized such as income generation and barter-trading. Policy makers will realize implementation of interventions that emphasize promotion of the use of village chicken to reduce poverty, conducting awareness programmes that highlight importance of village chickens in human nutrition. Also policies that favour organic food production might support village chicken meat consumption for positive human health implications. Civil organizations that work closely with rural communities provide programmes and support of initiatives that promote rearing of village chickens, which will be achieved through capacity building to the resource-poor households. They can ensure that households are informed about nutritional adequacy of meat and eggs to all household members, thereby reducing malnutrition among the vulnerable members of resource-limited households, particularly children.

1.2. Objectives

The broad objective of the study was to determine the nutritional contribution of village chickens to resource-poor households. The specific objectives of the study were to:

1. Determine farmer perceptions on the contribution of village chickens to rural households; and
2. Determine factors affecting village chicken meat consumption patterns among resource-poor household members.

1.3. Hypotheses

The hypotheses tested were that:

1. Chicken flock size, the gender of the head of household, socio-economic status and household size influence the extent to which village chickens influence household food security.
2. The preferred portions are consumed by all members of the household.

1.4. References

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Chapter 2: Review of Literature

2.1. Introduction

Village chickens, *Gallus domesticus* are referred to as backyard, traditional, rural, local, scavenging or indigenous chickens (Kingori *et al.*, 2003; Kyarisiima *et al.*, 2004; Dana *et al.*, 2010a; Kingori *et al.*, 2010a). These birds are commonly reared in communal production systems. They form an essential component to livelihoods of resource-poor households (Muchadeyi *et al.*, 2005). The review discusses the characteristics, challenges, roles and functions of village chickens, their contribution to food security and consumption patterns of village chickens.

2.2 Characteristics of village chickens

Village chickens are distinguished from exotic breeds by appearance and productivity characteristics. These chickens show a variety of plumage colours within the same flock and varying body sizes. Plumage colour is associated with socio-cultural uses of village chickens. Village chickens have not been clearly classified to specific breed(s) (McAnish *et al.*, 2004). This is due to high variability in genotype of chickens that are widespread throughout the continent and a difficulty to know the extent of genetic crosses between local and exotic hybrids.

Village chickens often scavenge for feed and water, so they are highly exposed to varying environmental temperatures, fluctuations in feed and water supply. They are highly exposed to diseases, parasites, predation and theft. Village chickens, however, thrive under these harsh conditions (Kingori *et al.*, 2010b). Resource-poor households lack inputs and some of them do not provide overnight shelter for their chickens (Kingori *et al.*, 2007; Grobbelaar *et al.*, 2010; Khawaja *et al.*, 2012).

The harsh conditions under which village chickens are exposed negatively affect the performance of these birds. Village chickens are associated with low productivity comprised of low egg production, slow rate of growth and production performance (Schou *et al.*, 2010; Bett *et al.*, 2011; Chulayo *et al.*, 2011). Village chicken hens start to lay after 27 weeks of age and have low clutch sizes of 2-3 clutches per hen per year (Mapiye *et al.*, 2008). Approximately 50 eggs per hen per year are produced of which 60 % are kept to hatch and the rest is consumed within the household (Halima *et al.*, 2007). At maturity, the average body weights of cocks and hens can be 2.4 and 1.5 kg, respectively (Mapiye *et al.*, 2008). Notwithstanding that village chickens possess light body and egg weights when compared to imported or improved breeds, these birds have a great contribution to the rural protein intake. The challenges that these chickens face need to be characterised and acknowledged.

2.3 Challenges to village chicken production

In resource-poor households, chickens do not receive adequate nutrients, they are susceptible to diseases and parasites, are prone to predation and there are no marketing structures exist for these village chickens, predation and theft (Mwalusanya *et al.*, 2001; Petrus, 2011).

2.3.1 High prevalence of diseases and parasites

Most common diseases include fowl pox, coccidiosis, salmonellosis, respiratory disease, Newcastle Disease and Infectious Bronchitis (Ashenafi *et al.*, 2004). Almost 80 % of village chicken mortality recorded in Bokka village of Botswana was due to diarrhoea and respiratory failure while coccidiosis infected 26 % of the village chicken flock in Central Ethiopia (Mushi *et*

al., 2006). Chicks are mostly affected by coccidiosis and Newcastle disease, resulting in increased mortality (Kungoza *et al.*, 2004; Magothe *et al.*, 2012a). Most disease outbreaks were observed during the dry season(s) most likely as a result of reduced moisture in the atmosphere (Mwalusanya *et al.*, 2001). Diseases spread through various routes, such as mixing with different livestock or animals of the same species from other households that might be already affected by a particular disease (Petrus *et al.*, 2011; Magothe *et al.*, 2012a). Disease outbreaks are seasonal and diseases increase flock mortalities since communal farmers hardly vaccinate and treat their chickens. Table 2.1 shows mortality caused by high diseases prevalence and parasites.

Scavenging chickens are also vulnerable to parasites. Common gastrointestinal nematode parasites are *Ascaridia galli* and *Heterakis gallinarum* (Mushi *et al.*, 2000; 2006). Out of 701 chickens that were examined in Kenya, 25.6 % and 1.4 % infected by *Ascaridia galli* and *Heterakis gallinarum* (Magothe *et al.*, 2012a). The parasite eggs are ingested from the ground during the scavenging of feed and at watering points. External parasites such as mites, fowl ticks and fleas are hosted on grass material (Kusina *et al.*, 2001; Badubi *et al.*, 2006; Magothe *et al.*, 2012a). Communal farmers hardly control these parasites (Magothe *et al.*, 2012b). Farmers lack awareness of veterinary services that are provided by the responsible state officials and they also need to know that it is not a huge inconvenience and is beneficial to treat chickens.

2.3.2 Predation

Predation has an impact on chicken flock losses. Common predators for chickens and eggs are cats, squirrels, snakes, lizards, eagles and hawks (Mwalusanya *et al.*, 2001; Olwande *et al.*,

Table 2.1: Prevalence of diseases and parasites in village chickens in resource-poor countries

Cause of Mortality	Country	% Flock mortality	Reference
<i>Disease</i>			
Newcastle disease	Uganda	77.5	Kungoza <i>et al.</i> (2008)
	Tanzania	42.9	Mwalusanya <i>et al.</i> (2001)
Diarrhoea and respiratory diseases	Botswana	80	Mushi <i>et al.</i> (2006)
Coccidiosis	Ethiopia	25.8	Ashenafi <i>et al.</i> (2004)
<i>Parasites</i>			
<i>Ascardia galli</i>	Kenya	25.6	Magothe <i>et al.</i> (2012a)
<i>Heteraskis gallinarum</i>	Kenya	1.4	Magothe <i>et al.</i> (2012a)

2010). Chicken deaths of 36.7, 22.5 and 4.5 % were reported from Tanzania (Mwalusanya *et al.*, 2001), Uganda (Kungoza *et al.*, 2008) and Zimbabwe (Kusina *et al.*, 2001), respectively. Predators mostly attack chicks and adult chickens that are not provided with overnight housing (Kungoza *et al.*, 2008). In Guruve district of Mashonaland in Zimbabwe, farmers considered loss of village chickens by predation as a minor problem (Kusina *et al.*, 2001). These farmers provided overnight shelter and have fenced their property to ensure security of their chickens.

2.3.3 Theft

Chicken theft has a negative impact to resource-poor households as they mainly keep them for home consumption. Chicken losses are also associated with theft even though the losses are difficult to quantify since farmers do not keep records. In communal areas of South Africa, Lesotho and Nigeria, theft is one of major challenges to livestock farming (Khoabane and Black, 2009; Olowa, 2010). There is limited literature on village chicken theft. Village chicken theft is possible since households provide minimal or no housing at all, thus, chickens remain vulnerable in the wild. Livestock theft can be prevented by fencing and provision of overnight shelter. The chickens are hardly stolen during the day.

2.3.4 Poor marketing and pricing

Resource-poor households are not the only consumers but also sell village chickens (Aklilu *et al.*, 2007). The price of a village chicken is not based on specific body weight but is usually based on the owner of a bird and the size of the bird (Gueye *et al.*, 1998). Other factors that

influence the pricing of village chickens are the season, plumage colour and sex of a bird as they are associated with socio-cultural uses of these birds (Dana *et al.*, 2010b; Moges *et al.*, 2011). The price of chickens rises during certain periods such as, public holidays and non-fasting periods. Usually, cocks are mostly sold as they do not effectively contribute to egg production (Gueye, 2001; Dana *et al.*, 2010b). In Senegal, village chickens are supplied to the market whole year round (Gueye *et al.*, 1998). The prices of village chicken meat and eggs are two to three times higher than meat and eggs from exotic chickens due to high demand and socio-cultural value of live village chickens (Mugga, 2007). Selling of village chickens usually occurs within the community (Henning *et al.*, 2006). However, in cases whereby village chickens are sold to urban dwellers it involves middlemen who sell them at a higher price (Bett *et al.*, 2011). The village chickens are, thus, not efficiently contributing to income generation. In Uganda the demand for village chicken meat exceeds supply (Mugga, 2007; Magala *et al.*, 2012). The slow growth rate of village chickens is a constraint and farmers usually fail to meet the demand for chicken meat (Aklilu *et al.*, 2007). However, one of the reasons why the demand for village chickens is not met could be the various roles that they play in livelihoods of resource-poor households.

2.4 Roles and functions of village chickens

Despite the challenges to village chicken production, village chickens contribute markedly to the food security of resource-poor households. They also have socio-cultural and socio-economic functions as well.

2.4.1 Attainment of food security

In 1997, the Food and Agriculture Organisation (FAO) recognised village chicken production as one of the strategies to be used in food security programmes (Iqbal and Pampori, 2008). Village chickens satisfy two of the major mainstays of food security which are availability and accessibility of food (Ayssiwede *et al.*, 2011; Petrus, 2011; Bett *et al.*, 2012). Village chickens are mostly utilised for the consumption of meat (Mtileni *et al.*, 2009; Olwade *et al.*, 2010). A household is considered food secure, if it has access to safe, healthy and sufficient food at all times by all members (Sonaiya, 2007). There is, currently a threat in developing countries facing protein deficiencies as a result of increasing human population (Gueye, 2009), rural unemployment and other factors. Meat and eggs from village chickens are the primary sources of proteins to resource-poor households (Gueye *et al.*, 1998). Village poultry accounts for approximately 80 % of the poultry in Africa (Goromela *et al.*, 2006) due to low-input requirements by these birds (Kyarisiima *et al.*; 2004; Sonaiya, 2007; Mulugeta and Tebkew, 2013). There are many ways in which village chickens contribute to the households' well-being.

2.4.1.1 Eggs

Eggs contain essential amino acids required for human diet and can contribute 3-4 % energy and proteins required by an adult person per day (Melesse *et al.*, 2012). Eggs from village chickens are preferred by consumers because of their yolk colour and flavour (Wattanachant *et al.*, 2004). Egg consumption is, however, not as common as meat consumption as households prefer to keep them for incubation (Missohou *et al.*, 2002). Therefore, eggs are only consumed when there is strong need for them. For example, eggs are cooked when there is a need for a quick meal to be made. In Tanzania and Kenya, for example, female teenagers are prohibited from eating eggs as

it may trigger early puberty (Aklilu *et al.*, 2008). Eggs that fail to hatch and those abandoned are consumed in the household (Missohou *et al.*, 2002). Resource-poor village chicken farmers rely on egg productivity to generate the flock. Thus village chicken eggs are accessible to the households but not readily available for consumption. Even though eggs are not consumed as much as meat, they still remain an invaluable protein source to poor rural households. About 10 % of eggs from village chickens are sold in Kenya (Sonaiya, 2007). Table 2.2 shows the nutritional composition of the eggs that form an indication of their contribution to human diet.

2.4.1.2 Meat

Village chickens provide meat which forms a source of proteins to human diets (Halima *et al.*, 2007; Sonaiya, 2007). In Senegal, Ethiopia and Kenya, consumers prefer meat from village chicken for its better taste and freshness to an extent that urban dwellers are willing to pay higher price for these birds at local retailing centres. For example, households that sold chickens to urban dwellers earned an average of 14.3 Ethiopian Birr per cockerel while those households that traded among themselves earned 6.8 Ethiopian Birr per cockerel (Aklilu *et al.*, 2007). This is an indication of high demand for village chicken meat. Moreover, there are no religious taboos on the consumption of village chicken meat. In Ethiopia, religion has an impact on the demand of village chicken meat such as during the non-fasting period that increases consumption since people are allowed to consume food (Aklilu *et al.*, 2007). However, the amount of village chickens consumed has not yet been quantified as farmers do not keep records of slaughtered birds. It is, therefore, important for farmers to keep records to understand chicken flock

Table 2.2: Nutritional composition of eggs

Nutrient	Amount
Energy (kcal.)	150.5
Protein (g)	12.4
Carbohydrates (g)	0.72
Vitamins	
<i>Vitamin A (μg)</i>	158
<i>Vitamin B₂</i>	0.46
<i>Vitamin E (mg)</i>	1.05
Minerals	
<i>Calcium (mg)</i>	56
<i>Iron (mg)</i>	1.9
<i>Phosphorus (mg)</i>	198
<i>Potassium (mg)</i>	138
<i>Zinc (mg)</i>	1.29

Adapted from Kitalyi (1998); Iannotti *et al.* (2014)

dynamics to improve their management practices, ability to detect trends as well as forecasting their production.

