A case study to establish the economic viability of local chicken production and processing in West Pokot County, Kenya

Article history: *Revised format: 25th March 2021, Available online: 15th April 2021*

Kemboi Michael*, NK. Rop. Kering Victor

Abstract:

The study presents a synthesis of findings undertaken in four sub-counties (West Pokot, South Pokot, Pokot Central and North Pokot) in Pokot West sub-county. The major objective of the study was to establish the economic viability of local chicken processing in the County. Questionnaires and focus group discussions were used to collect data. The results of the study revealed that the purpose of rearing chicken was for income and home consumption. Women were mainly involved in rearing chicken. The local chicken scavenged and their feed was supplemented with home-grown grains and household food refusals. The chicken were kept in the poultry house. The average number of hens were 11 per household (ranged 1-50), cocks 5 per household (ranged 1-30) and chicks were 16 per household (ranged 0-250). The average number of cocks sold per year per house hold ranged from 50 to 60 cocks. The hens sold per year for each household ranged from 40 to 60 hens while the eggs sold per year for each of the house hold ranged from 480 eggs to 5520 eggs. They were sold mainly to local traders at stalls at upper market centres. Producers, internal and external traders were the main actors in the local chicken value chain. Outbreaks of diseases and predation were the major constraining factors of chicken production. However, poultry farmers showed a lot of enthusiasm to boost up local chicken production and productivity. The vast population of chicken and high demand of chicken in the County justifies the establishment of a chicken processing plant. Nonetheless, emphasis should be given in availing feed, vaccines, veterinary drugs and infrastructural development. Further, market linkages for chicken and eggs need to be developed by having an organized market system in the County. Additionally, the County government needs to consider availing credit, extension and veterinary services. With this in place, area producers will be able to develop consistent chicken supply to service local and regional markets.

Keywords: Economic Viability, Local Chicken, Processing, Production, West Pokot County.

Paper Type: Research Article.

Recommended Citation: Kemboi MK, NK. Rop & Kering, V. A case study to establish the economic viability of local chicken production and processing in West Pokot County, Kenya. *Journal of Economics, Management Sciences & Procurement*, 1-73, 2021

AUTHORS' AFFILIATIONS

Nicholas K. Rop, Senior Lecturer, School of Agriculture & Biotechnology, University of Eldoret, Kenya. PO. Box 1125-30100, Eldoret. E-mail: nicholas.rop@uoeld.ac.ke.

Kemboi Michael Kipkorir, Adjunct Lecturer, School of Economics, University of Eldoret, Kenya. E-mail: rop.michael@yahoo.com

Kering Victor Kiptum, Adjunct Lecturer, Department of Business Administration, University of Eldoret, Kenya, Email:kiriongi@gmail.com

ABBREVIATIONS AND ACRONYMS

ASDSP	Agricultural Sector Development Support Program
ASDS	Agricultural Sector Development Strategy
EPZA	Export Processing Zones Authority
FAO	Food and Agriculture Organization
GOK	Government of Kenya
ILRI	International Livestock Research Institute
NCD	Newcastle Disease
NGO	Non-Governmental Organization
PPP	Public Private Partnership
SMS	Short Message Service
SNV	Netherlands Development Organization
VC	Value chain

1.1 INTRODUCTION

1.1.1 Background Information

The impact of local chicken in the national economy of developing countries and its role in improving food security, income and livelihood of many smallholders is significant owing to its low cost of production (FAO 1997; Gondwe 2004; Abdelqader 2007; Abubakar *et al*. 2007).In sub-Saharan Africa, 85% of all households keep chicken under free range/extensive system, with women owning 70% of it, providing scarce animal protein in the form of meat and eggs as well as being a reliable source of cash income (Gueye 1998; Bagnol 2000; Sonaiya *et al*. 2004;Abubakar *et al*. 2007).

In Kenya, poultry keeping is a source of livelihood as well as an income generating activity. The poultry statistics as per the Agriculture Sector Development Strategy is an estimated 28 million birds out of which 76% consists of free ranging indigenous chicken and 22% are commercial layers and broilers (Government of Kenya (2010)). As a result, local chicken are a living capital quickly mobilized in case of financial crisis. They are a unique opportunity for farmers to save and invest since they are financially and technically easy to breed.

As per the County department of livestock production (2012), there is approximately 38,400 birds in West Pokot County. The demand for local chicken from the county is relatively high. This is due to consumers' preference for local chicken as opposed to broilers and layers. Trade in local chicken is a source of revenue in the county as it fetches approximately Ksh 19,200,000.In the past, poultry farming was seen as a preserve for women and children who largely owned and controlled local chicken. However, as time went by, men got involved since it was fetching in a lot of money (ASDSP, 2014).

1.1.2 Study Objectives

The objectives of the survey were namely to;

1. Provide information on the vertical and horizontal linkages of the local value chain by 2015
2. Provide information on potential investment opportunities available in local chicken by 2015
3. Provide information about market access in the local value chain by 2015

1.1.3 Study Approaches and Methodology

The study used both qualitative and quantitative research. A limited number of critical issues were resolved through a quantitative approach. The data obtained were analysed using standard social science statistical packages. A questionnaire instrument and focus group discussions were used to collect information from the respondents.

1.2 DESCRIPTION OF THE STUDY AREA

1.2.1 Location and Size

West Pokot County is a county of Kenya. Its capital and largest town is Kapenguria. The county has a population of 631,231 (as per 2013 projections) and an area of 9,169.4 km².It is situated in the north rift along Kenya's Western boundary with Uganda border.

1.2.2 Climate

Rainfall varies from 400mm to 1,500mm per annum while temperatures ranges from 10 °C to 30°C .The high altitude areas in the county with moderate temperatures experience high rainfall which is suitable for crop production. The warm climate in the county is conducive for the rearing of chicken.

1.2.3 Administrative units

West Pokot has four sub-counties namely: West Pokot, South Pokot, Pokot Central and North Pokot. There are 13 divisions, 61 locations and 222 sub locations. Further, the county is divided into four constituencies namely Kapenguria (area 1,822.5 Km^2), Sigor (area 2109.7 Km^2), Kacheliba (area 3,953.2 Km^2), and Pokot South (area 1,284 Km^2).

1.2.4 Demographic profile

As per 2013 population projections, the county has had a population growth of 5.2% from 512,690 (254,827 male and 411,585 female) to 631,231 persons (317,746 male and 317,484 female).The youth, aged 15 to 34 years (196,830) comprise 31% of the county's population while the population of those 14 years

and above 64 years is 55 percent. This is a clear indication that dependents are more than those in the labour force.

1.2.5 Production figures for Chicken

Local chicken breeds are majorly reared by poultry farmers in the County. Only a few of the farmers have upgraded to exotic breeds. As evidenced in table 1, local chicken is available in large quantities in all parts of the County.

Table 1: Production figures for Chicken

Type of Chicken	Year 2010	2011	2012
Indigenous	659,750	660,750	662,750
Layers	700	1,700	3,700
Broilers	200	380	500
Crosses	41,880	42,880	44,880
Total	704,540	707,721	713,842

Source: *County livestock development office annual report 2012 – West Pokot*

2.0 STUDY RESULTS

2.1 PRODUCERS

2.1.1 Producer Characteristics

Producer characteristics were meaningful to the study as it helped to understand the logic of the background factors of the various respondents. The results of the study are based on the four sub-counties in West Pokot namely; South, Central, West and North sub-county. The findings of the study are shown in table one. Based on the results, 58.3% of the farmers in Pokot South are female while 41.7% are male. With reference to Pokot Central, majority 55.7% are male and 44.3% are female. In Pokot West, majority 61.3% are female while 38.7% are male. Further, 53.4% of the farmers in Pokot North are male whereas 46.6% of them are female. This implies that chicken farming is a major income generating activity for women. Also, chicken rearing is considered a household matter and can be done with only a relatively low investment in comparison to other livestock.

It was also important to establish the family member that owns the chicken. As evident in the results, the owner of the chicken was majorly the wife as indicated in South (26.7%), Central (90.2%), West (93.5%) and (70.7%) of them in Pokot North sub-county. This shows that the responsibility of taking care of the indigenous local poultry is likely to be done by women.

Further, majority of the farmers affirmed that they belong to a group. Specifically, 78.3% of those in Pokot North sub-county, 55.7% from Central, 64.5% South and 63.8% of the farmers from Pokot West confirmed that they belong to a group. Members of such groups receive support in the form of cash and subsidies. Educational programs such as workshops also form a major part of the benefits they receive from such associations. Okantah *et al.,* (2003) noted that poultry farmers with low patronage for farmer associations are often limited in their access to information, goods and services.

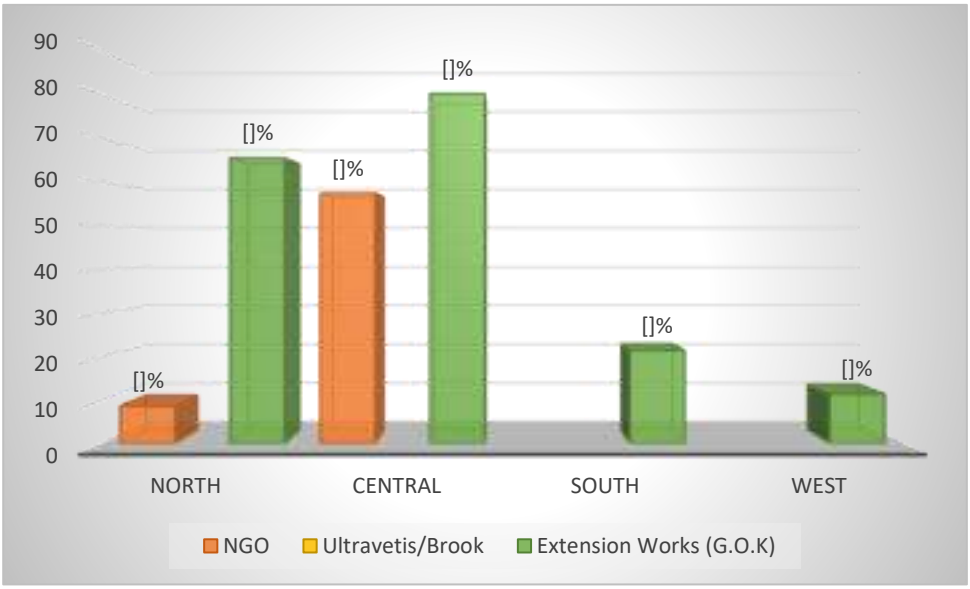
Table 2 Producer Characteristics

		SUB-COUNTIES WEST POKOT			
		South	**Central**	**West**	**North**
Gender	**Male**	25 (41.7%)	34 (55.7%)	24 (38.7%)	31 (53.4%)
	female	35 (58.3%)	27 (44.3%)	38 (61.3%)	27 (46.6%)
Owner of the chicken	**Wife**	16 (26.7%)	55 (90.2%)	58 (93.5%)	41 (70.7%)
	Husband	0	2 (3.3%)	1 (1.6%)	7 (12.1%)
	Husband and Wife	2 (3.3%)	4 (6.6%)	3 (4.8%)	10 (17.2%)
	Mother	19 (31.7%)	0	0	0
	Family	22 (36.7%)	0	0	0
	Mother and children	1 (1.7%)	0	0	0
Group Membership	**Yes**	47 (78.3%)	34 (55.7%)	40 (64.5%)	37 (63.8%)
	No	13 (21.7%)	27 (44.3%)	22 (35.5%)	21 (36.2%)

2.1.2 Training on Poultry Keeping

The study found it necessary to establish whether farmers had training on poultry keeping. This is because trained farmers are expected to be more capable of managing the poultry business well. As shown in figure one, majority of the farmers have received training from extension workers and Non-Governmental organizations with the least being those that have received training from Ultravetis/Brook. Thus, a few of the poultry farmers are equipped with technological know-how and information access.