Table 2.3 shows the results obtained from the studies performed on a certain Thai village chicken breed (Black-boned). Weights from live and slaughtered chickens were captured as well as proportions of nutrients lost through the cooking process. The drumsticks, thighs, breasts and wings have more flesh and thus, contain more proteins and are more edible than any other meat portions. Village chickens meat contains low muscular fat and that results in meat and eggs from these birds having more consumer preference when compared to imported chicken breeds.

2.4.2 Socio- cultural functions

Village chickens are used when there are cultural ceremonies, weddings, honouring of guests and gifts for newly born children (Aklilu *et al.*, 2007). Some mystical functions of village chickens in Africa include using village chicken as a sacrifice, in preventing bad luck and praising the ancestors (Mtileni *et al.*, 2009). For example, in Ethiopia, a white chicken is used to bring luck in some communities while black chicken casts bad luck (Aklilu *et al.*, 2008). A cock is used to praise male ancestors. These functions are core to customary uses of village chickens in Africa and have an impact on the number and sex of the chickens to be slaughtered for household consumption.

Village chickens are a source of food to rural households, basis of bartering, means of payment and source of income to rural women (Gueye, 2000). In communal areas cocks are used as the alarms to wake people in the morning (Aklilu *et al.*, 2008). Village chicken litter is used as

Table 2.3: Characteristics and nutritional composition of Thai village chickens

Characteristics	Estimate	Source
<i>Weight (kg)</i>		Pripwai <i>et al.</i> (2014)
Live weight	1.42	
Raw carcass weight	0.98	
<i>Chemical composition of some edible meat portions (%)</i>		Wattanachant <i>et al.</i> (2004)
Breast muscle		
Protein	24.4	
Fat	0.53	
Moisture	72.1	
Cooking loss	22.1	
Thigh muscle		
Protein	21.7	
Fat	2.81	
Moisture	74.1	
Cooking loss	20.1	

manure to grow the crops in rural areas of South Africa (Mtileni et al., 2009; Mungube et al., 2008). This strengthens crop-livestock interactions and thus enhances sustainable rural agricultural production. Prestige is another reason of rearing these birds (Dolberg, 2007), suggesting that these chickens are also valued as wealth. Not owning even chickens is an indication of extreme levels of poverty.

2.4.3 Socio-economic functions

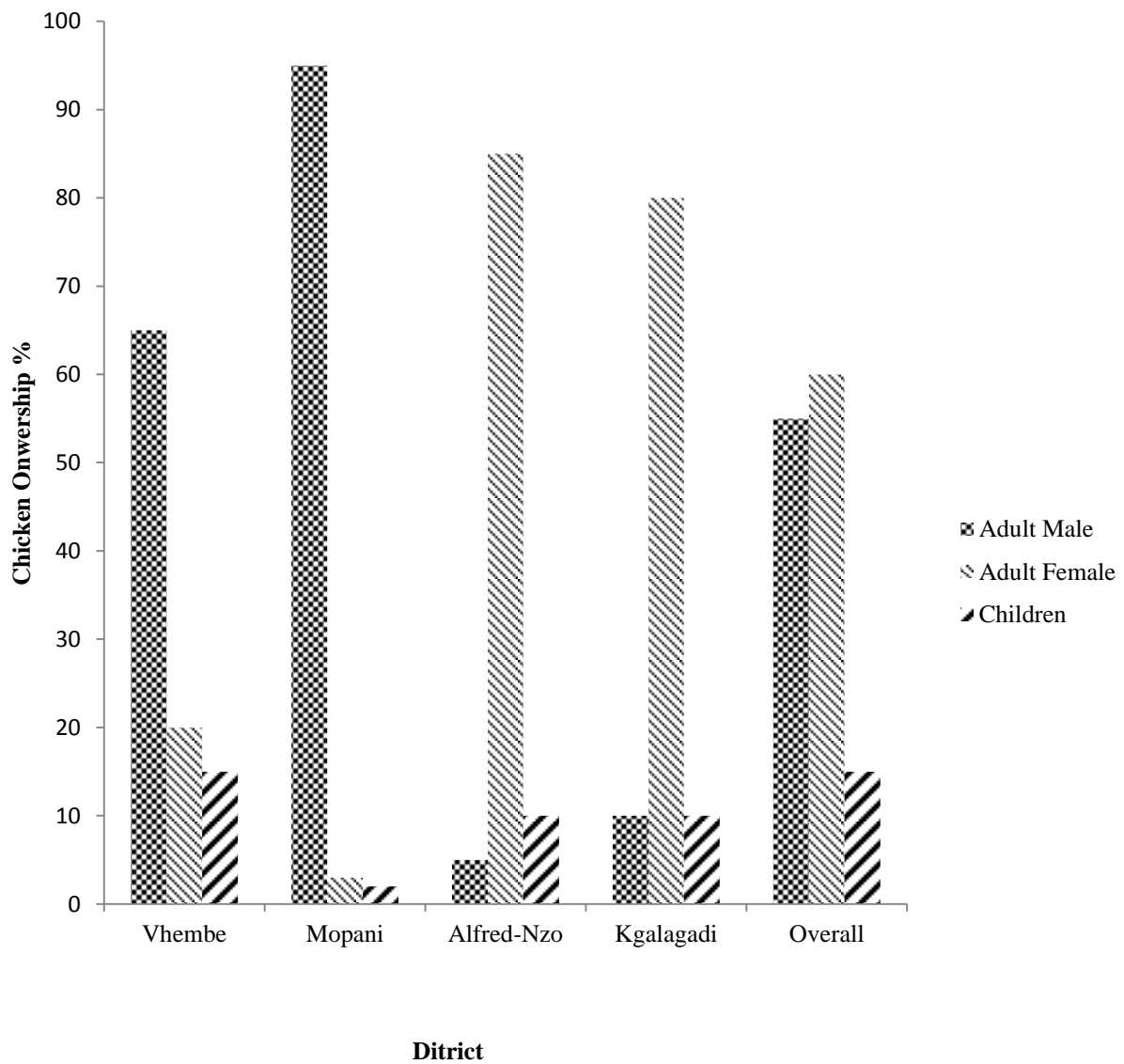
Village chickens are usually sold when households face cash shortages (Natukunda *et al.*, 2011). They are exchanged for cash as it can be used to access other items that a household might require (Gueye, 2001). The value given to village chickens depends on the culture, prestige and religion of the household. Sonaiya (2007) reported that, in Bangladesh, households that participated in the Smallholder Livestock Development Project that included village chicken production, increased their earnings considerably and increased their access to healthy food such as eggs and milk. A farmer rearing five adult chickens was calculated to increase her earnings by US\$ 38 per annum (Gueye, 2000).

A household that owns at least one chicken is regarded as better than one that owns no livestock at all, livestock rearing earns a social status to a household (Dolberg, 2007). In Tigray, Ethiopia, farmers described village chickens as a resource that drives a household out of poverty (Aklilu *et al.*, 2008). Moreover, village chickens are a source of social connections as they are used as gifts, medium of exchange or bartering and source of payment (Aklilu *et al.*, 2007). Village chickens have a huge bartering value (Aklilu *et al.*, 2008). In Ethiopia, poultry is referred to as initial capital since some farmers exchange chickens for farming implements. In Gambia, village chickens are used to acquire other types of livestock. Four adult hens are exchanged for one

sheep, while 25 hens exchanged for one cow (Gueye, 2000). In some cases, during the harvest season, labour costs are offset through chickens as payments. In the Kavango region of Namibia, farmers use village chickens to pay for services of the local clinics. The clinic would then sell those chickens (Petrus, 2011).

2.5 Gender roles in ownership of village chickens

Women and children are mainly responsible for the management of village chickens (Mtileni, 2011). Even in male-headed households, women are still the dominant owners of village chickens (Mtileni *et al.*, 2009). In Northern Namibia, women own approximately 80 % of these chickens and are assisted by children to manage them (Petrus, 2011). In Botswana, 98 % of village chickens are owned by women (Badubi *et al.*, 2006). Women have dominated the traditional poultry enterprise in Rongo and Homabay districts of Western part of Kenya (Ochieng *et al.*, 2011). Since village chicken production seems to operate better under women supervision, it would be wise to actively involve women to improve chicken productivity. Figure 2.1, shows village chicken ownership by different gender categories in different district municipalities of selected provinces of South Africa. Women dominate in the Alfred-Nzo district of the Eastern Cape and Kgalagadi district in the Northern Province of South Africa.



Source: Adapted from Mtileni *et al.* (2009).

Figure 2.1: Chicken ownership by gender in selected provinces of South Africa

Ownership of village chicken in the Eastern Cape and Limpopo is not biased to one particular gender as in other African countries although women are still dominating. Women are generally the main decision makers on flock culling and sales (Gueye, 2000; Missohou *et al.*, 2002). Some regions of Kenya and Tanzania disallow women to own chickens since they do not consume the meat, so men own village chicken whereas in some other regions men only focus on ruminant livestock (Gueye, 2000). In spite of cultural norms that segregate ownership of village chickens by gender there are regions which do not operate under those rules (Aganga *et al.*, 2000).

2.6 Factors affecting household meat consumption patterns

Village chicken meat is shared and consumed by all household members. Depending on the purpose of slaughtering, meat consumption patterns may differ. The religious and cultural factors have considerable influences on the slaughtering, consumption and benefit to household members. In this way, household members may not be consuming the same portion of a chicken meat from one event to another. There are other factors affecting slaughtering and consumption of village chicken meat in a household. Information on consumption patterns and nutritional contribution of village chicken to resource-poor households is, however, not available. Thus, the lack of information makes it difficult to predict how village chickens reduce food insecurity, especially among children.

Village chickens are slaughtered during religious, cultural and mystical event as well as when farmers are in fear of a diseases outbreak. Each of these events has varying importance and the value attached to the chicken(s) being used by the household differs. The purpose of slaughtering

also determines the number and sex of chickens to be slaughtered. The number of chicken consumed in a household depends on the nature of the event and number of attendees. The fear of disease outbreak by farmers also increases the number of chickens slaughtered and meat consumption frequencies (Gueye, 2000). However, there is no literature that specifically discusses the effect of purpose of slaughtering on the number of village chickens that are slaughtered.

2.6.1 Season

Village chicken meat consumption varies with seasons. During the fasting period, food consumption is low, therefore, there will be limited slaughtering of village chicken. To the poorest households, village chickens are not easily accessible, so they are only consumed during public holidays such as during Easters and Festive season (Aklilu *et al.*, 2008). During festive season, there are many gatherings that include family and social gatherings, weddings and cultural functions. These events result in increased number of village chickens being slaughtered as feast for people or performance of other functions. Aklilu *et al.* (2008) reported that social and religious festivals such as Christmas and Easter holidays increased the number of birds consumed by the average of 0.6 and 0.8 birds per household. The number of chicken slaughtered also accounts for the number of guests and household size.

2.6.2 Household size

Number of individuals in a household has an impact on the number of chickens consumed as well as on meat sharing patterns. There is an inverse relationship between household size and consumption per person (Lanjouw and Ravallion, 1995). This is an indication of a decrease in

size of meat portions consumed by each person in a large household. Children consume less fleshy portions of a chicken as a result of adults having priority over consumption of meat. There is a lack of information to predict the effect of household size on number of village chickens consumed per household.

2.6.3 Ownership patterns

Village chickens are mainly owned by females (Mtileni *et al.*, 2009) and this is verified by Figure 2.1 that shows ownership patterns of village chickens in selected districts of South Africa. Children are also seen taking part in village chicken flock management. In resource-poor households, village chickens are consumed to manage flock sizes and ageing of chickens (Halima *et al.*, 2007). Cocks are mostly consumed than hens (Geueye, 2000); this is used as a culling strategy. Households always strive to increase their flock sizes; this is shown by keeping more eggs for incubation and consumes less. Households rearing small flock sizes rarely slaughter a chicken, unless necessary.

2.6.4 Gender of the head of household

Due to cultural norms, meat consumption in a rural household is commonly affected and skewed to a particular gender (Gueye, 2000). The fleshy portion of a chicken such as thighs, breasts and giblets are served to men while less-fleshy portions such as neck, skin and wings are given to children and women. This is associated with flesh of a chicken providing strength to men (Aklilu *et al.*, 2008). There is thus, lack of evenness of protein supply as adults a first choice

upon meat cuts they consume. Children consume any portion served whether it a head, neck or feet. In Botswana, Kenya, Namibia, Tanzania and Uganda, the less preferred portions such as neck and abdominal organs are served to men while in some parts of Tanzania, Lesotho and Zimbabwe women do not consume chicken meat at all (Gueye, 2000). This is an indication of women and children consuming eggs, however, some cultures do not allow egg consumption by young females.

Logically, in a household, children are highly vulnerable to nutritional deficit due to nutrient deprivation. This leads to higher susceptibility to diseases especially to children. Approximately 10 % of malnourished children are found in Northern Africa and about 30 % in Sub-Saharan Africa (Sonaiya, 2007). In rural areas of South Africa, the issue of undernourishment is considered as health and economic problem which contribute greatly to poverty (Walsh *et al.*, 2002). Children require nutritious food for development of bones and muscles thus obtaining acceptable health standard.

2.6.5 Purpose of slaughtering

Depending on the nature of the event, village chicken meat consumption patterns and the number of village chickens that are slaughtered may differ. In a normal chicken slaughtering, meat consumption is assumed to be consumed equally by all member of the household, including children. During family or social gatherings village chickens become the core meal of the day that is prioritized to be served to the guests. Village chicken slaughtered for a mystical function may not be always consumed, for example, a chicken slaughtered for casting misfortunes are disposed or consumed by non-household members. During a cultural ceremony, customarily,

men are served prior to other attendees of that particular ceremony and they receive the most nutritious portions (Aklilu *et al.*, 2008). Information on the effect of the purpose of slaughtering a village chicken in a household and dynamics thereof is, however, limited.

2.7 Summary

Village chickens form an essential component to livelihoods of resource-poor households. Women and children are responsible for managing village chickens. The contribution by village chickens to resource-poor households is unknown. These chickens show a variety of plumage colours within the same flock and varying body sizes. Due to low inputs available to communal farmers, village chickens are highly susceptible to disease outbreaks, predation and theft. Village chickens are a source of food and income to rural women, furthermore, contribute to food security, socio cultural and socio-economic status of resource-poor households. Consumers prefer meat and eggs from village chickens for better taste, freshness and colour of the yolk and carcass. Increased access of village chickens is expected to increase the consumption of meat and eggs. Village chicken meat consumption patterns depend on the purpose of slaughtering, season, ownership and gender of the head of household, but the impact of these are not known. The broad objective of the study was therefore, to determine the distribution patterns of village chicken meat within resource-poor households.

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CHAPTER 3

Farmer perceptions on the contribution of village chickens to food security among resource-poor households

Abstract

Village chickens are reared by almost every rural household in low-income, food-deficit regions, but their contribution to food security is not well understood at both, household and national levels. The study was conducted to determine farmer perceptions on the contribution of village chickens to resource-poor households. A total of 242 households from Msinga participated in the study. There was an association between village chicken and other livestock ownership ($P < 0.05$). Half of the farmers owned large chicken flock and reared other livestock species. Village chickens were kept mainly for household consumption. Meat preference was strongly associated with age group ($P < 0.05$). Adults preferred more village chicken meat than broiler meat as compared to the youth. In all households, village chickens were mainly slaughtered during periods of transitory food shortages. Logistic regression identified gender of the head of household, level of income and religion to influence the consumption of preferred portions of village chicken meat by adult males and females ($P < 0.05$). Children consumed less of the preferred portions (heads, necks and feet). Half of the household did not have sufficient food throughout the year. Income received, chicken flock size and ownership of other livestock were significant determinants of households attaining adequate food throughout the year. Thus, households did not fully utilise village chickens to optimise household protein intake among household member. It is important to assess factors that limit the consumption of village chicken meat among children.

Keywords: household size, children, gender, food security, level of income.

3.1 Introduction

In communal production systems, many households keep the scavenging chickens in their backyards (Nemavhola and Ndlovu, 2000). Almost every communal household rear these chickens primarily for household consumption (Goromela *et al.*, 2006). Women and children are mostly responsible for the management of the chickens, while men take care of cattle, sheep and goats. These chickens play vital roles to the livelihoods of resource-poor households. They fulfil functions during cultural and social activities such as honouring of guests, strengthening of social relationships, bartering and wealth creation (Gueye, 2000; Aklilu *et al.*, 2008). The importance of village chicken production is, however, not well recognised by most development and extension workers as they contribute little to the national gross domestic product.

More than 80 % of village chickens are reared in low-income, food-deficit regions (Gueye, 2000) since they require minimum inputs such as housing and feed (Mtileni *et al.*, 2012). Village chickens have a huge potential of reducing poverty as they can easily be converted to food and cash (Aklilu *et al.*, 2008). Despite the low meat and egg productivity in comparison to imported and improved breeds kept under relatively benign environments, village chickens are well adapted to harsh environmental conditions, low feed provision and minimal veterinary services. Thus village chickens can improve food security of resource-poor households provided there are institutionalised efforts to develop village chicken production systems (Mtileni *et al.*, 2012). Many communities are in the process of developing strategies to improve village production systems. For example, the use of ethno-veterinary medicines to control diseases and parasites in

Eastern Cape, South Africa (Mwale and Masika, 2009) and village chickens and eggs are sold on Saturdays in Ethiopia and these have become their normal market days (Olwande *et al.*, 2010).

In Africa, meat and eggs from village chickens are more preferred than those from imported breeds. Urban dwellers of Kenya and Tanzania, for example, showed willingness to pay high prices for these village chicken products (Aklilu *et al.*, 2008). This indicates their potential to create wealth and enhance food security among resource-poor households. Live village chickens are also preferred for cultural and mystical functions. It is important to understand how farmers perceive the contribution of village chickens to household food security. The objective of study was to determine farmer perceptions on the contribution of village chickens to food security among resource-poor households. The hypotheses tested was that the chicken flock size, the gender of the head of household, socio-economic status and household size influence the extent to which village chickens contribute to towards household food security.

3.2 Materials and Methods

3.2.1 Study site

Data were collected at Msinga located at 28° 40' 00" S and 30° 34' 00" E of UMzinyathi District Municipality of KwaZulu-Natal, South Africa. The site was selected because of increased incidents of crop failures due to frequent periods of drought (Rukema and Simelane, 2013). Cattle and goat production are important enterprises as they generate large household income through existing marketing channel. The site consists of arid and semi-arid land receiving

between 600 and 700 mm of annual rainfall. Temperatures can rise up to 44 °C in the rainy season (December to February). Almost every household reared village chickens. Households stored rainwater in tanks to irrigate crop were grown in the backyards. Crop residues played considerable role in strengthening crop-livestock interaction by farmers. Soils are sandy. *Acacia* and *Aloe species* are common.

3.2.2 Household selection

Before commencement of the study, permission was obtained from the non-governmental organisation that provided local veterinary services to livestock farmers in the area as it had already established a relationship with the farmers. Permission was also received from the local authorities. Eight trained local enumerators were used and the questionnaire was then pretested by interviewing 16 respondents. Afterwards, 242 households that reared village chickens were selected and semi-structured questionnaires were administered.

3.2.3 Data collection

Data on household characteristics such as age and gender of the head of the household, reasons for rearing these birds, uses, ownership of village chicken and other livestock, flock sizes, production constraints and opportunities for village chicken to rural food security were collected. Meat consumption patterns were captured to provide indications on nutritional contribution of village chickens to resource-poor households. This included purpose of slaughtering of the chickens, number of chickens slaughtered and the chicken portions consumed by household

members. Appendix A shows the approval by the UKZN Ethics Committee. Appendix B gives the questionnaire used in data collection.

3.2.4 Statistical analyses

Demographics and descriptive statistics were analysed using the PROC MEANS and PROC FREQ procedures of SAS version 9.1 (2008). Chi-square tests using SAS 9.1 (2008) were performed to determine associations between ownership of village chickens and other livestock species as well as the association between age group and chicken meat preferences. The PROC GLM procedure of SAS 9.1 (2008) was used to test for significance difference in the rankings of the purposes of rearing village chickens across households. All statistical outputs were performed at 95 % level of significance ($P < 0.05$). The LOGISTIC regression procedure was used to predict the odds of children consuming the non-preferred chicken organs in a household. The predictors incorporated into the model were age and gender of the head of household, household size, religion, chicken flock size, source of income, purpose of slaughtering and the number of chickens slaughtered. The logit model used was:

$$\text{Ln} [P/1-P] = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \dots + \beta_{10}X_{10} + \varepsilon$$

Where:

P = probability of a child consuming a head in a household;

[P/1-P] = odds of a child consuming a specific organ/ part of chicken;

β_0 = intercept;

$\beta_1 \dots \beta_{10}$ = regression coefficient predictors;

$X_1 \dots X_{10}$ = predictor variables; and

ε = random residual error

The odds ($\beta_1 \dots \beta_{10}$) were interpreted as the proportion children that consumed the non-preferred chicken organs in the households versus those that did not consume non-preferred portions such as heads of chickens. Similar ordinal logistic regressions were used to estimate the probability of a child consuming feet and eggs, adults consuming their preferred portions, as well as households attaining food adequacy throughout the year.

3.3 Results

3.3.1 Household characteristics

Table 3.1 shows demographic information of the households interviewed. Women were commonly residing in the farms while most men worked in towns and cities. The major sources of income were government social grants such as old age and child support. Adult females were main owners of village chickens, followed by male adults, joint ownership of adult females and children and lastly children. Village chicken flock sizes ranged from 1 to 69 chickens. The average chicken flock size was 22.0 and cock-to-hen-ratio was 1:3. There was an association between village chicken flock size and other livestock ownership ($P < 0.05$). Half of the households reared large flock size of village chickens together with other livestock species. Farmers with large chicken flock size owned many classes of livestock (particularly cattle and goats). The median flock size was 18.5, thus a small flock was comprised of 18 or less chickens. Furthermore, 30 % of farmers who reared village chickens were also involved in cropping.

Table 3.1: Demography and socio-economic status of participated households

Characteristics	Figures
<i>Sample size (n)</i>	242
<i>Household size</i>	6.4
<i>Mean age of the head of household</i>	52
<i>Gender of head of household</i>	
Male (%)	27
Female (%)	73
<i>Major source of income</i>	
Old age grant (%)	38.4
Child support grant (%)	35.5
Casual work (%)	14.5
Formal work (%)	7.9
Hawking (%)	2.9
Gifts from family (%)	0.8
<i>% Village chicken ownership by gender</i>	
Males (%)	22
Females (%)	52.2
Children (%)	5.8
Joint ownership (% Females and children)	20
<i>Village chicken flock size</i>	
Mean flock size	22
Median	18.5
Cock-to-hen ratio	1:3
<i>Livestock mean herd size</i>	
Cattle herd size	3.4
Goats flock size	11.5

3.3.2 Role of village chickens to the households

Table 3.2 shows the purposes of rearing village chickens across different households. Village chickens were reared for meat consumption in two out of three households and this role was ranked important by the respondents. The nutritional role of village chickens to the households is, therefore, huge. Male-headed households ranked meat consumption, leisure and manure as most important purposes of rearing village chickens. Female-headed household ranked meat consumption, income generation and manure as most important while meat consumption, manure and income generation were important purposes for rearing village chickens in children-headed households. The ranking of meat as the main purpose of rearing chickens was not influenced by the gender of household member ($P > 0.05$). Ranked as least important was rearing the village chickens for prestige and the ranking was significantly different across household.

3.3.3 Village chicken meat consumption preferences

Over 90 % of the respondents preferred to consume village chicken meat than broiler meat. The main reasons for preference of village chicken meat were better taste (82 %), freshness of the carcass (9.5 %) and leanness (7.1 %). On the other hand, the youth did not prefer meat from village chickens and major reasons were poor hygiene (53 %) and meat toughness (47 %). About 85 % of the adult respondents preferred village chicken meat while 38 % of youth preferred village chicken meat. There was a strong association ($P < 0.001$) between age group and village chicken meat consumption preferences. Figure 3.1 shows the proportion of respondents on village chicken meat preference.