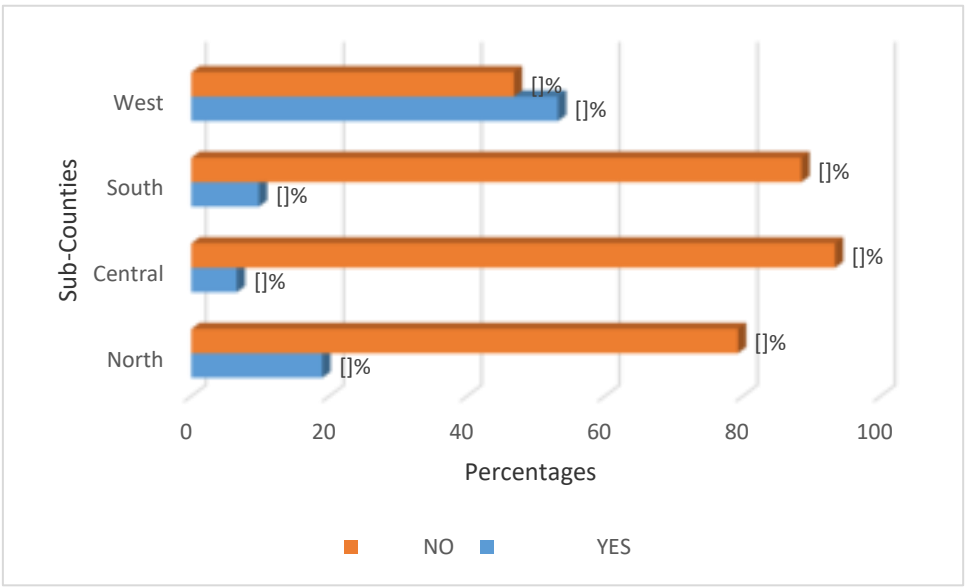
Figure 1. Training on Poultry Keeping



2.1.3 Record Keeping

Record keeping is essential in poultry farming. Records show the strength and weaknesses of the poultry operation. They provide useful insight to financial stability for your flock. If there are any shortcomings, records will show where adjustments can be made. Despite the benefits of record keeping, figure two indicates that farmers do not keep records. It is only in Pokot west sub-county where majority (53.2%) of the farmers kept records with a few from South, Central and North sub-counties confirming to keep records.

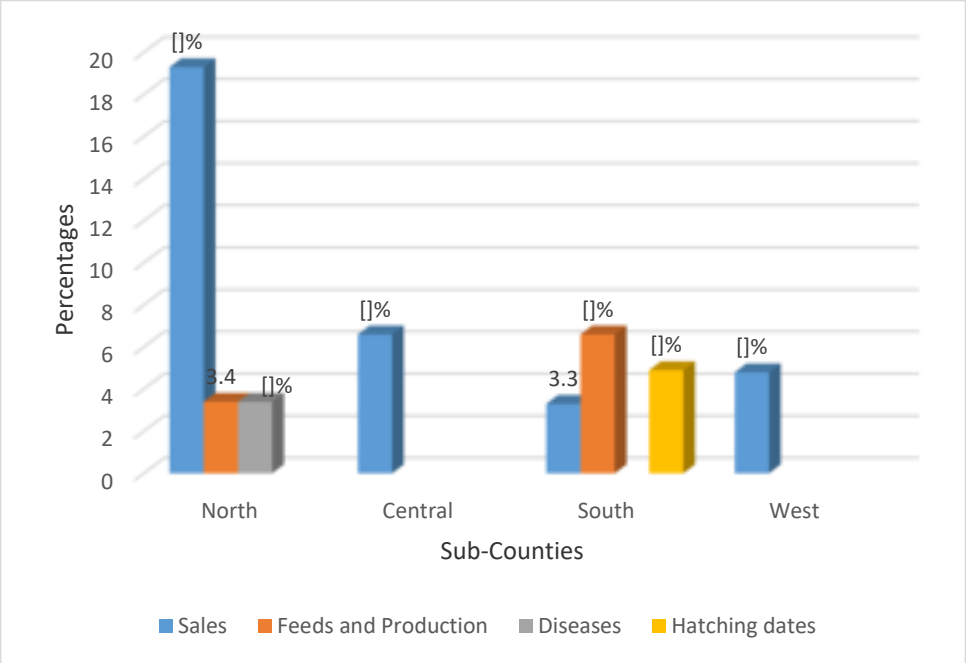
Figure 2. Record Keeping



2.1.4 Records kept for Chicken

Henderson & Gomes (1974) noted that one approach to improve poultry farming is through the use of farm records. A farmer who maintains an adequate set of records can usually handle problems better than the one who does not (Hansen *et al.*, 1991; Poggio, 2006).Among the farmers that keep records (figure three), most of them keep records of sales. Some keep records of feeds and production while the least keep records of disease and hatching dates.

Figure 3. Records kept for Chicken



2.1.5 Descriptive Statistics for Household size

Table two presents the results on household size in the County. Poultry farmers had up to 23 household members. The minimum household number was 3 members. This implies that the poultry farmers in West Pokot generally had a large family size.

Table 2 Descriptive Statistics for Household size

	N	Minimum	Maximum	Mean
Pokot North Sub-county	54	3	14	7.41
Pokot South Sub-County	59	3	23	9.37
Pokot Central Sub- County	62	3	19	8.46
Pokot West Sub-County	60	3	20	8.63

Source: Own computation

2.1.6 Descriptive Statistics for Period Kept Chicken

The study deemed it important to establish the period kept chicken by poultry farmers. The results are presented in table three. From the findings in the table, poultry farmers had up to 40-year poultry keeping experience. Their average period of poultry keeping was 10 to 13 years. Expectedly, the more the numbers of years of experience in poultry keeping, the better the ability to manage the poultry business well. Cases of disease outbreak and poor feed quality should be better handled by experienced poultry farmers.

Table 3. Descriptive Statistics for Period Kept Chicken

	N	Minimum	Maximum	Mean
Pokot North Sub-county	58	1	30	10.48
Pokot South Sub-County	61	1	25	12.16
Pokot Central Sub- County	62	1	33	13.11
Pokot West Sub-County	60	1	40	13.93

N: Represents the number of sample respondents

2.1.7 Number of each class of Chicken

Chicken farming contributes to the overall well-being of the households. It also provides employment and income generating opportunity. The study thus sought to establish the number of each class of chicken kept by the poultry farmers. The results are presented in table four. Results of the analysis indicated that farmers have an average of 10 to 12 hens. The maximum number of cocks kept are 20 to 100 while those of pullets range between 20 and 70 per household. The maximum

number of layers kept are 20 to 60 whereas those of chicks range from 30 to 250 chicks per household. Turkeys are only kept in Pokot central where there are 19 on average. There are no guinea fowls reared in the study area while ducks and doves reared in the county are minimal.

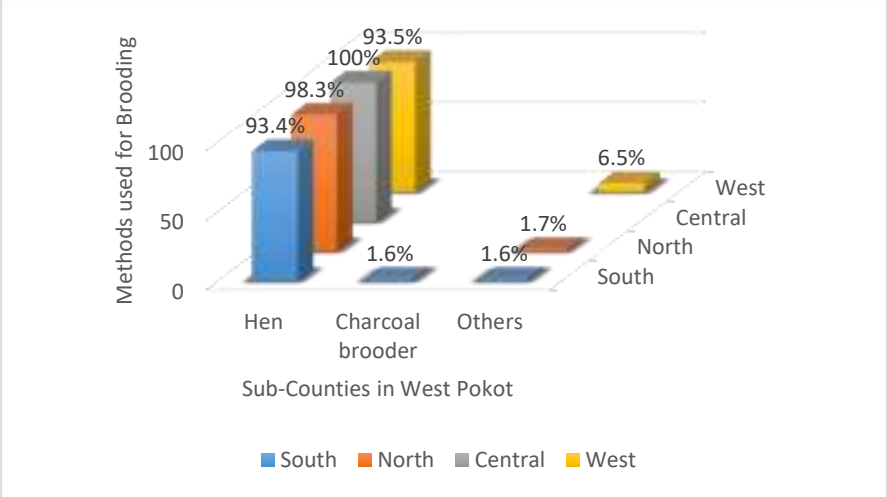
Table 4 Number of each class of Chicken

	North			South			Central			West		
	Min	**Max**	**Mean**	**Min**	**Max**	**Mean**	**Min**	**Max**	**Mean**	**Min**	**Max**	**Mean**
Hen	2	50	10.66	2	50	12.22	1	4	2.56	1	35	11.16
Cocks	0	20	3.24	1	30	4.87	3	100	17.84	0	25	5.19
Pullets	0	35	8.95	0	70	11.2	0	20	4.41	0	30	9.84
Layers	0	20	0.69	0	0	0	0	60	10.18	0	18	0.35
Chicks	0	250	20.14	0	125	14.3	0	30	0.49	0	60	14.42
Turkeys	0	0	0	0	0	0	0	100	19.25	0	0	0
Guinea fowls	0	0	0	0	0	0	0	0	0	0	0	0
Ducks	0	2	0.03	0	25	0.48	0	0	0	0	0	0
Doves	0	0	0	0	30	0.5	0	9	0.34	0	0	0

2.1.8 Method used to Brood the Chicks

The method used by farmers to brood the chicks was also put into account. As observed in figure four below, majority of the farmers in the County use the hen to brood the chick while a few of them use Charcoal brooders to brood the chicks.

Figure 4. Method used to Brood the Chicks



2.1.9 Reproductive performance

Poultry is kept in most farm households without clearly defined purpose by most producers. The poultry production system is characterized by low input-output ratio. Birds are left to scavenge and are given minimal supplements. As evidenced in table five, the hens kept for breeding in the county range between 20 and 80 on the maximum whereas the cocks are between 6 and 20. Most farmers in West Pokot replied that the supplements include home leftover wastes, grains that cannot be used for home consumption and anything they find irregularly. Under such management condition village poultry lay 8-40 eggs before brooding. This figure (local chicken's egg productivity) can be improved to 100 eggs per annum per bird and ten clutches per annum under semi intensive management system (Tadelle and Ogle, 1996). The same source also revealed that this low productivity is a factor of low hatchability and long broodiness time of local breeds. The mean egg given for younger brooding chicken is 10 to 13 eggs while those that mature are between 12 to 20 eggs. The maximum numbers of eggs hatched are 15 to 20 eggs.

Table 5. Reproductive Performance

	North			South			Central			West		
	Min	**Max**	**Mean**	**Min**	**Max**	**Mean**	**Min**	**Max**	**Mean**	**Min**	**Max**	**Mean**
Hens kept for breeding	0	20	5.57	2	50	14.65	0	80	21.51	1	31	11.94
Cocks kept for breeding	0	7	1.71	1	20	2.65	0	15	3.39	0	6	1.84
Eggs laid before brooding	0	40	18.34	10	25	16.1	0	26	18.05	8	20	15.23
Eggs given for brooding	0	25	12.52	7	18	11.17	7	22	13.64	8	15	10.56
Number of eggs hatched	0	20	10.28	6	15	8.75	5	18	11	5	15	8.6
Number of eggs that mature	0	20	6.72	3	14	5.92	3	14	7.02	1	12	5.44

2.1.10 Age at laying of Pullets and the Age at which Cocks Serve in Months

The age at laying of pullets and the age at which cocks serve was also established. The findings are presented in table six. The age at laying of pullets is averagely 6 months while the cocks serve at 5 to 7 months.