Table 3.2: Reasons for rearing village chickens as ranked by respondents

Reason	Mean (ranks)			Significance
	Male n = 160	Female n = 65	Child n = 17	
Meat	1 (1.31)	1 (1.35)	1 (1.47)	†NS
Eggs	5 (2.22)	4 (2.35)	5 (2.50)	NS
Income	4 (2.10)	2 (2.06)	3 (1.86)	NS
Leisure	2 (1.75)	6 (2.48)	6 (2.60)	NS
Ritual	7 (2.47)	5 (2.37)	4 (2.25)	NS
Manure	3 (2.07)	3 (2.08)	2 (1.80)	NS
Prestige	6 (2.31)	7 (2.89)	7 (3.00)	*

The lower the rank (mean rank) of a reason, the greater is its importance, †NS-Not significant ($P>0.05$), * $P<0.05$

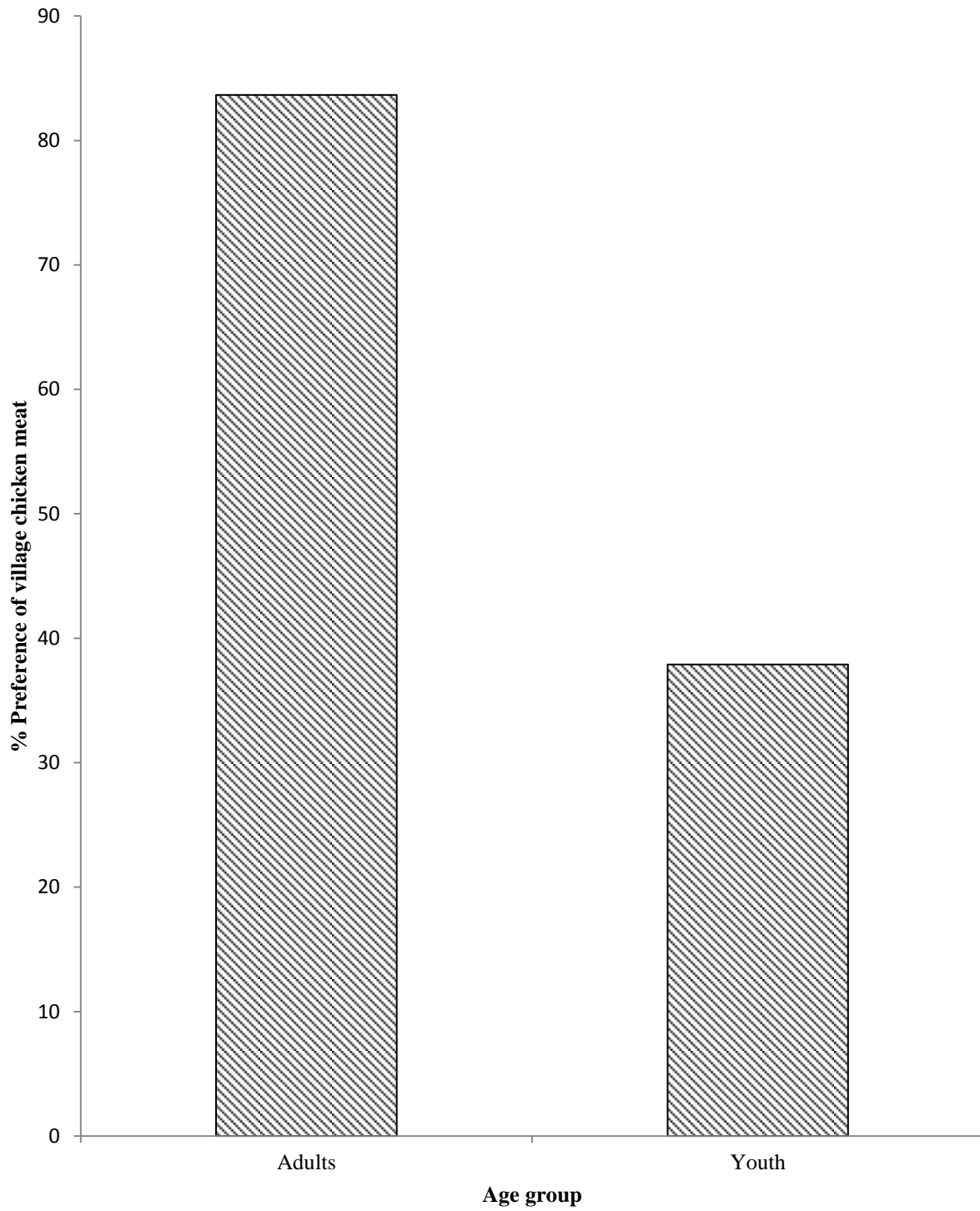


Figure 3.1: Village chicken meat preference over broiler meat among youths and adults

3.3.4 Village chicken slaughtering

Table 3.3 shows the rankings of the purposes of slaughtering of the village chickens by household members. The ranking of major reasons for slaughtering a chicken by the respondents varied among households. Males ranked slaughtering village chicken during food shortages, meal on paydays and cultural activities. Slaughtering due to food shortages, welcoming of guests and cultural activities were ranked as important by female members of the households. Children ranked cultural activities, food shortages and fear of diseases as important reasons for slaughtering village chickens. Even though the rankings assigned by household members were varied, there was no significant difference among the rankings. The gender of household member did not have an impact on the rankings of the reasons of slaughtering across the households.

Ninety per cent of the households slaughtered at least one village chicken per month, 9 % slaughtered two chickens per month and 1 % slaughtered 3 or more chicken per month. Responses highlighted that slaughtering and numbers of chickens slaughtered were influenced by household size. The average of 1.02 ± 0.19 and 1.19 ± 0.43 chickens were slaughtered in the small and large households, respectively. These figures were estimated from January to August 2013 by the respondents. There was a strong relationship between household size and number of chickens slaughtered ($P < 0.05$). The number of chicken slaughtered increased with household size.

Adult males and females consumed the preferred portions of a chicken such as drumsticks, thighs, wings and breasts while children consumed the less preferred portions such as heads, feet, necks and abdominal organs. Children also consumed eggs but 21 % of the households incubated

Table 3.3: Major reasons for slaughtering village chickens

Reasons for slaughtering	Rank ¹			Significance
	Household members			
	Adult males	Adult females	Children	
Food shortage	1 (1.59)	1 (1.41)	2 (1.60)	†NS
Fear of diseases	8 (2.25)	9 (2.35)	3 (1.66)	NS
Household gatherings	9 (2.30)	8 (2.30)	7 (2.28)	NS
Welcoming of guests	4 (2.00)	2 (1.92)	-	NS
Cultural activities	3 (1.97)	3 (1.96)	1 (1.40)	NS
Incentive for children	11 (2.64)	5 (2.19)	4 (1.87)	NS
Social gatherings	10 (2.50)	11 (2.50)	6 (2.00)	NS
Meal on public holidays	6 (2.12)	10 (2.42)	5 (2.00)	NS
Meal during school holidays	5 (2.11)	6 (2.19)	10 (2.57)	NS
Festive season	7 (2.14)	4 (2.11)	9 (2.50)	NS
Meal on a payday	2 (1.80)	7 (2.22)	8 (2.33)	NS

-Not mentioned, the lower the rank (mean rank) of a reason, the greater is its importance, †NS.

eggs to generate replacement flock. Table 3.4 shows the consumption of village chicken products across households.

3.3.5 Factors affecting chicken meat consumption

Fifteen per cent of the households did not consume necks, feet and head at all as they offered them to their cats and dogs. Table 3.5 shows the odds ratio estimates of factors affecting consumption of preferred meat portions by a male. The predictors of consumption of the three preferred portions by a male are depicted in Table 3.5. The logistic regression identified various factors, at 95 % confidence interval that affect consumption of selected portions of village chicken meat by males in a household. Religion and decision-maker (defined as person responsible for serving food) were significant predictors of thigh consumption. A male adult in a household that followed tradition religion was 1.933 times more likely to consume a thigh than a male adult in a household that followed Christian religion. Gender of the head of the household, flock size and the decision maker were significant predictors of drumstick consumption, respectively. A male had 2.144 times more likely to consume a thigh in a male-headed household than an adult male in a female-headed household. Source of income, household size and flock size were also significant as predictors of wing consumption. In a household that received employment income, a male was 4.798 times more likely to consume a wing than in a household that received income from other sources.

Table 3.6 shows the odds ratio estimates of female consuming preferred portions of a village chicken meat in a household. Religion followed in a household and decision maker were significant predictors of a female consuming a thigh in a household. A female was 0.495 times

Table 3.4: Consumption of village chicken products in the households

Village chicken portions	% consumption by households		
	Male	Female	Children
Head	2.8	9.9	73.1
Feet	0.4	16.5	72.7
Neck	21.4	40.0	36.7
Thighs	43.8	53.7	5.7
Drumstick	47.9	47.1	4.9
Wings	47.5	45.0	14.0
Breasts	18.6	31.8	50.0
Back	29.3	38.4	28.9
Intestines and abdominal organs	16.1	11.1	57.4
Eggs	10.3	17.3	69.0

Table 3.5: Odds ratio estimates of male consuming preferred chicken portions within a household

Predictors	Thigh			Drumstick			Wing		
	Odds	LCI ¹	UCI ²	Odds	LCI	UCI	Odds	LCI	UCI
Age (youth vs. adult)	1.122	0.538	2.342	1.906	0.896	4.055	1.355	0.618	2.971
Gender (male vs. female)	0.794	0.384	1.642	2.144	1.038	4.431	0.784	0.362	1.699
Household size (small vs. large)	0.814	0.455	1.458	1.112	0.613	2.013	0.545	0.299	0.994
Religion (tradition vs. Christianity)	1.933	1.111	3.362	1.061	0.604	1.863	0.723	0.407	1.284
Income (employment vs. non employment)	1.043	0.353	3.085	0.878	0.282	2.733	4.798	1.243	18.516
Flock size (small vs. large)	1.043	0.586	1.858	0.551	0.305	0.994	0.332	0.183	0.603
Reason for slaughter (food shortage vs. non-food shortage)	0.712	0.329	1.542	1.032	0.470	2.270	0.723	0.407	1.284
No. of chickens slaughtered (one vs. more than one)	2.127	0.782	5.780	0.475	0.170	1.331	0.472	0.164	1.356
Gender of decision maker (male vs. female)	4.930	1.521	15.978	4.390	1.085	17.759	0.624	0.187	2.081
Adequacy of chicken meat (yes vs. no)	0.904	0.250	3.261	1.154	0.315	4.235	2.221	0.576	8.568

¹LCI- Lower confidence interval, ²UCI- Upper confidence interval

Table 3.6: Odds ratio estimates of a female consuming thighs, drumstick and wings in a household

Predictors	Thigh			Drumstick			Wing		
	Odds	LCI ¹	UCI ²	Odds	LCI	UCI	Odds	LCI	UCI
Age (youth vs. adult)	0.727	0.348	1.519	0.492	0.23	1.050	0.760	0.355	1.624
Gender (male vs. female)	0.929	0.454	1.899	0.520	0.251	1.077	0.589	0.271	1.28
Household size (small vs. large)	1.237	0.692	2.212	0.810	0.449	1.459	1.359	0.757	2.438
Religion (Christianity vs. tradition)	0.495	0.285	0.86	0.878	0.503	1.532	1.275	0.728	2.231
Income (employment vs. non employment)	1.537	0.511	4.622	1.864	0.602	5.769	0.269	0.068	1.072
Flock size (small vs. large)	1.094	0.614	1.948	1.678	0.937	3.004	1.483	0.830	2.652
Reason for slaughter (food shortage vs. non-food shortage)	1.041	0.48	2.256	0.858	0.392	1.875	0.457	0.161	1.297
No. of VC slaughtered (one vs. more than one)	0.446	0.165	1.205	1.664	0.604	4.586	1.318	0.586	2.966
Decision maker (male vs. female)	0.269	0.083	0.869	0.225	0.056	0.907	5.755	1.697	19.511
Adequacy of chicken meat (yes vs. no)	1.057	0.292	3.826	1.773	0.487	6.45	0.982	0.249	3.879

¹LCI- Lower confidence interval, ²UCI- Upper confidence interval

more likely to consume a thigh at 95 % confidence interval at a tradition-worshipping household. Decision maker was the only significant predictor of drumstick and wing consumption by a female. A female was 0.225 and 5.755 times more of consuming drumstick and wing, respectively, when a male was a decision maker over meat consumption in the household.

3.3.6 Household food adequacy

Half of the households indicated that they did not have sufficient or reliable source of food. This was most common in during the cool-dry season. Source of income, livestock ownership and village chicken flock size were significant predictors of food adequacy in a household (Table 3.7). Households that received regular employment income were 4.246 times more likely to attain adequate food throughout the year than those received non-employment income. Households that received employment income with large flock size and owning other livestock had significant probability of attaining adequate food all year round.

3.3.7 Opportunities and interventions to village chicken production

Lack of veterinary services, chicken losses due to predation, lack of feed resources and lack of market support were ranked as major constraints to improvement of village chicken production. The health support provided to the households focused on goats and cattle. Households lacked secure overnight shelter for chickens, in this way chickens were vulnerable to predators. Feed provided to chickens was mainly the unground maize that was bought or harvested from their crop harvest and kitchen waste, these resulted feeding of low quality feed. Selling of village chickens amongst the neighbouring households had been adopted by the farmers since selling

Table 3.7: Odds ratio estimates for household’s food adequacy throughout the year

Food adequacy predictors	Odds	LCI	UCI	Significance
Age (youth vs. adult)	0.668	0.318	1.401	†NS
Gender (male vs. female)	0.974	0.517	1.835	NS
Household size (small vs. large)	1.159	0.644	2.087	NS
Income (employment vs. non-employment)	4.246	1.461	12.344	*
Flock size (large vs small)	2.096	1.159	3.789	*
Livestock ownership (chickens with livestock vs. chicken only)	2.988	1.610	5.543	*

¹LCI- Lower confidence interval, ²UCI- Upper confidence interval, †NS-Not significant ($P>0.05$), * $P< 0.05$

of village chicken in a market was not common. From December 2012 to August 2013, purchased, sold and consumed chickens remained as low as 0.42 ± 1.19 , 0.56 ± 1.46 and 5.51 ± 4.67 , respectively.

The respondents realised the opportunities of utilising village chickens to improve their food security such as home consumption, income generation and the use of chicken litter as manure to improve soil fertility. As interventions to village chicken production, the following interventions were suggested as important by the respondents as stated in groups, assistant supply of nutritious feed and housing structures (24 %), housing structures only (23 %) and development of village chicken market (21 %) as well as provision of veterinary assistance (25%).