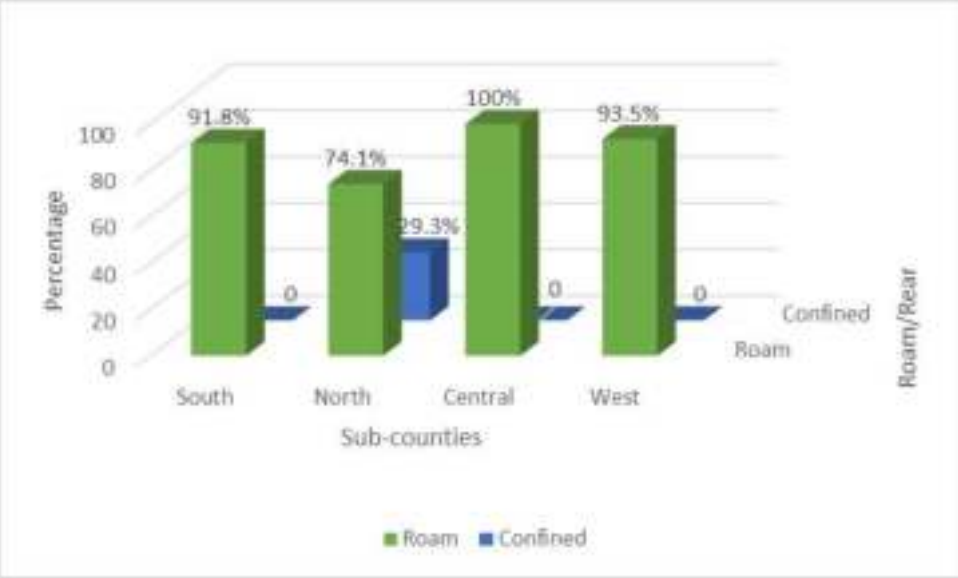
Table 6. Age at laying of Pullets and the Age at which Cocks Serve in Months

		North			Central			South			West	
	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
Laying of pullets	0	6	4.19	5	7	6.03	0	8	5.39	0	6	2.71
Cocks serve	0	6	4.58	6	9	8.2	0	8	5.67	0	8	3.1

2.1.11 Poultry Management Practices in the County

Figure five gives a summary of whether farmers leave their chicks to roam or be reared by their dam. From the findings, it is evident that chicks are left to roam rather than be reared by their dam. It is only in Pokot Central sub-county where a few of the farmers leave their chicks to be reared by their dam.

Figure 5. Poultry Management Practices

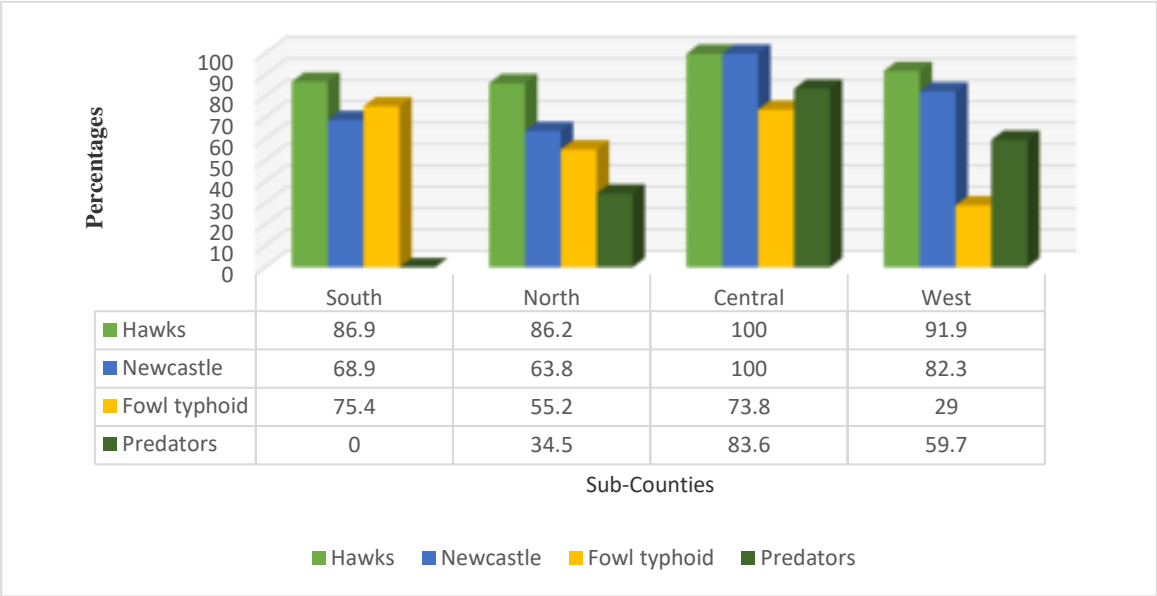


2.1.12 Main Threats to Chicken

By understanding the different threats to chicken, farmers can better secure their chickens and reduce losses. According to Eshetu *et al*. (2001), Newcastle and fowl

pox are considered to be the most important causes of mortality in local chicken while predators are an additional causes of loss. As shown in figure six, the major threats to the poultry farmers are basically hawks, Newcastle and fowl typhoid. Newcastle is highly infectious and cause more loss than any other disease in the tropics. These threats cut across the four sub-counties. Further, since majority of the farmers leave their chicken to roam, they are exposed to predators such as hawks. The results conform to findings by SNV (2013) echoing that poultry diseases (fowl typhoid, Coccidiosis and NCD) were ranked as the most important cause of mortality followed by predation and cold weather conditions.

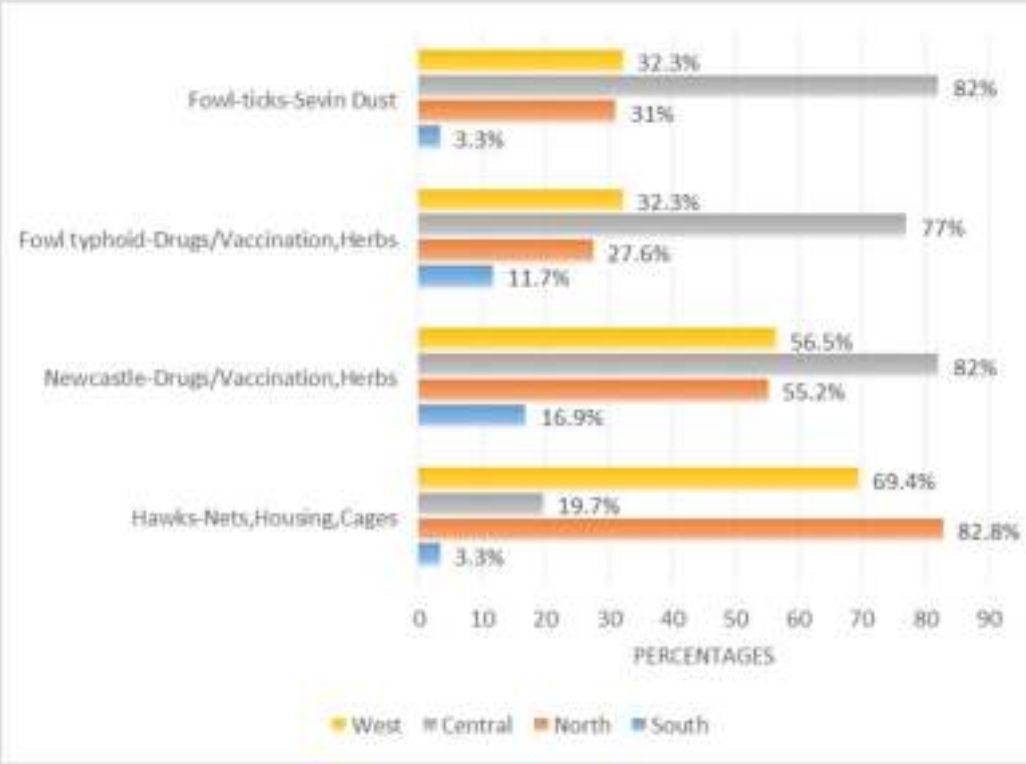
Figure 6. Main Threats to Chicken



2.1.13 Protection against Threats

In light of the aforementioned threats to chicken, farmers have taken an initiative to protect their chicken against these threats. As shown in figure seven, sevin dust is used by farmers to protect against fowl ticks. Particularly majority (82%) of the farmers in Pokot Central use Sevin dust to protect against fowl ticks. However, farmers from the South used majorly herbs such as Aloe Vera to protect against fowl typhoid. In regards to fowl typhoid and Newcastle, farmers vaccinate their chicken, treat them with herbs as well as drugs. Vaccination however was not a common practice among the farmers. Further, farmers confined their chicken to houses, cages and also nets so as to protect them from hawks. This was especially the case in Pokot North as evidenced by 82% of the poultry farmers.

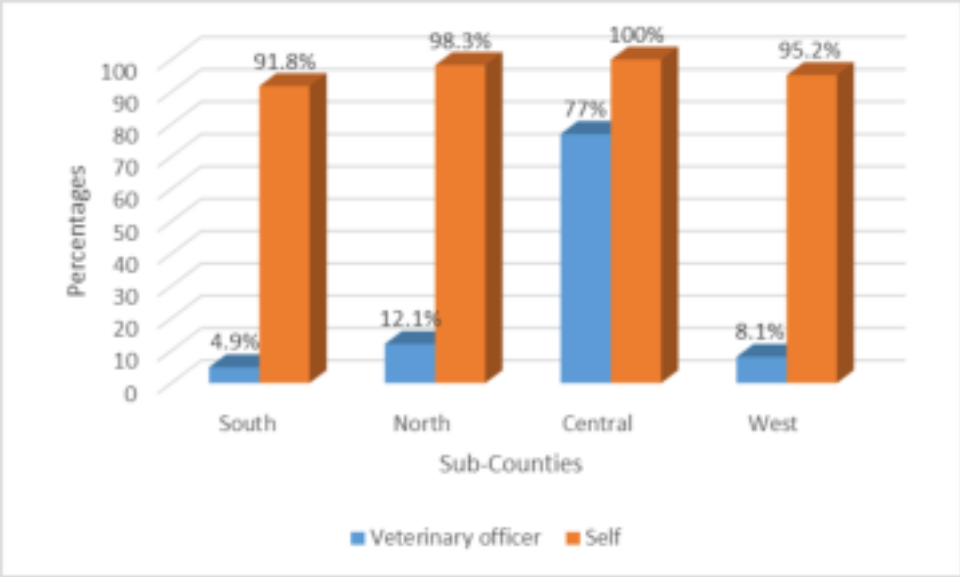
Figure 7. Protection against Threats



2.1.14 Disease Control

The study also put into account the individual that treats chicken when sick. Figure eight highlights the results. It was interesting to note that majority of the poultry farmers treat the chicken themselves with the exception of a few who let their chicken be treated by veterinary doctors. It was only in Pokot Central sub-county where majority (77%) of the farmers confirmed that veterinary doctors' treat their chicken. The poor coverage of veterinary services observed in all sub-counties could negatively impact the development of poultry production and deserves attention from all the concerned stakeholders.

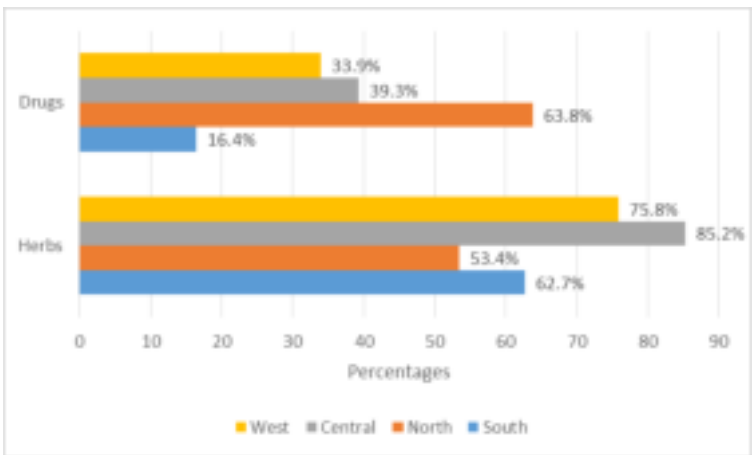
Figure 8. Disease Control



2.1.15 Treatment of chicken by Farmers

One of the major constraints to chicken production is undoubtedly the existence of various diseases. As evidenced in figure nine, drugs bought from the agro vet are used by farmers to protect against diseases. However, access to these drugs is a challenge hence a few of the farmers use drugs to treat their chicken. Only majority (63.8%) of those from Pokot North use drugs. Since plant products with recognized medicinal properties are far more accessible to poultry farmers than the drugs used in western veterinary treatments, such plant are used majorly to treat chicken. Particularly, majority (85.2%) of the farmers from Pokot Central, North (75.8%), South (62.7%) and North (53.4%) use herbs such as pepper and Aloe Vera (*Dolicos*) to treat their chicken.

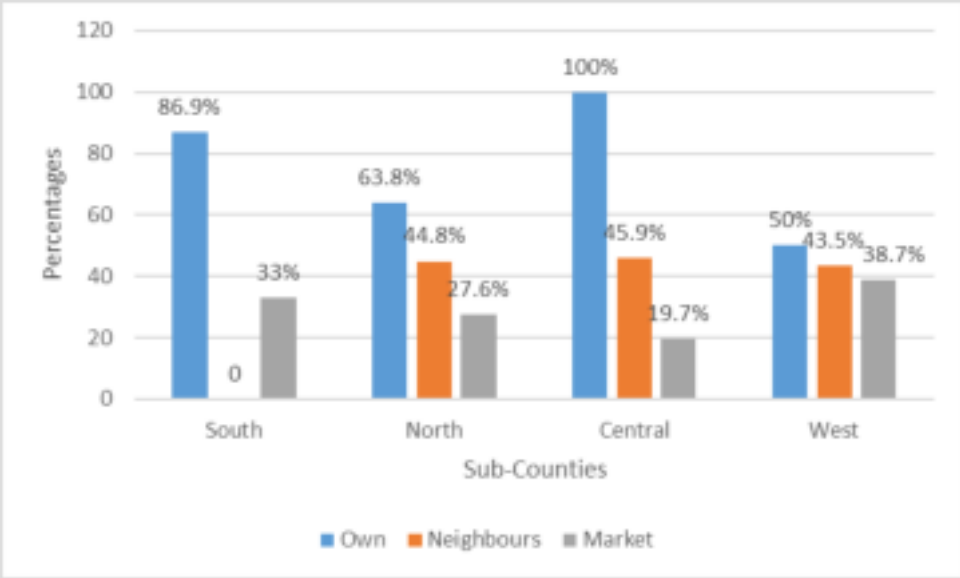
Figure 9. Treatment of chicken by Farmers



2.1.16 Source of Breeding Cocks

It was also found necessary to establish where breeding cocks are obtained from. It was evident in figure 10 that the cocks are owned by the poultry farmers themselves. As well, a significant percentage of the farmers obtain their cocks from neighbors while the least being those obtaining their cocks from the market.

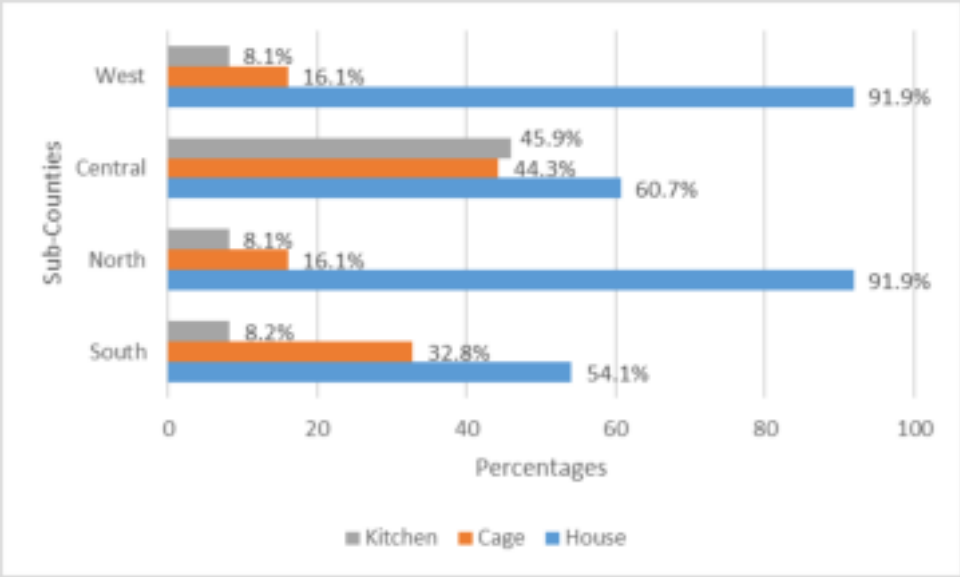
Figure 10. Source of Breeding Cocks



2.1.17 Housing of Chicken

In order to realize the benefits of rearing poultry, it is important to keep chicken in an appropriate housing environment. Housing for chicken in the county is mainly for protection against predators in the night and not for rearing purposes. The findings from figure 11 indicate that chicken are kept in houses with a significant number of farmers keeping their chicken in cages and the least being those keeping chicken in the kitchen. According to Jones and Faure, (1981) a cage is usually not an appropriate place to keep chicken since chicken pronounce fear responses when kept in cages. This implies that the housing environment for chicken needs to be equipped at a minimum with a laying nest, high perch, and an area for pecking, scratching and dust bathing to meet fundamental behavioral needs of the chicken.

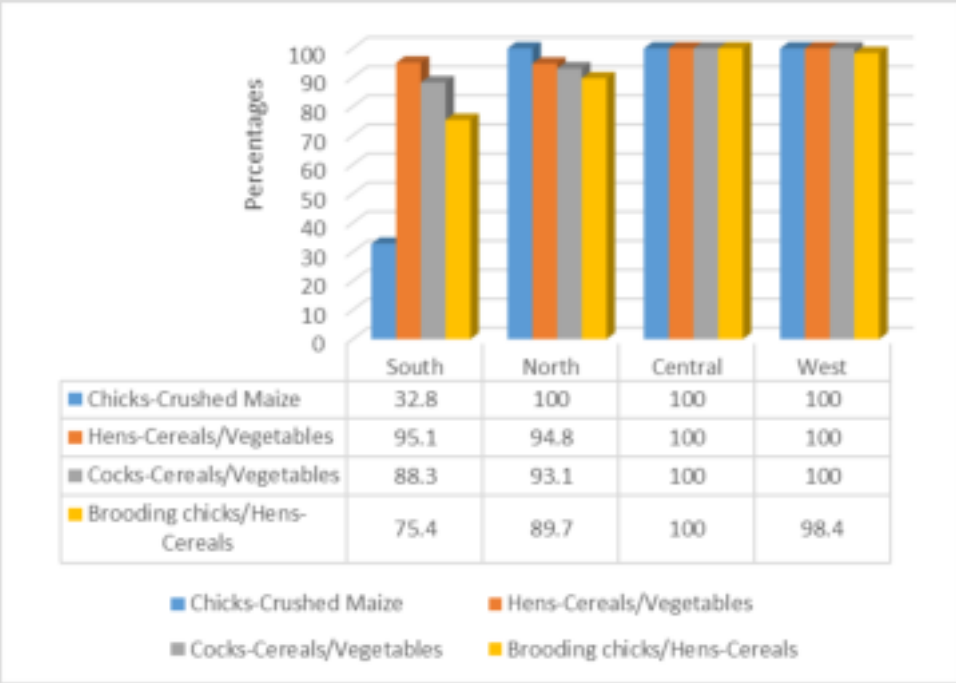
Figure 11. Housing of Chicken



2.1.18 Food for Chicken

Chicken at different stages of development require different feed formulations. It is therefore important to watch the diet for chicken since wrong ingredient can affect growth in young chickens, egg production in layers and long term health consequences. As evidenced in figure 12, the main feed for the chicks are basically crushed maize and maize flour, for the hens their food is cereals which includes maize, millet and sorghum as well as vegetables such as kales and cabbages. Similarly, the food for cocks is mainly maize, millet and sorghum while those for brooding chick/hens maize flour and cereals. In rear occasions, brooding chicks were fed with chick mash and remains of rice.

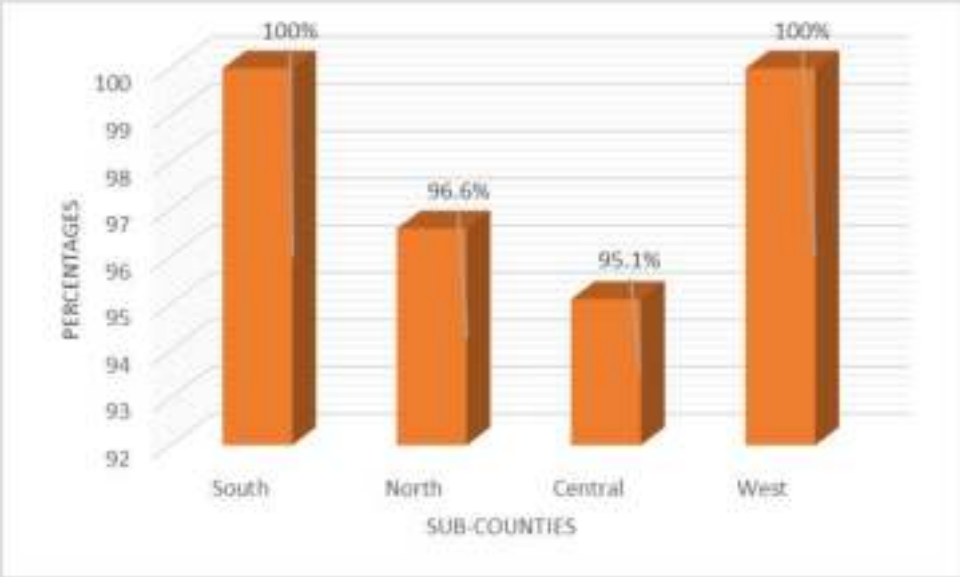
Figure 12. Food for Chicken



2.1.19 Chicken feeding Practices

Scavenging chicken usually make better use of locally available feed resources hence easier to manage. This prompted the study to establish whether the chicken scavenge or not. The findings of the study are illustrated in figure 13. As evidenced in the findings, poultry farmers in West Pokot County confirmed that chicken scavenge.