3.4 Discussion

In rural South Africa most people are unemployed and are largely depended on various forms of social grants from government. Unlike rural areas of Zimbabwe where most men reside in villages (Muchadeyi *et al.*, 2004), women were found residing in the area while men work in towns and cities. Women and children are largely prone to poverty, so they participate in agricultural activities. This enhances skills development to children as they take responsibility through participating in farming (Mapiye and Sibanda, 2005).

As anticipated, village chicken population outweighed other livestock species and mainly owned by women. This agrees with earlier reports (Missohou *et al.*, 2002; Aklilu *et al.*, 2008). Similar observations were made in Alfred-Nzo and Kgalagadi districts of South Africa (Mtileni *et al.*, 2009). Large population of chickens compared to other livestock could be due to their low requirements of production inputs such as water, feed, land, housing, health care

and labour. The average village chicken flock size was superior to those reported in other parts of Africa such as 17.0, 17, 7.13 and 6.23, reported elsewhere (Muchadeyi *et al.*, 2004; Mtileni *et al.*, 2009; Meseret *et al.*, 2011). Our findings were comparable to those reported by Mushi *et al.* (2006) and Okeno *et al.* (2012). Similar cock-to-hen ratio was observed by Okeno *et al.* (2012). Three out of ten households reared village chickens only, while others integrated these birds with other livestock species, mainly goat and cattle. This indicates similar settings of livestock ownership to other African countries (Muchadeyi *et al.*, 2004). Goats and cattle also play a major role in livelihoods of rural households as they reflect household's wealth status. Aklilu *et al.* (2008) reported that owning poultry with no other livestock is regarded as a sign of poverty. Muchadeyi *et al.* (2004) reported that village chickens are not alternatives, but compliment other livestock species. Thus farmers rear village chickens with other livestock to counterbalance the effects of seasonality in agricultural enterprises. Village chickens and other livestock play major roles in terms of home consumption and income generation to the households during poor cropping seasons such as in cases of increased droughts, pests or any other damages. Aklilu *et al.* (2008) indicated that village chickens are a useful tool for poor households to alleviate poverty as a result of their shorter growth period compared to other types of livestock.

Household consumption was the main purpose for rearing village chickens across the households; income generation was ranked third important while prestige was the least. These results agree with earlier reports (Missohou *et al.*, 2002; Moreki, 2010). Other reports (e.g. Hening *et al.*, 2006; Aklilu *et al.*, 2008; Mekonnen *et al.*, 2010; Okeno *et al.*, 2012; Zewdu *et al.*, 2013) reported that chickens are mainly reared to generate household income. In the current study, village chickens were necessarily kept for home consumption during transitory food scarcity and cultural activities. Households prioritize the use of village

chickens to provide food to the households provided there is no other source of food to be consumed and use for performing cultural rituals within the households. Goats were main income generating stock in the households due to the auction sale that takes place annually in the area.

The findings on meat preference agrees with Mtileni *et al.* (2009) who reported that consumers in selected districts of South Africa preferred village chicken meat than broiler for better taste, leanness and their use for special meals. These results agree with Bett *et al.* (2013). Memon *et al.* (2009), however, reported that in Hyderabad district of Pakistan, 85 % of respondents preferred broiler meat to rural poultry. On the other hand, eggs were consumed by children of all sexes. This might be due to disapproval of mystical beliefs that prohibited female children from consuming eggs. Missohou *et al.* (2002) reported that, in Senegal, households did not consume eggs at all while those unhatched or abandoned were not consumed by young females as this might trigger early puberty. In this way, children are susceptible to malnutrition-related diseases that can result in retarded growth in children. Increased egg consumption by children reduces number of eggs that are kept for incubation so to generate replacement flock.

The most preferred portions of the meat are regarded as fleshy and juicy organs of a chicken. These portions include drumsticks, thighs and wings which are mostly consumed by adult males and females in the household. Aklilu *et al.* (2008) stated that, customarily, most nutritious portions of chicken meat are served to men. Meat consumption by adults in a household is affected by gender of the head of household, religion, source of income and gender of the person responsible for serving food (decision-maker). Adult males consume thighs and drumsticks in male headed-households that follow traditional practices. Gender of the person responsible for serving food has got the same influence on meat consumption in

the household. Serving nutritious portions to adult males and females show respect and value of these people to the household. African tradition prioritises meat consumption to adult males and mostly heads of the households. In the households that followed the traditional religion there were low incidences of adult females and children consuming thighs and drumsticks. The socio-cultural factor such as respect among household members results in adults consuming the greater portion of a chicken thus obtaining high protein intake. The overall impact of these factors result in children reduced protein intake whereas proteins are crucial for their growth and development of muscles. On the other hand, in households that receive employment income, consumption patterns may be different due to variety of food consumed and affordability. In this way, the socio-economic status of the household can result in different consumption patterns by an adult male other than consumption of drumsticks and thighs.

Half of the households did not have sufficient food throughout the year. This included households that reared small flocks of village chickens with no other livestock. This may be due to the fact that crop harvests were not enough for own consumption due to bad cropping season. Socio-economic status of a household determines attainment of adequate food even throughout non-harvesting season of the crops. Receiving employment income and owning other livestock species improve food security among resource-poor households. Decision-making on food accessibility is affected by gender and role in ownership livestock (Mapiye and Sibanda, 2005). This may also indicate that households did not fully utilize their livestock to generate income or as means of acquiring adequate food. However, this may also be due to seasonal change as food inadequacy was experienced during a cool-dry season, or large household sizes and increased unemployment rate in rural areas.

Village chicken meat form the basis of rural protein intake to resource-poor households as the chickens are readily available and accessible. There was no market for village chickens, however, intra-household trading was found to be common. Our findings on purchases, sales and consumption of village chickens remained less comparable to the results obtained by Mlozi *et al.* (2003) who reported 6.4 ± 0.1 birds sold per day in Tanzania. Okeno *et al.* (2012) who reported 5.6 ± 0.9 and 9.3 ± 3.3 purchased and consumed by per month, respectively. Lowest values observed in this study justified lack of marketing channels and low consumption of village chickens in the households.

Farmers lacked finance to afford improved feeds, housing facility and veterinary services. This results in diminishing improvement in village chicken production. Farmers can also use the locally available material to build chicken houses, affordable health care using ethno-veterinary approach (Mwale and Masika, 2009) and use ground maize to feed to their chickens. The situation justified the necessity for institutionalized efforts such as advisory services provided to the farmers to improve their practices. Farmers that received similar services in Ethiopia improved their production (Gueye, 2000). Multipurpose interventions remained a key requirement in order to improve contribution of village chickens to resource-poor households.

3.5 Conclusions

Women owned more village chickens compared to their male counterparts. Households that reared large chicken flock sizes of village chicken also reared goats and cattle whereby goats were more important for income generation. Village chickens were kept for meat consumption within the households and chickens were slaughtered during transitory periods

of food shortages and during performance of cultural rituals. Preferred chicken meat portions were consumed by adults. In this way, farmers mainly benefited through nutritional contribution of village chickens which was also skewed to adults. It is important to assess factors that limit the consumption of village chicken meat to children. The farmers did realise opportunities of utilising village chickens to improve food security and socio-economic status but they lacked relevant inputs to improve village chicken production.

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Chapter 4

Village chicken meat consumption patterns among resource-poor household members

Abstract

The study was conducted to determine factors affecting consumption of meat from village chickens among resource-poor household members. Eighteen households from UMzimkhulu Municipality participated in the trial over four selected months. Seventy-two village chickens were slaughtered across the trial period. The number of village chickens slaughtered varied with seasons. There was a significant association between a household size and consumption of preferred portions. Consumption of chicken meat portions increased with increasing household size. In a large household, children consumed less-preferred portions than children in a small household ($P < 0.05$). There was a relationship between number of children and consumption of intestines in the households ($\chi^2 = 9.05$; $P < 0.05$). Increasing number of children in the households increased chances of consuming intestines. Adults consumed more of preferred meat portions compared to children. Preferred meat portions included drumstick, thighs, wings, breasts and back. Gender of the head of household, household size and age restriction practice were significant predictors for an adult male to drumstick, thigh and wings, respectively ($P < 0.05$). Village chicken flock size and season were significant predictors for an adult female to consume neck and thighs. Household size was a significant predictor for head, feet and liver consumption by male children ($P < 0.05$). As the household size increased, children, were likely to suffer from nutritional insecurity.

Keywords: household size, children, gender, season.

4.1 Introduction

Village chickens have a substantial contribution to human diets as they are a readily available source of meat and eggs (Kitalyi, 1998; Mtileni *et al.*, 2009; Mtileni, 2011). Meat and eggs provide a variety of nutrients that are inadequately obtained from plant food sources (Murphy and Allan, 2003). Proteins, vitamin A, vitamin B-12, riboflavin, calcium and iron are high in animal foods; Meat and eggs have high biological value.

Despite large ownership and abundance village chickens, household meat consumption in resource-poor households remains low (Chapter 3; Muchadeyi *et al.*, 2005). On average, a person consumes 0.5 kg of chicken meat per year (Aklilu *et al.*, 2007). A village chicken flock is usually mainly comprised of chicks and growing chickens (Chapter 3). Thus, the great proportions of chickens in the flocks do not have instantaneous function to household food security. Meat consumption remains popular when compared to eggs in resource-poor households due to eggs being reserved for flock generation.

Limited protein intake in rural households negatively affects growth and development of children. Customarily, priority for nutritious portions such as chicken thighs, drumsticks and breasts is given to men (Aklilu *et al.*, 2008). Reasons for this are not clear. It could be that adults perform hard labour and therefore, require more nutrients. Children are considered to have low nutritional needs. Children, therefore, suffer from malnutrition and other nutrition-related diseases due to inadequate protein intake. It is commonly assumed that when chickens are slaughtered, all household members have equal and equitable access to the meat. That hypothesis needs to be tested to assess whether the preferred portions are consumed by all members of the household. Understanding chicken consumption pattern is particularly useful in making predictions on whether efforts to improve village chicken productivity can result in

increased food and nutrition security for all household members, including children. The objective of the study was to determine the factors affecting village chicken meat consumption patterns among resource-poor household members.

4.2 Materials and methods

4.2.1 Study site

Consumption patterns of village chicken meat were conducted in uMzimkhulu Municipality of Harry Gwala District Municipality, located at 30° 30' 25" S and 29° 56' 34" E. The site was selected because of the huge value that farmers placed on village chicken production. Grazing was poor due to the abundance of unpalatable Ngongoni grass (*Aristida junciformis*). Thus, village chicken production is an integral component of the livelihoods of the community. The area has an average annual rainfall of 850 mm and temperature can be as low as 7.6°C in the cool-dry season. The major common crops grown were maize, pumpkins, sugar beans and Irish potatoes. The land had shallow shale *strata* and dominated by grassland and forests across varying topography of steep and plane slopes.

4.2.2 Household selection

Before commencement of the trial, permission was obtained from both community-based organisation that provided home-based care and local tribal leadership. A group of community-care workers assisted in identification of the 18 households that were willing to participate in the study. A total of 18 households that were willing and able to provide a chicken between 5 to 6 months old were selected.

4.2.3 Data collection

The baseline information on the household characteristics was recorded from the participating households. A total of 72 village chickens of approximately five months of age were slaughtered across the seasons. Each household's slaughtering standard was used. The birds were slaughtered using a sharp knife to cut off the throat before they were allowed to bleed for about 5 minutes, until blood stopped coming out. Slaughtering processes were observed. The meat was consumed on the day chicken was slaughtered. A day later, the head of the household and children were asked to complete a mini-questionnaire on the consumption of chicken meat portions. The mini-questionnaire captured aspects on the consumption and adequacy of the portions to household members, head of household, and gender and age and gender impact on meat consumption as well level of satisfaction on the portions consumed. The portions were categorised into highly preferred portions and less preferred portions. The highly preferred portions were drumsticks, thighs, breast and wings while the less-preferred portions included internal organs, neck, head, feet, liver and intestines. The collection was done in February, April, June and August 2014 as these were the months where meat from village chickens was highly consumed. Appendix C shows the questionnaire used during data collection.

4.2.4 Statistical analyses

The data were analysed using SAS 9.1 (2008). The Chi-square statistic was used to test for associations between household size and number of chickens slaughtered, household size and portion sharing and gender and age as well as level of satisfaction over consumed portions by household members. The LOGISTIC regression procedure was used to predict the odds of a male child consuming the non-preferred chicken portions. The predictor variables incorporated into the model were the gender of the head of household, household size,

purpose of slaughtering a village chicken, number of village chickens slaughtered per meal, chicken flock size, month, age and gender on meat consumption. The logit model used was:

$$\text{Ln} [P/1-P] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_8 X_8 + \varepsilon$$

Where:

P = probability of a male child consuming non-preferred portions in a household;

[P/1-P] = odds of a male child consuming a head in a household;

β_0 = intercept;

$\beta_1 \dots \beta_8$ = regression coefficient predictors;

$X_1 \dots X_8$ = predictor variables; and

ε = random residual error

The odds ($\beta_1 \dots \beta_8$) were interpreted as the proportion of children that consumed the non-preferred portions versus those that did not consume those portions. Similar ordinal logistic regressions were used to estimate the probability of consumption of chicken meat portions by adult males and females. Adult male and female referred to members of the household from 13 years old onwards.