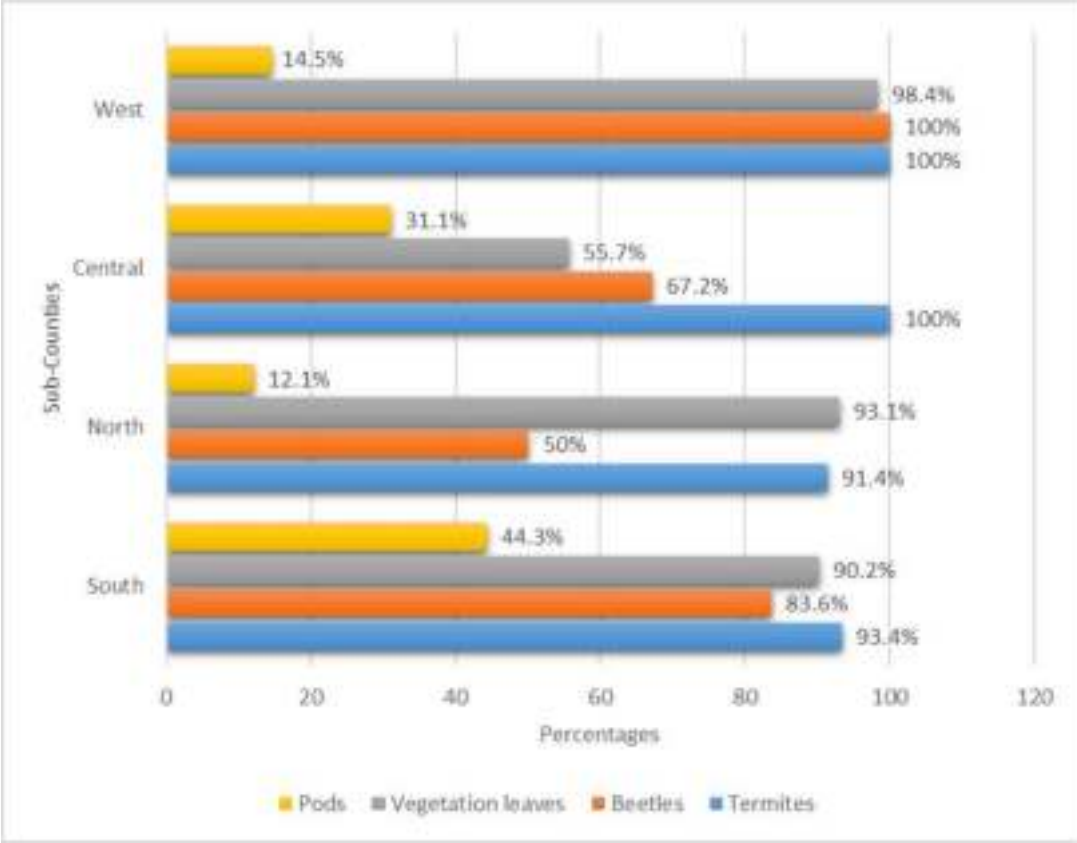
Figure 13. Chicken feeding Practices



2.1.20 Scavenging feed Resources

Potential scavenging feed resources can be categorized into four main groups: (1) household wastes; (2) materials from the environment, such as, protein sources (worms, snails, termites insects, grasshoppers and frogs), grain products from cultivating, harvesting and processing (rice, maize and rice and maize bran), green leaves and seeds;3) cultivated and wild fodder materials such as grasses, herbs, fodder trees. Figure 14 illustrates the scavenging feed resources. Out of all these, the study established that majority of scavenging chicken find vegetation leaves, materials from the environment such as beetles and termites as well as pods. The results conform to that of SNV (2013) baseline survey report asserting that birds are fully reared on scavenging with supplementary feedings with maize, white ants and kitchen waste. The results of the study are also consistent with that of Doviet (2005) noting that local chicken play a role of converting household leftovers, wastes and insects into valuable and high quality protein.

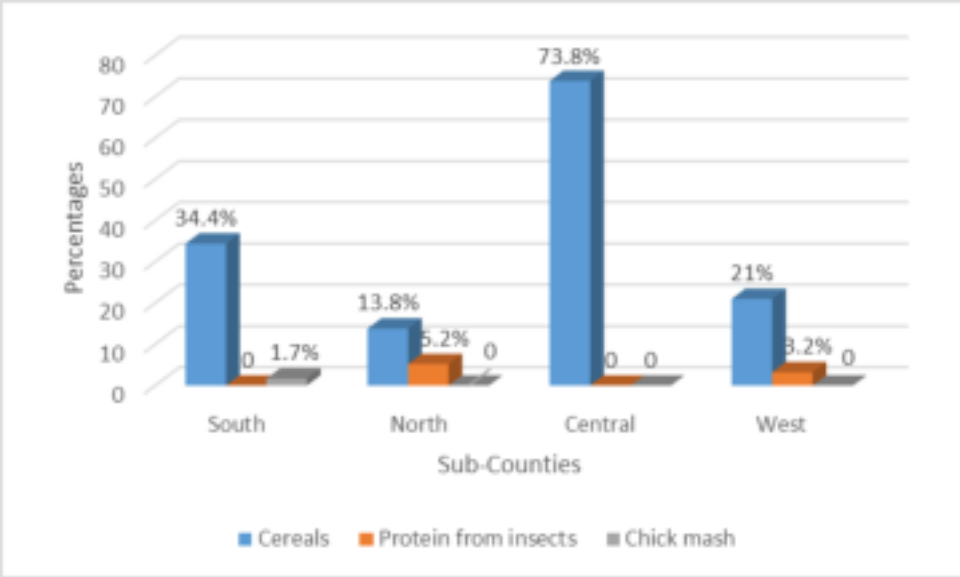
Figure 14. Scavenging Feed Resources



2.1.21 Supplement diet for Scavenging

In most cases, the nutritional status of scavenging birds is below the nutrient requirements of crossbred growers and layers. As such it is utmost necessary to supplement the diet of scavenging birds. The study thus sought to establish whether poultry farmers have supplement diet for scavenging. From the findings in figure 15, 73.8% of the farmers from Pokot Central supplement the diet with Cereals which is also the case with farmers from West, South and North sub-counties. However, limited number of farmers supplement the diet of scavenging chicken with chick mash.

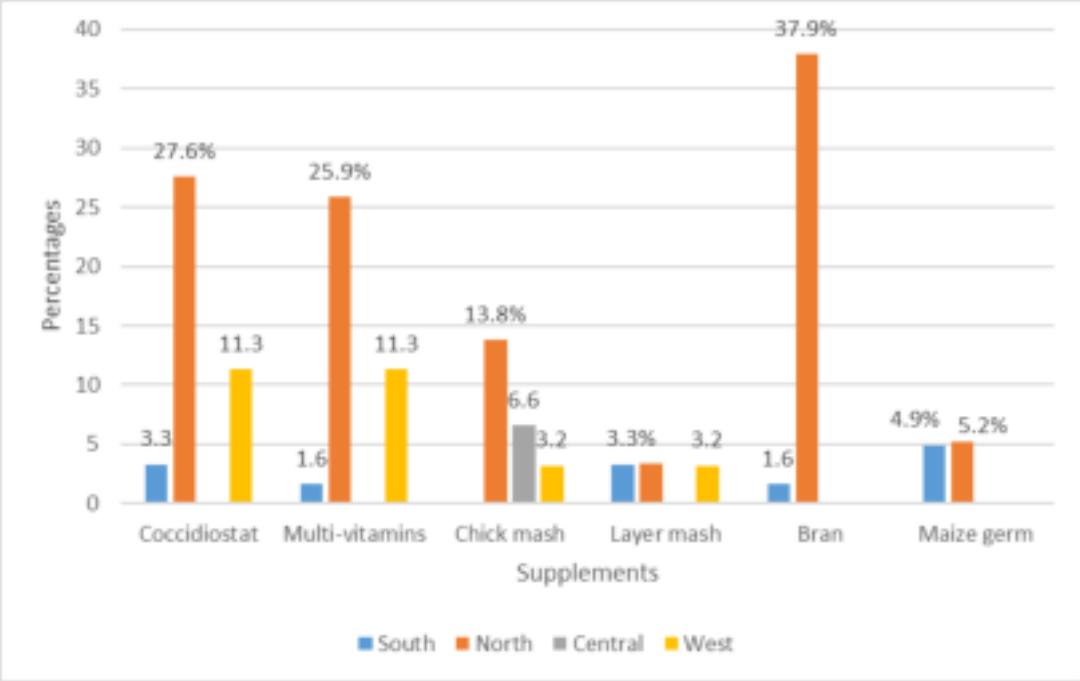
Figure 15. Supplement diet for Scavenging



2.1.22 Chicken Supplements

The study also sought to establish the kind of supplements poultry farmers give to their chicken. The findings are shown in figure 16. It was evident that supplement are rarely given to chicken. Particularly, in Pokot South and Central, farmers noted that supplements are not given to their chicken. However, in Pokot North, most of the farmers gave supplement to their chicken. For instance, 37.9% of the farmers in Pokot North confirmed that they give Bran to chicken, 25.9% Multi-vitamins and 27.6% Coccidiostat.

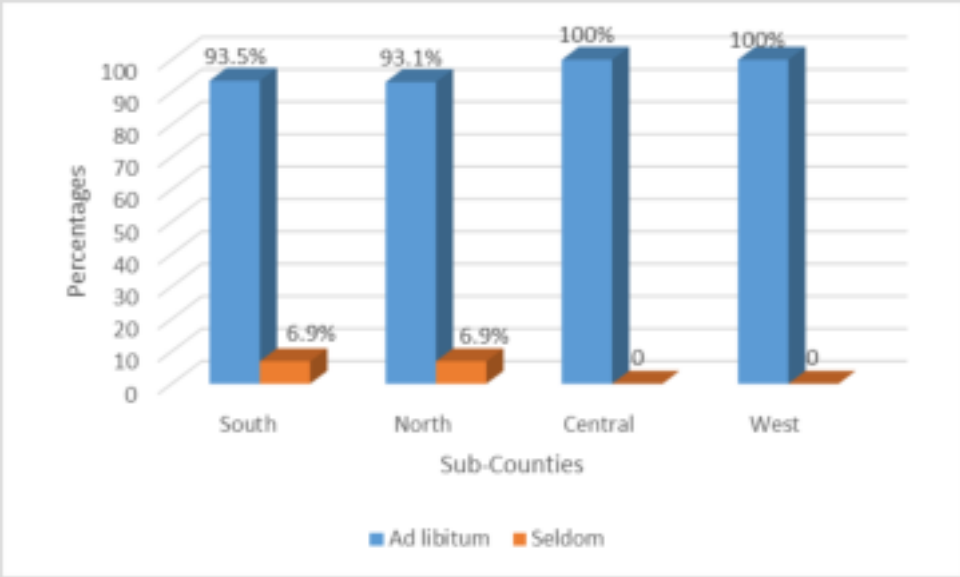
Figure 16. Chicken Supplements



2.1.23 Drinking Water

Water is the most important nutrient in a bird's diet. Half of a bird's body is made up of water and eggs are made up of around 65% water. Clean, fresh drinking water is essential for good health and prevents a number of diseases from striking. This is the case in the county (figure 17) since farmers give their chicken drinking water Ad libitum.

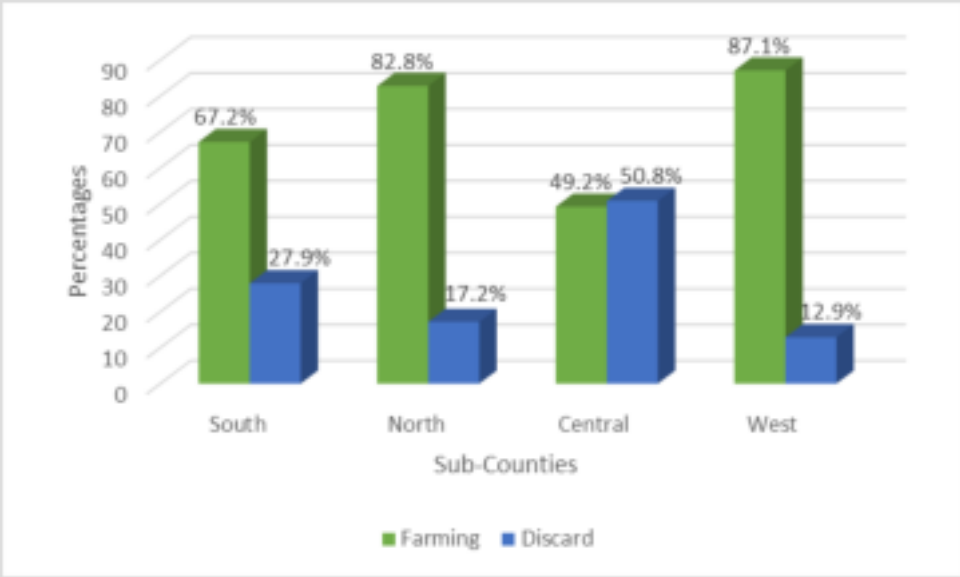
Figure 17. Drinking Water



2.1.24 Use of poultry Manure

Properly composted chicken manure can be a great addition to your garden soil though fresh chicken manure can pose a challenge in the garden sine it can scorch tender plant roots. As such, it was found necessary to establish what the poultry farmers in West Pokot do with manure. The findings in figure 18 revealed that majority 67.2% (North), 82.8% (Central), 49.2% (South) and 87.1% (West) of the farmers from this sub-counties use chicken manure in farming. Only a few of the poultry farmers discard chicken manure.

Figure 18. Use of Poultry Manure



2.1.25 Number of Birds sold Per Year

The number of birds sold per year by poultry farmers highly depends on the accessibility of input, housing, disease incident and purpose of bird keeping among others. As shown in table seven, the average number of cockerels sold per household in the county ranges from 50 to 60 cocks and 40 to 60 for hens. The maximum number of pullets sold ranged from 20 to 960 pullets and that of chicks from 20 to 60 chicks. Layers were rarely reared in the county. Minimum number of layers were only available in North and Central sub-counties. The maximum number of eggs sold in the county ranged from 480 to 5520 per year.

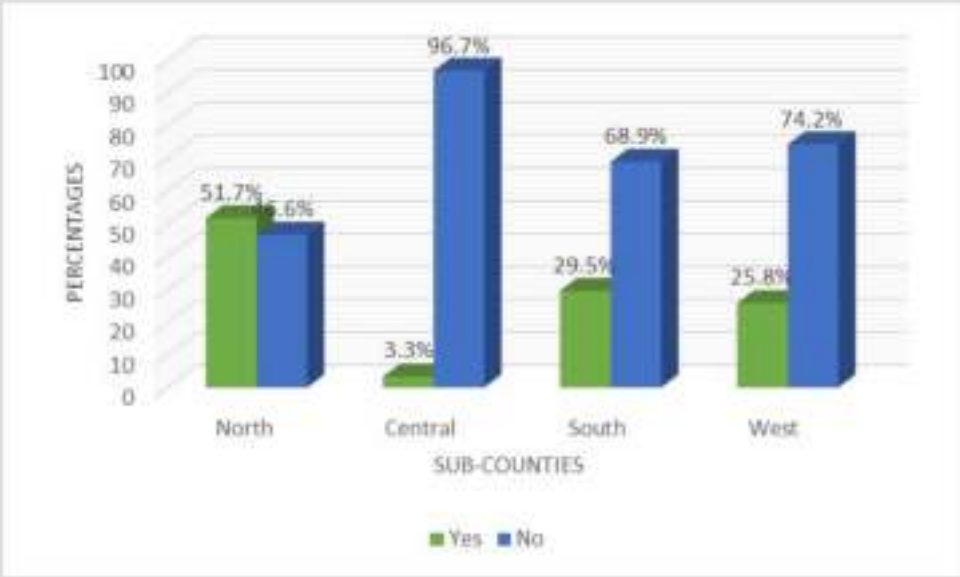
Table 7. Number of Birds sold Per Year

	North		Central		South		West	
	Max	Mean	Max	Mean	Max	Mean	Max	Mean
Cocks	50	9.3	60	15.46	4800	98.59	40	11.42
Hens	45	7.95	40	11.49	2400	59.54	60	9.73
Pullets	960	23.98	40	6.67	180	11.38	20	1.76
Chicks	60	1.88	0	0	20	0.33	0	0
Layers	1	0.02	10	2.28	0	0	0	0
eggs	5520	533.2	480	139.18	2000	230.6	4000	323.55

2.1.26 Pricing

As shown in figure 19, poultry farmers observed that the price of poultry products is not good since they have to struggle so as to earn profit from their sales. According to the poultry farmers, "*their local chickens were drug free and had a vital role in socio-cultural functions*." Therefore, they expected traders to pay more money for the purchase of their local chicken. Furthermore, producers from Parasinta group said, "*during planting seasons, everyone wants to sell their chicken so as to buy farm inputs*." Taking this into consideration, low price of chicken is offered since farmers have a low bargaining power.

Figure 19. Pricing



2.1.27 Unit Price of Birds Sold Per Year

The unit price of the birds were also put into account. The findings are illustrated in table eight. The price of cocks in the county was somewhat uniform ranging from Ksh 700 to Ksh 800.The unit price of the hens was relatively lower than that of the cocks. The maximum price of the hens ranged from Ksh 500 to Ksh 650.The lowest price for the pullets was Ksh 250 while the highest price was Ksh 500.The unit price for eggs was an average of Ksh 10 to Ksh 15 per egg. Chicks were only sold in North and South sub-counties where the price ranged from Ksh 100 to Ksh 200.Similarly, the mean price for layers was Ksh 200 in Pokot Central sub-county.

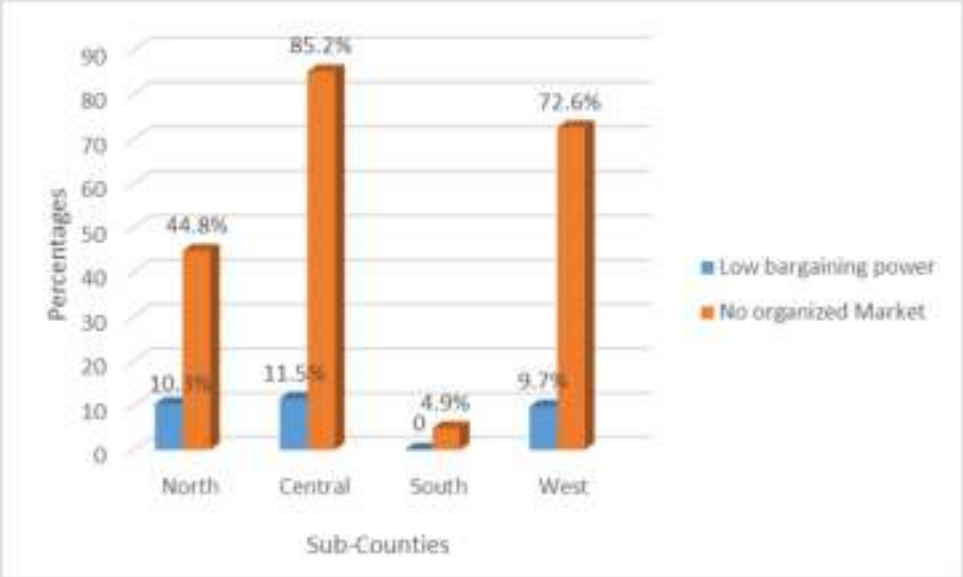
Table 8. Unit Price of Birds Sold Per Year

		North			Central			South			West	
	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
Cocks	0	800	483.3	0	750	588.52	0	750	429.3	300	700	475.81
Hens	0	600	314.9	0	650	418.03	0	600	288.2	0	500	285
Pullets	0	500	132.6	0	250	57.38	0	450	94.4	0	300	52.58
Eggs	0	15	9.16	5	15	12.05	0	14	6.83	0	10	4.48
Chicks	0	200	5.37	0	0	0	0	100	3.39	0	0	0
Layers	0	2	0.04	0	500	200.82	0	0	0	0	0	0

2.1.28 Reasons for Poor Poultry Prices

The study sought to establish the reasons why the price for poultry is not good. The results of the study are presented in figure 20.Producers in West Pokot County noted that low bargaining power and no organized market for their produce has contributed to poor poultry prices. In most cases, the birds not sold at the market are taken back home and sold at lower price. Most poultry farmers are price takers and price is set by negotiation of the parties that lead to increased bargaining power of the buyers.

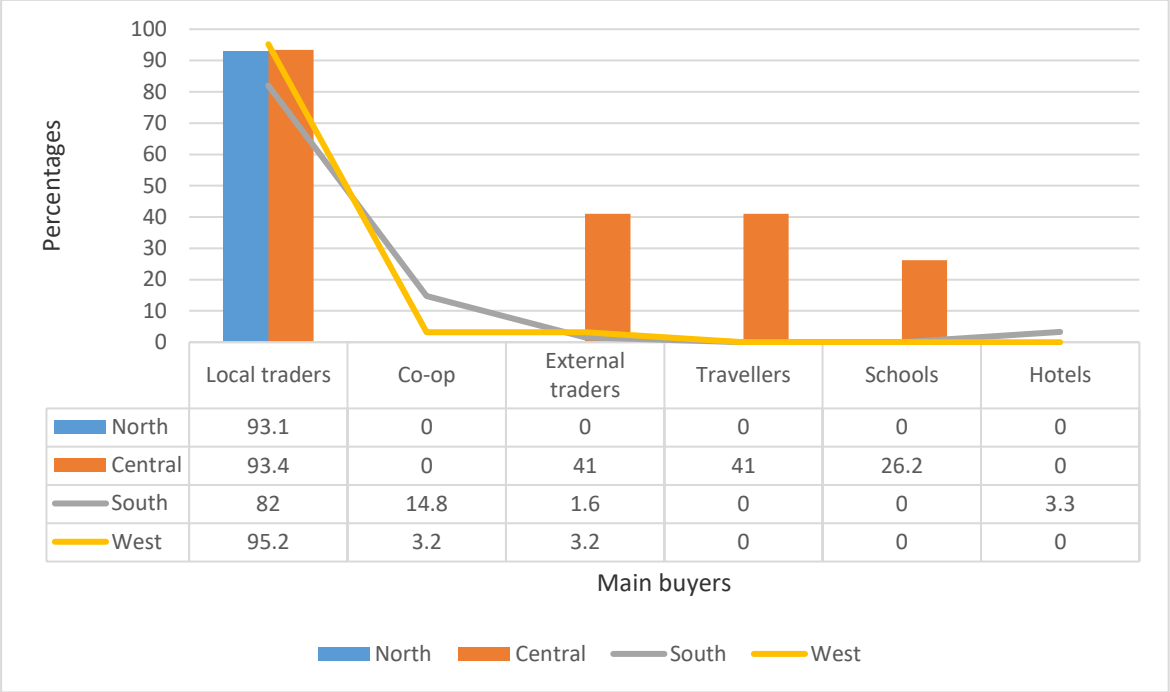
Figure 20. Reasons for Poor Poultry Prices



2.1.29 Main buyers

Figure 21 presents the results on the main buyers of poultry products. As shown in the figure, local traders were found to be the main buyers of poultry products in the county. External traders also had a huge stake among the buyers together with travelers and schools. Hotels were also among the buyers in Pokot South sub-county.