4.3 Results

4.3.1 Household demography

From the participated households, seven out of ten households were female-headed. All female heads of households were on-farm residents. Each household had an average of 5.94

± 2.92 members whereby 2.44 ± 2.09 were children. More than 65 % of the households were comprised of five or less individuals (was regarded as a small household size group). Village chickens were owned by heads of the households and were decision-makers over their consumption. The initial (February) average flock size was 11.6 ± 3.85 chickens (excluding chicks). The chicken flock size comprised of eight chickens or less was regarded as small flock. Over 70 % of the households followed the Zulu tradition. All households prepared village chicken meat through boiling and adult females were responsible for serving meat. Table 4.1 shows the household characteristics and dynamics of meat consumption within those households.

4.3.2 Dynamics of village chicken flock sizes and consumption

There were fluctuations on village chicken flock size. Chicken flock size (the number of adult and consumable cocks and hens) was low in April and even lower in August. There was a strong association between household size and number of village chickens slaughtered ($\chi^2 = 15.04$; $P < 0.05$). The increase in household size increased the number of village chickens slaughtered. Hens were mostly consumed than cocks across the households. The main purposes of slaughtering village chickens were to provide a meal during food shortages (ordinary meal), cultural ceremonies and household gatherings. The average live bodyweights of 1.68 ± 0.29 , 1.66 ± 0.30 , 1.65 ± 0.23 and 1.59 ± 0.29 kg per bird were slaughtered by the households in February, April, June and August. In June there were cultural ceremonies that took place in households where meat consumption was not only based on household members only but also the neighbours.

4.3.3 Meat consumption patterns

Table 4.2 shows household meat consumption patterns among the household members.

Table 4.1: Household demography and dynamics of meat consumption

Characteristics	Estimate
Household size (mean)	5.9
Households with ≤ 3 children (%)	50
Households with > 3 children (%)	33.3
Average number of girls per household	1.2
Average number of boys per household	1.3
Households with adults only	16.7
Female- headed households (%)	65
Mean flock size/ household	
February	11.6
April	9.8
June	10.2
August	6.0
Number of chickens slaughtered/consumed per month/ household	
February	1.11
April	1.39
June	2.5
August	4.2

Table 4.2: Consumption of chicken meat portions in households with few and high numbers of children in February, April, June and August (%)

	in February			April			in June			August		
	≤ 3	> 3	Adults	≤ 3	> 3	Adults	≤ 3	> 3	Adults	≤ 3	> 3	Adults
	children	children	only	children	children	only	children	children	only	children	children	only
Head	75.0	12.5	12.5	70.0	20.0	10.0	60.0	30.0	10.0	66.7	33.3	0.0
Feet	70.0	20.0	10.0	63.6	27.3	9.1	63.6	36.4	0.0	66.7	33.3	0.0
Neck	66.7	25.0	8.3	55.6	44.4	0.0	50.0	40.0	10.0	8.3	58.3	8.3
Drumstick	55.6	27.8	16.7	58.8	23.5	17.7	58.2	23.5	17.7	55.6	27.8	16.7
Thigh	55.6	27.8	16.7	58.8	23.5	17.7	58.8	23.5	17.7	55.6	27.8	16.7
Wing	52.9	29.4	17.7	58.8	23.5	17.0	60.0	26.7	13.3	52.9	29.4	17.7
Breast	57.2	28.8	14.3	58.3	16.7	25.0	58.8	23.5	17.7	60.0	33.3	6.3
Back	52.9	29.4	17.7	57.1	28.6	14.3	57.1	28.6	17.7	55.6	27.8	16.7
Heart	60.0	26.7	13.3	56.3	25.0	18.8	56.3	25.0	18.8	55.6	27.8	16.7
Liver	58.8	23.5	17.7	53.3	26.7	20.0	64.3	21.4	14.3	55.6	27.8	16.7
Intestines	25.0	50.0	0.0	85.7	14.3	0.0	50.0	33.3	0.0	50.0	50.0	0.0

Chicken portions such as drumsticks, thighs, wings, breast and back formed the preferred portions while heads, feet, necks, and abdominal organs formed the less-preferred meat portions by household members. There was a relationship between number of children and consumption of intestines in the households ($\chi^2 = 9.05$; $P < 0.05$). Increasing number of children in the households increased chances of consuming intestines. Adult males mostly consumed preferred portions; they were also observed consuming hearts and liver. The preferred portions that were mostly consumed by adult females constituted drumsticks, wings, breasts and back; necks were mostly consumed among the less-preferred portions. All children consumed the less-preferred portions; however, female children consumed back and breasts and increased the consumption of less preferred portions in August. There was a decline of discarded less-preferred meat portions until June and increased in August. These portions were either disposed or fed to cats and dogs in the household.

The proportions of the households that consumed the different meat portion varied with month of the year. Within the households, meat consumption was common among the individuals of the same gender and age groups. The proportion of the households that consumed the preferred portions was higher than those that consumed the less-preferred portions ($P < 0.05$). Thighs and drumsticks were the mostly consumed among the preferred portions while breasts formed the least shared portions and were consumed by adults in the households ($P < 0.05$). Intestines were mostly consumed across households that had more children. The households that did not have children discarded heads and intestines. Overall, households shared most of the meat portions in August.

4.3.4 Factors affecting meat consumption

From mini questionnaire that was administered to the household prior the commencement of the trial, 17, 61 and 22 % of the households consumed meat very seldom, at least once a week and more than once a week, respectively. The overall consumption of chicken meat varied across households with adults consuming preferred portions than children. There were households that restricted meat consumption by age, where children did not have priority over meat consumption. During cultural ceremonies meat consumption was restricted according to gender of attendees. Meat consumption among household members from resource-poor households was determined by various factors as identified by logistic regression.

4.3.4.1 Adult males

Table 4.3 shows the odds ratios of an adult male consuming village chicken meat. The logistic regression identified various factors that affected consumption of the meat portions by an adult male. None of predictors for less-preferred portion consumption by adult male were significant ($P > 0.05$). The gender of the head of the household was a significant predictor of an adult male consuming a drumstick in a household. An adult male was 0.184 times more likely to consume a drumstick in a male-headed household. Household size was significant in predicting an adult male consuming a thigh. An adult male was 0.279 time more likely to consume a thigh in a household comprised of less than five members. The practice of restricting meat consumption by age was a significant predictor for an adult male consuming a wing and breast in a household. An adult male was 0.215 and 0.026 times more likely to consume a wing and a breast, respectively, in a household that practised age restriction in meat consumption.

Table 4.3: Odds ratio estimates for adult males consuming preferred meat portions

Predictors	Drumstick			‡Sig.	Thigh			Sig.	Wing			Sig.
	Odds	LCI	UCI		Odds	LCI	UCI		Odds	LCI	UCI	
Head of the household (male vs. female)	0.184	0.057	0.590	*	0.729	0.245	2.175	NS	0.514	0.162	1.638	NS
Household size (small vs. large)	0.744	0.226	2.453	†NS	0.279	0.086	0.905	*	0.473	0.125	1.787	NS
Purpose of slaughtering (ordinary vs. ritual)	0.249	0.025	2.510	NS	2.079	0.227	19.026	NS	0.561	0.043	7.299	NS
Chickens slaughtered (1 vs. > 1)	2.956	0.745	11.179	NS	1.648	0.449	6.047	NS	1.330	0.316	5.596	NS
Flock size (small vs. large)	1.355	0.393	4.666	NS	1.946	0.582	6.501	NS	1.070	0.289	3.964	NS
Time of year (Feb. vs. other)	1.570	0.519	4.752	NS	0.540	0.189	1.546	NS	2.359	0.740	7.526	NS
Age restriction (yes vs. no)	1.441	0.388	5.348	NS	1.386	0.408	4.710	NS	0.215	0.053	0.880	*
Gender restriction (yes vs. no)	1.345	0.237	7.643	NS	0.508	0.106	2.442	NS	3.184	0.397	25.523	NS

LCI-Lowest confidence interval, UCI-Upper confidence interval, ‡Sig-Significance, †NS-Not significant ($P > 0.05$), * $P < 0.05$

4.3.4.2 Adult females

Table 4.4 shows the odds ratio estimates of an adult female consuming village chicken meat. Village chicken flock size significantly influenced the consumption of a neck by an adult female. An adult female was 4.666 times more likely to consume a neck in a household that reared a small flock. None of the predictors for less-preferred portions consumed by adult female were significant. The month was a significant predictor of an adult female consuming a thigh in a household. During February an adult female was 3.464 times more likely to consume a thigh. Restricting meat consumption by gender was significant in predicting an adult female consuming a breast in a household. An adult female was 0.061 times more likely to consume a breast in a household that restricted meat consumption by gender. None of the predictors were significant for an adult female consuming other preferred meat portions.

4.3.4.3 Children

Table 4.5 shows the odds ratio estimates of a male child consuming village chicken meat. Household size was a significant predictor for head consumption by a male child. A male was 0.132 times more likely to consume a head in a household comprised of a small size. The gender restriction practice on meat consumption and household size were significant predictors of liver consumption by a male child. A male child was 6.840 times more likely to consume a liver in a household that practised gender restriction on meat consumption.

On the other hand, the household size was a significant predictor for all the portions that were mainly consumed by a female child ($P < 0.05$). In a household comprised of a small size, a female child was 0.148, 0.020 and 13.405 times more likely to consume a head, feet and wing consumption by a female child. Factors affecting consumption of meat portions by female children are shown in Table 4.6.

Table 4.4: Odds ratio estimates of preferred portion consumption by adult females

Predictor	Thigh			Sig.	Breast			Sig.
	Odds	LCI	UCI		Odds	LCI	UCI	
Head of the household (male vs. female)	0.546	0.156	1.913	NS	0.105	0.026	0.413	NS
Household size (small vs. large)	2.248	0.619	8.163	NS	1.427	0.380	5.350	NS
Purpose of slaughtering (ordinary vs. ritual)	1.619	0.149	17.642	NS	12.890	0.649	256.114	NS
Chickens slaughtered (1 vs. > 1)	1.050	0.220	5.004	NS	0.684	0.139	3.357	NS
Flock size (small vs. large)	0.475	0.121	1.858	NS	1.211	0.296	4.954	NS
Time of year (Feb. vs. other)	3.464	1.058	11.339	*	0.618	0.174	2.195	NS
Age restriction (yes vs. no)	1.666	0.429	6.473	NS	2.694	0.558	13.007	NS
Gender restriction (yes vs. no)	0.843	0.127	5.587	NS	0.061	0.005	0.751	*

LCI-Lowest confidence interval, UCI-Upper confidence interval, ‡Sig-Significance, †NS-Not significant ($P > 0.05$), * $P < 0.05$

Table 4.5: Odds ratio estimates for less-preferred portion consumption by male children

Predictor	Head			Sig.	Feet			Sig.
	Odds	LCI	UCI		Odds	LCI	UCI	
Head of the household (male vs. female)	0.252	0.043	1.482	NS	25.724	1.478	447.595	*
Household size (small vs. large)	0.132	0.020	0.881	*	0.014	0.004	0.471	*
Purpose of slaughtering (ordinary vs. ritual)	4.354	0.612	56.863	NS	0.366	0.489	6.451	NS
Chickens slaughtered (1 vs. > 1)	6.547	0.512	83.774	NS	0.485	0.045	5.255	NS
Flock size (small vs. large)	2.984	0.561	15.833	NS	0.060	0.003	1.105	NS
Time of year (Feb. vs. other)	0.290	0.054	1.564	NS	0.147	0.012	1.790	NS
Age restriction (yes vs. no)	1.035	0.126	8.508	NS	0.013	0.001	0.449	*
Gender restriction (yes vs. no)	3.643	0.478	12.481	NS	0.688	0.006	2.879	NS

LCI-Lowest confidence interval, UCI-Upper confidence interval, ‡Sig-Significance, †NS-Not significant ($P > 0.05$), * $P < 0.05$

Table 4.6: Odds ratio estimates for head, feet and wing consumption by female children

Predictors	Head			Sig.	Feet			Sig.	Wing			Sig.
	Odds	LCI	UCI		Odds	LCI	UCI		Odds	LCI	UCI	
Head of the household (male vs. female)	0.934	0.292	2.992	NS	0.216	0.037	1.246	NS	0.472	0.073	3.037	NS
Household size (small vs. large)	0.148	0.04	0.547	*	0.02	0.002	0.209	*	13.405	1.105	162.685	*
Purpose of slaughtering (ordinary vs. ritual)	1.408	0.111	17.877	NS	0.1	0.002	4.377	NS	0.033	0.020	1.896	NS
Chickens slaughtered (1 vs. > 1)	2.326	0.543	9.966	NS	1.746	0.251	12.163	NS	0.124	0.015	1.048	NS
Flock size (small vs. large)	1.361	0.389	4.76	NS	4.726	0.79	28.275	NS	0.509	0.059	4.413	NS
Time of year (Feb. vs. other)	2.325	0.763	7.085	NS	0.683	0.14	3.325	NS	0.614	0.094	4.021	NS
Age restriction (yes vs. no)	0.581	0.139	2.419	NS	7.676	0.539	109.281	NS	5.486	0.555	54.210	NS
Gender restriction (yes vs. no)	0.788	0.122	5.111	NS	1.544	0.114	20.854	NS	0.891	0.243	1.236	NS

LCI-Lowest confidence interval, UCI-Upper confidence interval, ‡Sig-Significance, †NS-Not significant ($P > 0.05$), * $P < 0.05$

4.3.4.4 Discarded meat portions

Table 4.7 shows the factors that influenced discarding of less-preferred portions by the households ($P < 0.05$). Household size was the significant predictor of discarding of the less-preferred portions by the households. A household comprised of a small household was 3.694, 14.893, 10.793 and 5.199 times more likely to discard a head, feet, neck and intestines, respectively. Purpose of slaughtering a village chicken was a significant predictor for discarding feet and necks ($P < 0.05$). Household that slaughtered village chickens for an ordinary meal were 21.242 and 30.784 times more likely to discard feet and necks. Also, the number of village chickens slaughtered influenced discarding of a head, feet and neck in a household. The purpose of slaughtering a village chicken in a household also influenced discarding of less-preferred portions in a household.

4.3.5 Satisfaction on portions consumed

Household members were asked to state their levels of satisfaction on portions they consumed. Adults were satisfied over the consumed portions. There was a relationship between the households that prioritised adults on meat consumption and proportion of adults that were satisfied with the portion consumed ($\chi^2 = 8.5094$; $P < 0.05$). Households that practised gender restriction over meat consumption prioritized adult males consuming the preferred meat portions. However, children of all sexes preferred the portions that were consumed by adults as they felt those portions were big and flavoursome. This indicated dissatisfaction towards meat portions consumed children. There was also a relationship between the number of village chickens slaughtered and the level of satisfaction by female children over meat consumption ($\chi^2 = 8.6140$; $P < 0.05$). As the number of village chickens slaughtered increased, the proportion of female

Table 4.7: Odds ratio estimates of discarding less-preferred meat portions in the households

Predictor	Head			Sig.	Feet			Sig.	Neck			Sig.
	Odds	LCI	UCI		Odds	LCI	UCI		Odds	LCI	UCI	
Head of the household (male vs. female)	2.035	0.654	6.334	NS	1.943	0.556	6.786	NS	0.709	0.164	3.075	NS
Household size (small vs. large)	3.694	1.078	12.653	*	14.893	2.828	78.431	*	10.793	1.905	61.166	*
Purpose of slaughtering (ordinary vs. ritual)	1.974	0.157	24.749	NS	21.242	1.502	300.447	*	30.784	1.400	676.798	*
Chickens slaughtered (1 vs. > 1)	0.153	0.033	0.707	*	0.172	0.035	0.833	*	0.109	0.020	0.613	*
Flock size (small vs. large)	0.379	0.109	1.320	NS	0.553	0.148	2.061	NS	0.341	0.064	1.803	NS
Time of year (Feb. vs. other)	0.798	0.269	2.370	NS	0.852	0.260	2.788	NS	1.066	0.264	4.299	NS
Age restriction (yes vs. no)	0.749	0.199	2.818	NS	0.997	0.266	3.732	NS	2.279	0.426	12.194	NS
Gender restriction (yes vs. no)	0.536	0.095	3.038	NS	0.897	0.170	4.279	NS	0.225	0.018	2.731	NS

LCI-Lowest confidence interval, UCI-Upper confidence interval, ‡Sig-Significance, †NS-Not significant ($P > 0.05$), * $P < 0.05$

children that wished to consume the most preferred portions of village chickens decreased from 40 to 19 %.

4.4 Discussion

More than 5 in 10 households are headed by females that reside on farm relying more on farming and these have children to provide with nutritious food. Traditional beliefs by these households justify frequent use of village chickens to perform cultural rituals. However, not all ritual uses of village chickens allow the consumption of the meat by household members. Indicating increased slaughtering of village chickens may not guarantee increased meat consumption.

Village chicken meat consumption is associated with the range uses of these birds that can be cultural, religious, social or ordinary. Results of the current study on increased slaughtering of the hens from the flock disagrees with Gueye (2000) who reported that cocks are mainly removed from the flock at early growth stages. This may also be due to households aiming to reduce non-productive flock. Increased slaughtering of village chickens in April and June can be attributed to increased number of public holidays including the religious Easter festival (Aklilu *et al.*, 2007). Generally, in communal areas households preferably schedule cultural events to be held during the cool dry season to avoid rapid spoilage of carcasses. Average flock size declined during the same period due to increased slaughtering of village chickens. However, overall flock sizes owned by the households were low compared to those reported in by Mtileni *et al.* (2009), the average flock size of 17 chickens per household. This may be related to the undefined disease outbreaks during the rainy season of the previous year. Farmers were not able to provide vaccines and medication to their chickens to prevent or cure particular diseases. Fear of disease

outbreaks can increase sales and consumption of village chickens in the households (Gueye, 2000). Also, the challenge of flock size declines may be due to inbreeding that result from keeping the same flock for a long period of time without controlled breeding.

The current study revealed that household size and purpose of slaughtering a chicken affect the number of village chicken to be consumed per meal. Also, in agreement with Aklilu *et al.* (2008) that the gender of the head of the household has an effect on the meat consumption pattern among household members. That is, a male head of the household is likely to have a priority on consumption of nutritious portions of a chicken. However, in this study, adult females were also consuming the preferred portions that are customarily consumed by men. This can be due to great proportion of females as heads of the households. Also, depending on cultural or religious circumstances, meat consumption patterns may differ.

Village chicken meat was commonly shared among household members, sharing patterns increase with the number of members. The type of an event of where village chicken is slaughtered affected the sharing patterns of the meat. During a cultural ceremony, religious festival or any other special occasion, the sharing patterns of meat portions among household member or attendants varied from meat consumption of an ordinary meal. Members of a large household size consumed relatively low volumes of chicken meat due to increased sharing of the portions. In this way, increasing number of chicken slaughtered per meal reduced meat portions sharing among household members and therefore, increased the volume of the meat consumed per member including children.

A variety of practices across the households affected meat consumption and these withheld consumption the preferred portions by male and female children. According to Aklilu *et al.* (2008), adult males received the most nutritious portions and there was a notion that village chicken meal contributed to good and solid relationship especially the marriage. The intensity of gender issues towards meat consumption in the households affects consumption of meat by children. Prioritising adults to consume the meat, also, benefited mainly adult males as they consume more of the most preferred portions of the meat. The majority of the adult males could include elder sons and relatives of the households that consume the preferred portions.

Chicken flock size influenced neck, back and wing consumption by adult females. The consumption of a neck as a less preferred portion could be due to few number of chickens being slaughtered in a household as a result of low availability of chickens in a household. Households may tend to reduce culling rate of their chickens in order to generate more breeding stock. In that way, an adult female in the household consumes some of the less preferred portions due to inadequacy of meat. On the other hand, as described in Chapter 3, the consumption of the back and wings may be mainly influenced by the perceptions that these portions are suitable for adult females. Also, the small chicken flock size might have been caused by disease outbreaks in the area during the previous year, the same disease outbreaks were also observed in August 2014. However, adult females have increased chances of consuming thighs in February and these results agree with Aklilu *et al.* (2007) as this month is found along the season that is associated with many social events occurring. Those events include Christmas, New Year's Eve and Easter holidays and result in increased slaughtering chickens. Also, due to high proportion of female-headed households, adult females as eldest in a family have priority on consumption of preferred

portions, however if the household has an adult male that is not a head of the households, that person has priority over the consumption of preferred meat portions. The practice of gender restriction by households benefit breast consumption by adult females, and this is a fleshy portion of the meat.

Liver consumption by male children is in disagreement with Aklilu *et al.* (2008) who reported that, in Ethiopia, abdominal organs are served to adult males as they improve their sexual stamina. Household size also had a similar effect on male children consuming heads in household comprised of 5 or less members. This might also be due to small size of the head and liver that they seem suitable for consumption by children in a household. Furthermore, the practice of gender restriction on meat consumption influenced male children to consume the liver. Liver consumption by male children might be advantageous to their reproductive future. Male children consume all less preferred portions of the meat.

The number of individuals in the household influences the consumption of meat portions by female children. Wings are the only preferred portions that are consumed by female children in the household. This could indicate that most of the individuals in the female children group were relatively older than their male counterparts and that might have resulted in consumption of some of the portions that were consumed by adult females.

Moreover, households comprised of few household members did not consume all organs of a chicken. Mainly the less preferred portions of the meat are the discarded from consumption by household members, due to abundance of preferred meat portions to all member of a household.

This may result from household members consuming adequate portions of village chicken meat or the household have alternative source of meat and proteins. Discarding meat portions also indicate the possibility of a household keeping companion animals such a cats and dogs that are usually fed some of these portions.

Overall, the consumer satisfaction over meat consumption favours adult males and females as they refer to the preferred portions as adequate. Household practices such as age and gender restriction on meat portions may be influencing the increased consumption of preferred portions by adult males and females. Children of both sexes are not satisfied with consumed meat portions as they consumed mainly the less preferred portions of the meat. This situation appeals to human protein requirements whereby children require high intake of nutrients for growth and development of their muscles and tissues. It is evident that meat consumption in the household is not satisfactory to all household members. Increasing the number of village chickens slaughtered may circumvent children dissatisfaction over the meat portions they consume in a household as this was shown by the decline in the proportion of female children that were dissatisfied over meat consumption. Children consumed the less preferred portion even in the small-sized households.

4.5 Conclusions

The study has shown that the number of village chickens slaughtered in a household varies from times to time and village flock size decrease with increasing meat consumption rate. The customary practices in the households have a negative impact on children consuming the preferred meat portions. In this way, children are the main consumers of less preferred portions

even if the number of village chickens slaughtered increases. Adult males are the main beneficiaries of village chicken meat consumption in the household and are always satisfied with meat portions consumed and this result in male and female children not satisfied over the meat portions they consume. That is to say, as household size increases, the vulnerability of children, especially female child to nutritional insecurity increases.

4.6 References

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Chapter 5

General discussion, Conclusions and Recommendations

5.1 General discussion

The hypotheses tested were as follows. The chicken flock size, gender of the head of household, socio-economic status and household size influence the extent to which village chickens contribute to towards household food security. The preferred portions are consumed by all members of the household. These hypotheses were tested in Chapters 3 and 4, respectively.

In chapter 3, households that reared large chicken flock sizes were better off to attain more nutritional security to their household members while those that reared small chicken flock sizes were more dependent on village chicken meat as the animal source protein. Thus, rearing village chickens for household consumption was commonly practised as it was a dominant reason among the resource-poor households. This suggests that other village chicken roles were considered subsequently to consumption usage of a chicken in a resource-poor household.

The current study highlighted that village chickens were not reared for income generation purposes and that was observed in households that reared small and large flocks. To eh households that owned large flock sizes, this was an indication of village chickens as a measure of wealth in the household since those households were more likely to keep other livestock species. In such households, village chickens are mostly kept for leisure and prestige, since the dependency of village chickens for meat consumption is low. In that way, village chickens contributed more in the households that reared small flock sizes, female-headed and large

household size. Women from resource-poor were commonly found to be on-farm dwellers, received little or no income at all. Increasing village chicken flocks in the resource-poor households could have resulted in improved contribution of these birds to the poor households, thus, improved food security.

The gender of the head of household had an impact in the decision making as the head catered for all matters related to the household. To some extent, the culling rate of chicken and other livestock species was determined by the head of household and this person was commonly the owner of the chickens in a household (Chapter 3). The effect of the gender of the household, furthermore, intensified meat consumption patterns among household members, whereby, the consumption of edible portions became skewed to the head of household and adult members.

Large households were usually comprised of more children, thus, children required more nutrients, especially proteins, for growth and development. In that way, the increase in household size increased the number of chickens slaughtered in the household. However, an inverse relationship between household size and consumption per person was observed, indicating that, members of a larger household consumed less amount of food per person. Therefore, large households that did not receive regular income were likely to face the challenge of inadequate and nutritional insecurity.

The results obtained in Chapter 3 were as expected; they were similar to those obtained in various similar studies. Therefore, the hypotheses are not rejected.

In Chapter 4, the increasing in the number of children in a household increases the chances of less-preferred portion consumption. Adults benefit more on meat consumption as they consume more preferred portion of the chicken. In rural regions, more respect is given to males especially the heads of households as they are seen always consuming more meat than any other household members. This kind of behaviour resulted in children being prone to reduced animal protein intake, whereas, taking advantage of large stocks of village chickens in rural households would have contributed even more to attainment of children nutritional security. Village chicken meat contains animal-source proteins that have high biological value and are essential for growth and development of children muscles. The current study justified the necessity to improve village chicken production in the resource-poor households to first mitigate the challenge of household nutritional insecurity.

Therefore, the hypothesis that village chicken meat is consumed equally among household members is rejected. This is because these portions were mainly consumed by adult members of the household.