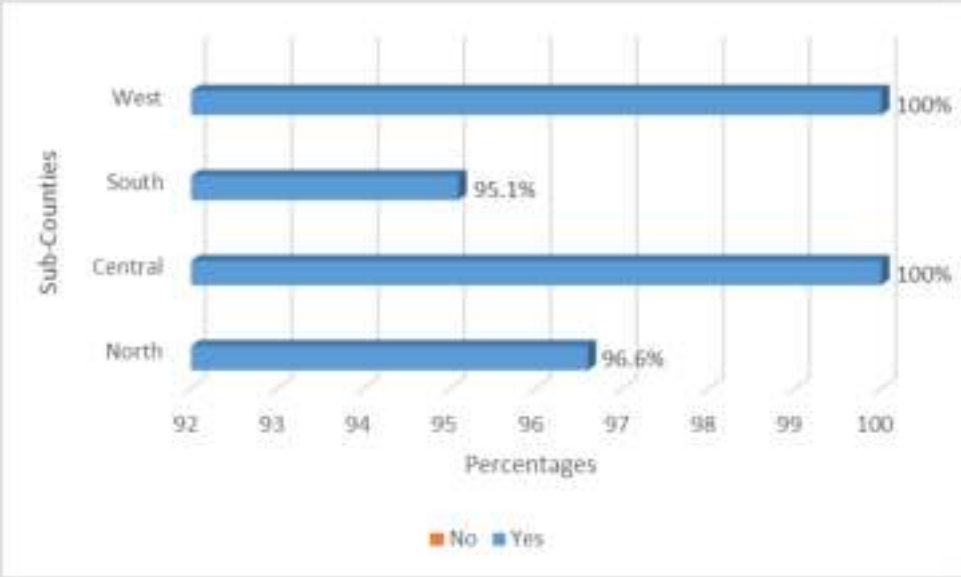
Figure 21. Main buyers



2.1.30 Farmers' view on chicken keeping

Figure 22 presents the findings on the benefits of keeping chicken. It is a major source of eggs and meat which have a high nutritional value particularly in the supply of protein. The poultry industry also provides employment opportunities for the populace, thereby serving as a source of income to the people. The wide array of benefits brought about by poultry farming prompted the study to establish whether the farmers find chicken keeping as a good business. The results of the analysis in figure 16 clearly indicate that farmers find chicken keeping as a good business.

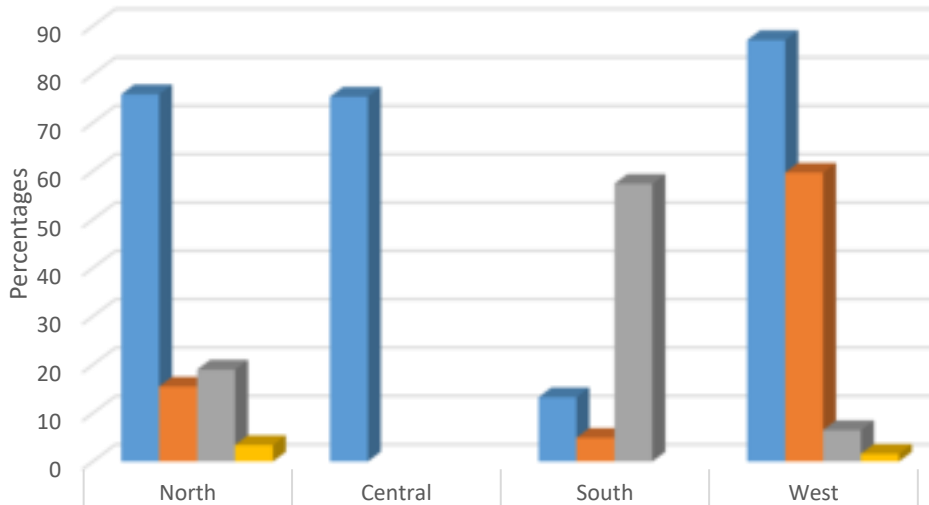
Figure 22. Farmers' View on Chicken Keeping



2.1.31 Benefits of the Poultry Business

Ready market for poultry produce is a major reason why residents in West pokot County have ventured in poultry farming. Chicken are also a source of food. In most cases, local chicken meat and eggs contribute 20–30% to the total animal protein supply in low-income and food-deficit countries hence they are particularly important in improving diet (Alam 1997).Further, they mature quickly hence farmers earn income from the poultry business. As such, figure 23 presents the benefits of poultry business. As evidenced in the figure, only 13% of the farmers in Pokot South confirmed that there is ready market for their produce. In Pokot West, poultry is a major source of food while in Pokot South it is least used as a source of food. The findings tally with that of Assefa (2007) and Halima (2007) positing that village chicken owners sell their chicken and eggs to purchase food, cover school fees and to also adjust flock size.

Figure 23. Benefits of the Poultry Business

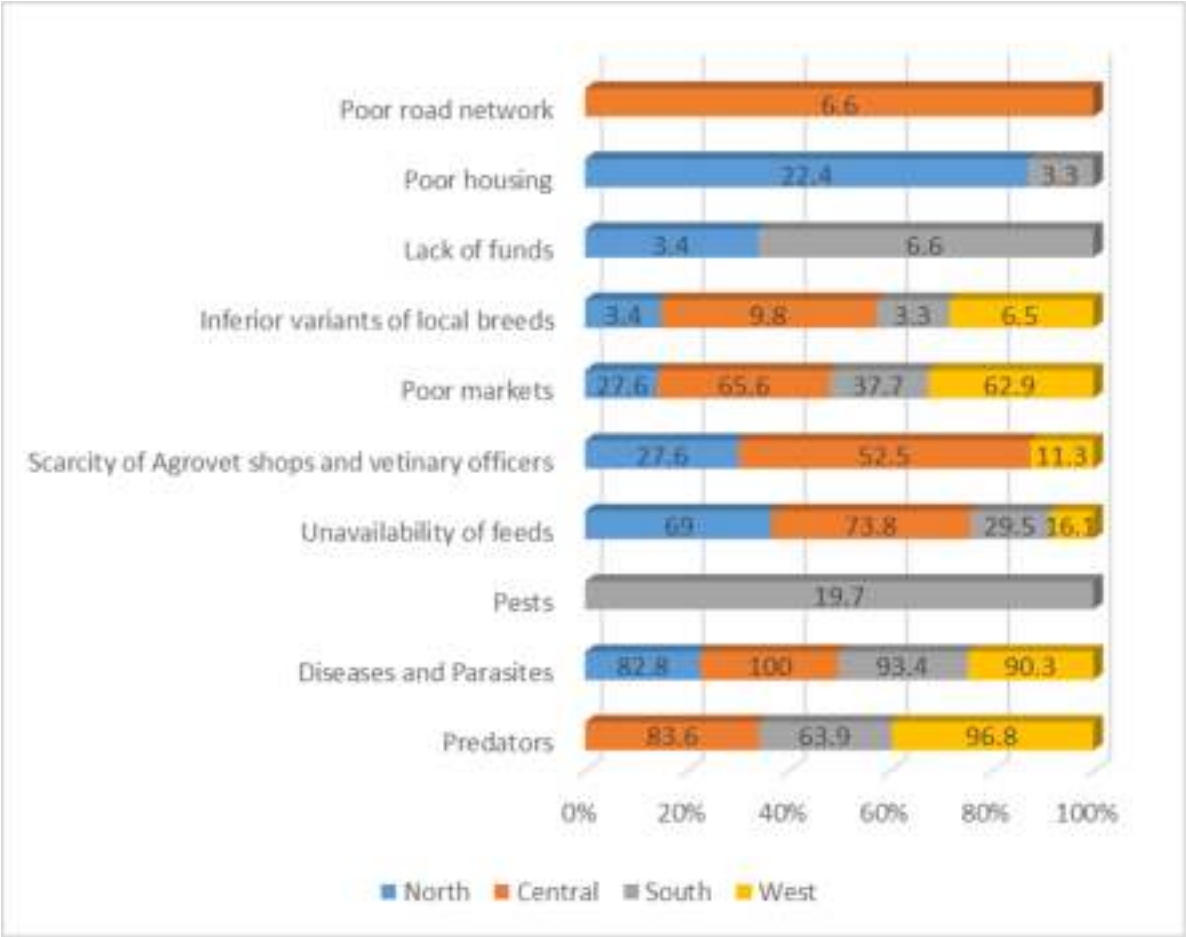


	North	Central	South	West
Ready Market	75.9	75.4	13.3	87.1
Source of Food	15.5		4.9	59.7
Source of Income	19		57.4	6.5
Matures quickly	3.4			1.6

2.1.32 Challenges in Rearing Chicken

The study established that the county faces a number of challenges in the poultry business. As shown in figure 24, farmers are adversely affected with predators as evidenced by 83.6% of the farmers from North sub-county, 63.9% from South and 96.8% from West. Diseases and parasites are also a threat to the poultry farmers with majority of the farmers from Pokot Central being affected the most. The farmers also experience unavailability of feeds, poor markets and scarcity of veterinary officers. Additionally, farmers are exposed to theft of chicken, limited access to credit and poor road network. Further the breed variants kept are inferior and they lack proper housing.

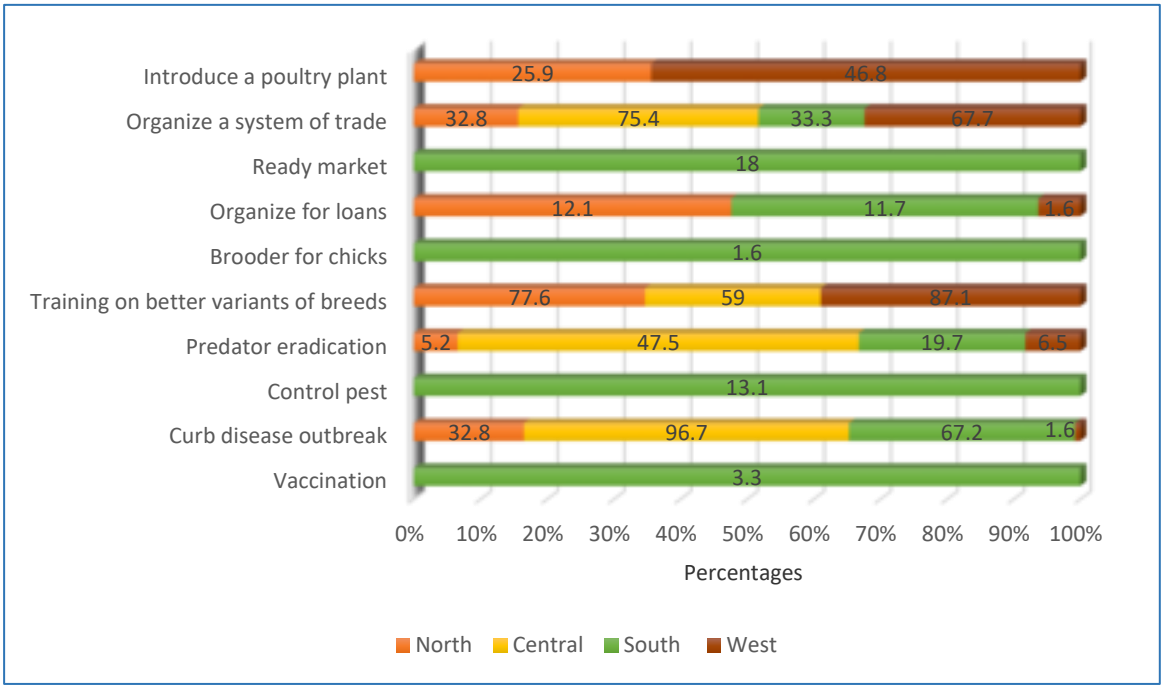
Figure 24. Challenges in Rearing Chicken



2.1.33 Measures to improve Chicken Production

The study also sought to establish the ways in which chicken production can be improved. The results are presented in figure 25. Majority of the farmers from West (87.1%), Central (59%) and North sub-county noted that training on better variants of local breeds and technology is likely to improve chicken production. As well, majority of the farmers from Central and West sub-county confirmed that an organized system of trade will go a long way in improving chicken production. Further, most (46.8%) of the farmers from Pokot West sub-county noted that a poultry plant is likely to improve chicken production. Also, curbing diseases outbreak together with predator eradication were found to be contributing factors of improved chicken production. Additionally, enhancing credit access for farmers, controlling pests, finding ready market and vaccination of chicken were also among the contributing factors to improved chicken production.