5.2 Conclusions

Village chicken meat consumption continues to provide proteins in resource-poor household members. Village chicken meat consumption benefits the adult members of the household demoting child nutritional requirements that may result in detrimental health consequences. Therefore, village chicken contribution to resource-poor households is not yet optimised to alleviate poverty in resource-poor households. The factors that affect meat consumption by

household members should be considered for future progressions aimed to improve the contribution of village chickens.

5.3 Recommendations

To optimise the contribution of village chickens to resource-poor households, it is recommended that, women as major owners of village chickens should prioritise village chicken production for home in order to improve protein intake in the resource-poor households. Village chicken production should be more intensive, in order to increase chicken flock sizes that will adequately supply preferred portions especially to children. At household level, the importance of nutrients from village chickens should be emphasized, especially to child's growth requirement. Once, the objective of meat consumption has been satisfied, then the focus may be diversified to incorporate income generation through selling village chickens in order to improve the food security of resource-poor households.

Further research should focus on in-depth studies on the nutritional contribution of village chickens to resource-poor households. The following are possible research areas:

1. To determine the quality of meat portions consumed by the household members;
2. To determine the ideal number of consumers to consume one village chicken; and
3. To determine the contribution and quality eggs from village chickens from resource-poor households.

Appendix A

University of KwaZulu-Natal and Department of Agriculture, Forestry and Fisheries

Animal and Poultry Science

Topic: The contribution of indigenous chickens in the rural households- approaching zero hunger.

INTRODUCTION

My name is _____. I'm the representative of the partnership between University of KwaZulu-Natal and provincial Department of Agriculture, Forestry and Fisheries in implementing the theme of Zero Hunger via research. I am working on a project of the above-mentioned topic. So I pleasantly invite you to participate in this survey by filling this questionnaire. Households have been selected randomly for which this very household has been chosen to take part in this questionnaire. By so doing you will be helping me to bring together crucial information that will help me to complete this project and so to help the nation about the contribution of indigenous chickens in rural households. Please note that there is neither right nor wrong answers to these questions, you have a right to remain anonymous and you may withdraw from answering questions should you feel your right to remain anonymous is violated.

Community Name:	
District Name	
Do you have indigenous chickens in this household? (use code) code: 1- yes 2- no	
Time interview starts (HH:MM)	

SECTION A: Demographic and socio-economic status of the household

1. Name of the head		3. Gender/ codes:1-male 2-female	
2. Age		5. Ethnic group	
4. Relationship codes: 1-head 2-spouse 3-child		7. Primary occupation codes: 1-Farming 2-Livestock rearing 3-Unemployed 4-Pensioner 5-Casual work 6-Self-employed 7-Formal work 8-Student 9- None	
6. Marital status codes: 1-single 2-married 3-divorced 5-widowed 6-cohabiting 7-other (specify)		9. Number of years residing in this area	
8. Secondary occupation/ codes: 1-Farming 2-Livestock rearing 3-Unemployed 4-Pensioner 5-Casual work 6-Self-employed 7-Formal work 8-Student 9-None		11. Number of adults in the households/ (>13years)	
10. Religion codes: 1- Christian 2- tradition-based 3- other (specify)		13. The major source of income this household codes: 1- formal work 2- casual work 3-hawking 4- old-age grant 5- child support 6- other (specify/)	
12. Number of children in the household up to 13 years of age? (<13years)			

14. How much do you spent on food per month_____ 1) R0-R500 2) R501-R1000 3) R1001-R1500 4) R1501-R2000 5) R2001-R2500 6)>R2500

15. When do you face food shortages?

- 1) Summer 2) Autumn 3) Winter 4) Spring

16. Ownership and benefits of different types of livestock

Other livestock type	Number of animals	How long have you been farming? (Code: 1= < 5 years, 2= 5-10 years, 3=10-20 years, 4=20-50 years)	Owner of the animals Code: 1.Father/ 2. Mother 3. Children 4. Other (specify)	Responsible member in the household Code: 1. Father 2.mother 3. Children. 4.Other	Reason for rearing animals Codes 1.consumption 2. Selling 3.Prestige 4.Leisure 5. Rituals 6. Manure	Which livestock that contribute significantly into livelihood of the household Tick (✓) as many as you can.	Rank the importance of livestock 1 =most 2= moderate/ 3=least
Broiler							
Cattle							
Sheep							
Goats							
Ducks							
Pigs							

17. What type(s) of chickens do you have?

Types of chickens	Flock size				Hen: cock
	Cocks	Hens	Chicks	Total	Ratio
Normal village chickens					
Naked-neck					
Frizzle					
Exotic layers					
Exotic broilers					
Other (specify)					

18. What are the reasons of rearing indigenous chickens in this household

Reasons	Tick as many as possible	Rank the most 3 reason 1= most 2=moderate, 3= least
Meat		
Eggs		
Income		
Leisure		
Rituals		
Manure		
Prestige		
Other (specify)		

19. Evaluating the importance of chickens

	Number of animals	How long have you been farming? (Code: 1= < 5 years, 2= 5-10 years, 3=10-20 years, 4=20-50 years)	Owner of the animals Code: 1.Father 2.Mother 3.Children 4. Other (specify)	Responsible member in the household Code: 1.mother 2.father 3.Children 4.Other	Number of this type of animal bought since December 2012/	Total cost of purchasing this type of animal since December 2012	Number of animals sold since December 2012	Total number slaughtered since December 2012/	Flock composition	
									M	F
Chicken										

20. How can you describe your involvement in animal rearing? _____ (1) Full time (2) part time

21. What do you think can be done to improve contribution by chickens in your household?

22. In which seasons do you experience **most** of the challenges for indigenous chicken? (Tick as many as possible then rank the most 3)

Challenges	Seasons							
	Hot Wet	Rank	Hot Dry	Rank	Cool Dry	Rank	Post-Rainy	Rank
Disease								
External parasites								
Internal parasites								
Theft								
Predation								
Limited market access								
Feed shortage								
Housing								
Other (specify)								

23. Predation as a cause of chicken loss (Tick and rank 1-3 most -least important)

Predators	Tick	Rank
Snake		
Mongoose		
Dog		
Eagle		
Other(s) specify		

24. Tick the most important predator of the following chickens

	Snake	Mongoose	Dog	Eagle	Others
Eggs					
Chicks					
Growers and adults					

25. Type of chicken farming system do you practice (1) Extensive (2) Intensive (3) Semi-intensive (4) Other (specify)

27. Do you house chickens at night? (1) Yes (2) No

28. If yes, where do you house them?

(1) Kitchen (2) In the trees (3) In cages (5) Chicken house built for them (5) other specify

29. Materials used to make chicken house (1) Mud (2) woods and nets (3) Zinc metals (4) Bricks (5) other (specify)

30. Do you clean chicken houses? (1) Yes (2) No.

31. How often to do you clean chicken house? Code: 1. once a week, 2. twice a week, 3. once a month, 4. twice per month 5. When we remember

SECTION B: Products (Meat and eggs)

1. What are the main reasons for slaughtering indigenous chicken in this household?
Tick as many as possible and rank

REASONS	Chicken uses	Rank the most 3
Only food source available		
Fear of diseases/		
Family gatherings		
Preparing for guests		
Cultural activities		
Incentive for children		
<input type="checkbox"/> Social gathering		
<input type="checkbox"/> Meal on Public holidays		
<input type="checkbox"/> During school holidays		
<input type="checkbox"/> Festive season		
<input type="checkbox"/> On paydays		
<input type="checkbox"/> Other (specify)		

2.

ume eggs from indigenous chickens? (1) yes (2) no

3. If no, why not? Explain

4. What are the main reasons for consuming eggs from indigenous chickens Tick as many as possible reasons and rank

REASONS	Egg uses	Rank the most 3
Only food source available		
Family gatherings		
Preparing for guests		
Cultural activities		
Social gathering		
Meal on Public holiday		
During school holidays		
Festive season		
Other (specify)		

5. How many indigenous chickens do you slaughter per given meal in this household? ___
6. Who makes decision on the distribution of the indigenous chicken to family members in the household? (1) head (2) spouse (3) other (specify)

7. How do you distribute the indigenous chicken among members of the household? Please tick.

	Male	Female	Children
Head			
Feet			
Neck			
Thighs			
Drumstick			
Wings			
Breasts			
Back			
Intestines and abdominal parts			
Eggs			
Other (specify)			

(s) consumed enough for all house hold members? (1) Yes (2) no

9. If no, what is the ideal number of chickens to satisfy your household members? _____

10. Do you prefer meat form indigenous chickens than broilers? (1) Yes (2) no/*cha* (skip Q11)

11. If yes to Q10, why do you prefer that way? (1) Leanness (2) better taste/ (3) freshness (4) Colour of meat (5) other (specify)

12. If no to Q10, why do you prefer that way(1) low tenderness(2) low hygiene (3) not familiar(4) other(specify)

13. Are there any opportunities for indigenous chickens in achieving zero/or minimized hunger?

14. What research issues do you think should be addressed under indigenous chicken production?

Research issues	Tick as many as possible	Rank the most 3 research issues
Production		
Handling		
Health		
Market		
Feeding techniques/		
Nutritional composition		
Other (specify)		

15. What are possible interventions that are required in terms of improving the contribution by indigenous chicken? Explain

Thank you very much for your time and contribution?

Do you have any question?

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DECLARATION BY THE PARTICIPANT
RESEARCH SURVEY ON THE CONTRIBUTION OF INDIGENOUS CHICKENS IN THE RURAL
HOUSEHOLDS OF KWAZULU-NATAL: APPROACHING ZERO HUNGER

I..... (Full names of participant) hereby confirm that I understand the contents of this document and the nature of the research project, and I consent to participating in the research project.

I understand that I am at liberty to withdraw from the project at any time, should I so desire.

SIGNATURE OF PARTICIPANT

DATE

.....

Appendix B

University of KwaZulu-Natal and Department of Agriculture, Forestry and Fisheries

Animal and Poultry Science

Topic: The contribution of village chickens in the rural households.

INTRODUCTION

My name is _____. I'm the representative of the partnership between University of KwaZulu-Natal and provincial Department of Agriculture, Forestry and Fisheries in implementing the thyme of Zero Hunger via research. I am working on a project of the above-mentioned topic. So I pleasantly invite you to participate in this survey by filling this questionnaire. Households have been selected randomly for which this very household has been chosen to take part in this questionnaire. By so doing you will be helping me to bring together crucial information that will help me to complete this project and so to help the nation about the contribution of indigenous chickens in rural households. Please note that there is neither right nor wrong answers to these questions, you have a right to remain anonymous and you may withdraw from answering questions should you feel you right to remain anonymous is violated.

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SIGNATURE OF PARTICIPANT

DATE

.....

Mini Questionnaire: Meat Consumption Trial

1. What is the age of the farmer? ____
2. What is your marital status? 1-single 2-married 3-divorced 4-widowed 5-cohabiting 6-other (specify)
3. What is your main occupation? 1-Farming 2-Livestock rearing 3-Unemployed 4-Pensioner 5-Casual work 6-Self-employed 7-Formal work 8-Student 9- None
4. What are the major sources of income in this household? 1- formal work2- casual work3- hawking4- old-age grant5- child support6- other(specify
5. Please circle the most main source of income. 1- formal work 2- casual work 3-hawking 4- old-age grant 5- child support6- other(specify
6. What is you religious system? 1- Christian 2- tradition-based3- other(specify)
7. How many chickens do you slaughter at a given time ____
8. Which portions do you consider most nutritious? (Tick as many as possible)

	Male adult	Female adult	Male child	Female child
Head				
Feet				
Neck				
Drumstick				
Thigh				
Wing				
Breast				
Back				
Heart				
Liver				
Gizzard				
Intestines				
Gravy				

9. Do you prefer meat form indigenous chickens than broilers? (1) Yes (2) no (skip Q10)
10. If yes to Q9, why do you prefer that way? (1) Leanness (2) better taste (3) freshness (4) Colour of meat (5) other (specify)
11. If no to Q9, why do you prefer that way? (1) Tenderness (2) low hygiene (3) not familiar (4) other (specify)

Meat consumption checklist

Portions	Who ate this portion/	Was this portion shared?		Was the amount of this portion enough to the person(s) who consumed/ 1=yes,2=no
		Codes: 1=yes/ <i>yebo</i> ,2=no/ <i>cha</i>	If yes, by how many/	
Head				
Feet				
Neck				
Drumstick				
Thigh				
Wing				
Breast				
Back				
Heart				
Liver				
Gizzard				
Intestines				
Gravy				
Head				

1. Who made a decision on the distribution of IC to household members? ____ Use codes below the table.

2. Which portion(s) would you like to eat? Explain.

Adult male:

Adult female:

Male child:

Female child:

Codes: 1= head, 2= spouse, 3=adult male, 4=adult female, 5= male child, 6- female child, 7- all of us

3. What made you eat that portion(1) Custom(2) own choice(3) told to do so(4) other (*specify*)
4. Were there any gender restrictions on consumption of certain portions of IC? __ (1) Yes (2) No If yes, briefly explain. _____
5. Were the any age restrictions? __ (1) Yes (2) No
6. How many village chickens do you have now? ____

Thank you very much for your time and contribution.

Do you have any question(s)?

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