Figure 25. Measures to improve Chicken Production



3.0 INTERNAL AND EXTERNAL TRADERS

3.1.0 Internal Traders Characteristics

Table nine present the results on internal trader characteristics. The study put into account the gender of internal traders. It was evident that majority of the traders were male while a few were female. Pokot North and West sub-county had no female internal traders.

The level of education of internal traders was also established. Majority of the traders had primary as their highest level of education while the rest had secondary level of education and the least college level of education. One needed to be abreast with the present day economic and competitive environment to run a business. The poultry business involves modern and innovative ways of acquiring information from different sources such as the media, internet among other sources to enhance knowledge about current market trends in the poultry business.

The average period of years traded in chicken was 5-10 years with few traders having traded for over 10 years. Finally, it was established that there was no association of traders. This indicates that, more than half of the respondents are moderately educated to run their business effectively.

Table 9. Internal Traders Characteristics

		North	Central	South	West
Gender	Male	100%(5)	83.3% (10)	83.3% (5)	100 (6)
	Female	0	16.7% (2)	16.7% (1)	0
Education	K.C.P.E	60% (3)	41.7% (5)	66.7% (4)	66.7% (4)
	K.C.S.E	0	8.3% (1)	16.7% (1)	33.3% (2)
	College	0	50% (1)	16.7% (1)	0
	No formal education	40% (2)	0	0	0
Years Traded in Chicken	1-4 Years	20% (1)	33.3% (4)	50% (3)	16.7% (1)
	5-10 Years	60% (3)	41.7% (5)	50% (3)	33.3% (2)
	Over 10 Years	20% (1)	25% (3)	0	50% (3)
Association of Traders	Yes	0	0	0	50% (3)
	No	100% (5)	100% (12)	100% (6)	50% (3)

3.1.1 External Traders Characteristics

The findings in table ten showed that the external traders were basically male. The years spent by traders in the business varied across the sub-counties. While some traders had traded for 1-4 years, others had taken as long as 5-10 years in the business. Majority of the traders in the county had traded for 5 to 10 years. This implies that the traders are skilled since they have a vast wealth of experience in chicken trade.

In all the sub-counties, traders had Secondary and Primary as their highest levels of education. Education is important in the adoption of new technologies. Education among traders accelerates both growth and development of the poultry enterprise. The low level of education of traders could explain why local chicken trade has not yet developed.

Further, association of traders was not evident in the County. Association of traders are of importance since they enable traders to learn skills which could increase their credibility in the chicken trade. Pokot West sub-county was the only sub-county with majority of association of traders while the rest had minimal association of traders. Cognate to the results, the ASDSP value chain analysis (2014) indicates that traders and middlemen operate individually. The level of individualism among traders is high such that they scramble for chicken whenever there is scarcity.

Table 10. External Traders Characteristics

		North	Central	South	West
Gender	Male	100%	100%	75%	66.7%
	Female	0	0	25%	33.3%
Education	K.C.P.E	0	25%	25%	33.3%
	K.C.S.E	50%	50%	25%	33.3%
	College	0	25%	25%	33.3%
	None	25%	0	0	0
Years Traded in Chicken	1-4 Years	25%	25%	25%	33.3%
	5-10 Years	75%	75%	75%	66.7%
Association of Traders	Yes	33.3%	25%	25%	66.7%
	No	66.7%	75%	75%	33.3%

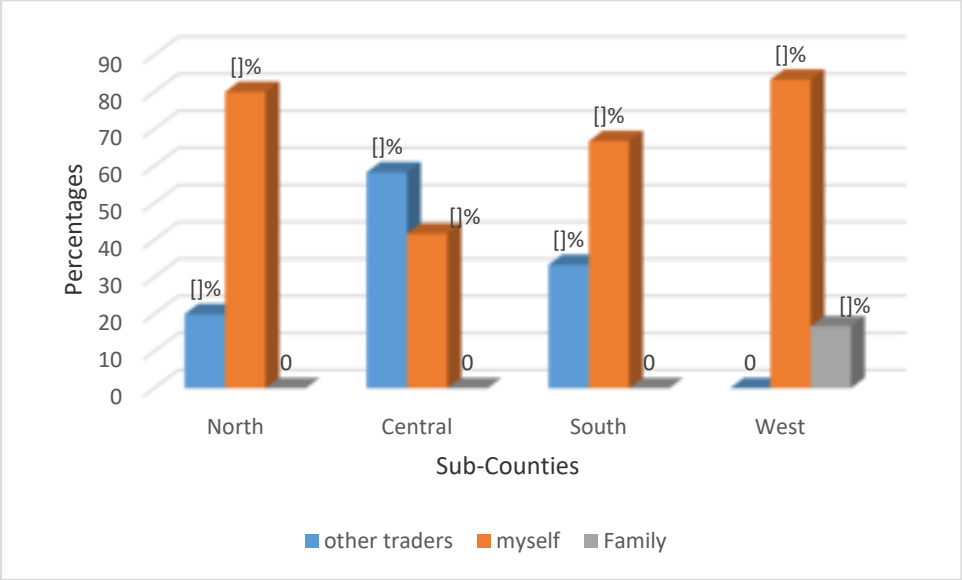
3.1.2 Average number of traders in Sub-Location

The information about internal traders was self-reported thus there is perceptual representation of information. The number of traders in the sub-location were established. Internal traders in Pokot North sub-county noted that there are three traders in the sub-location. Those in central revealed that there is an average of four traders in the sub-location with a maximum of 10 traders. Additionally, traders from South affirmed that there are a minimum of two traders in their sub-location and a maximum of 10 traders. Finally, those in Pokot West sub-county noted that there are a maximum of 100 traders in the sub-location and 43 traders on average.

3.1.3 Introduction to Chicken Business Trade

While establishing horizontal and vertical linkages in the value chain, the study sought to establish from the individual how he/she got introduced to the chicken business. As evident in figure 26, majority of the traders got personally engaged by themselves into the chicken business followed by those that were introduced by other traders and the least being those introduced into the chicken business by family members.

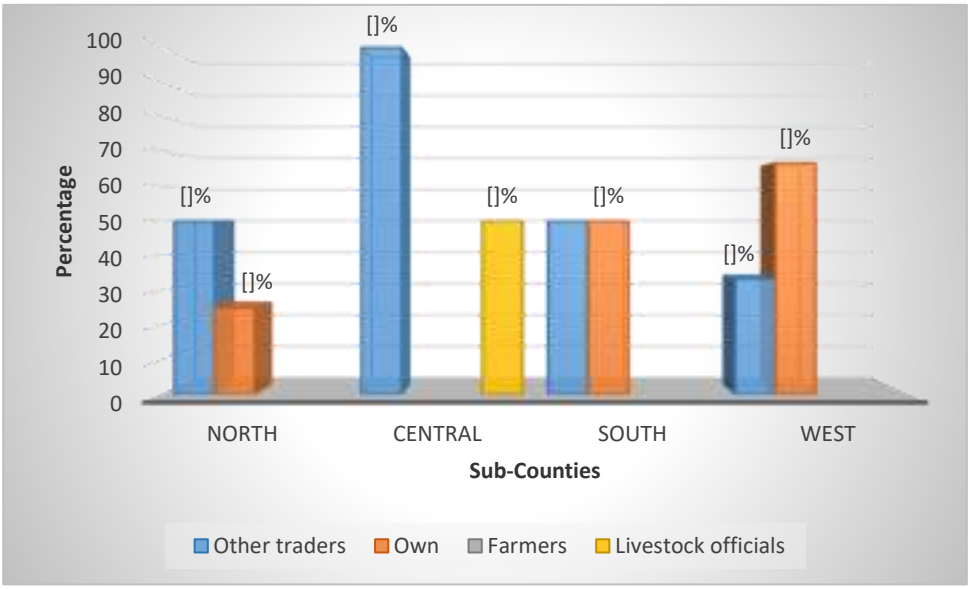
Figure 26. Introduction to Chicken Business Trade



3.1.4 Knowledge on availability of Chicken

The study sought to establish how the traders learnt about the availability of chicken. The results are presented in figure 27. It was confirmed that traders learnt about the availability of chicken from other traders. Also, a significant number of the traders learnt about the availability of chicken on their own while those from Pokot south sub-county learnt about the availability of chicken from livestock officials.

Figure 27. Knowledge on availability of Chicken



3.1.5 Suppliers of Chicken

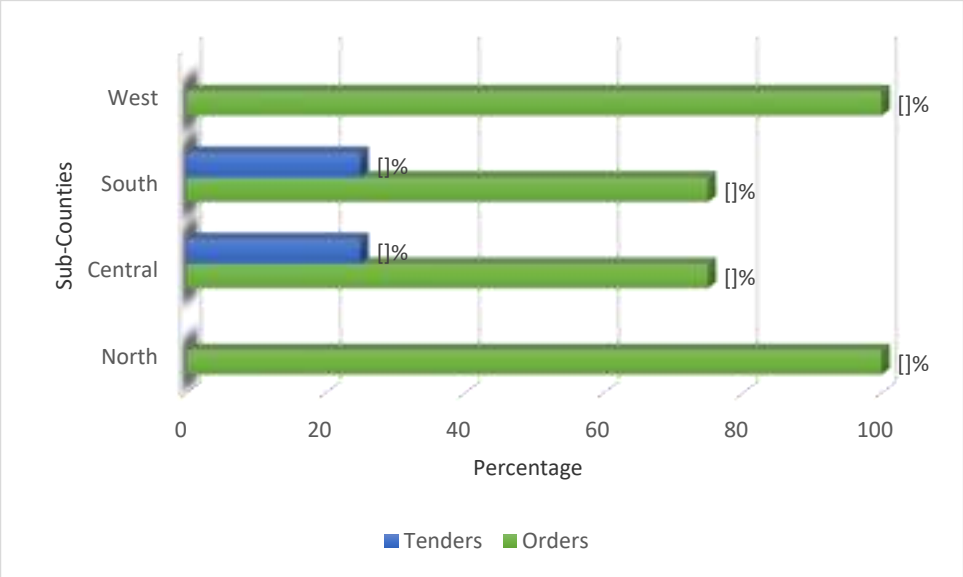
The study found it necessary to establish where external traders buy their chicken. It was evident from figure 28 that majority of the traders buy their chicken from farmers. As well, most of the traders buy their chicken from other traders with the least buy their chicken from groups.

Figure 28. Suppliers of Chicken

3.1.6 Terms of Supply

The terms of supply were put into account by the study. Figure 29 presents the findings. The terms of supply were majorly orders across the county. Tenders were also made in Pokot South and Central sub-counties.

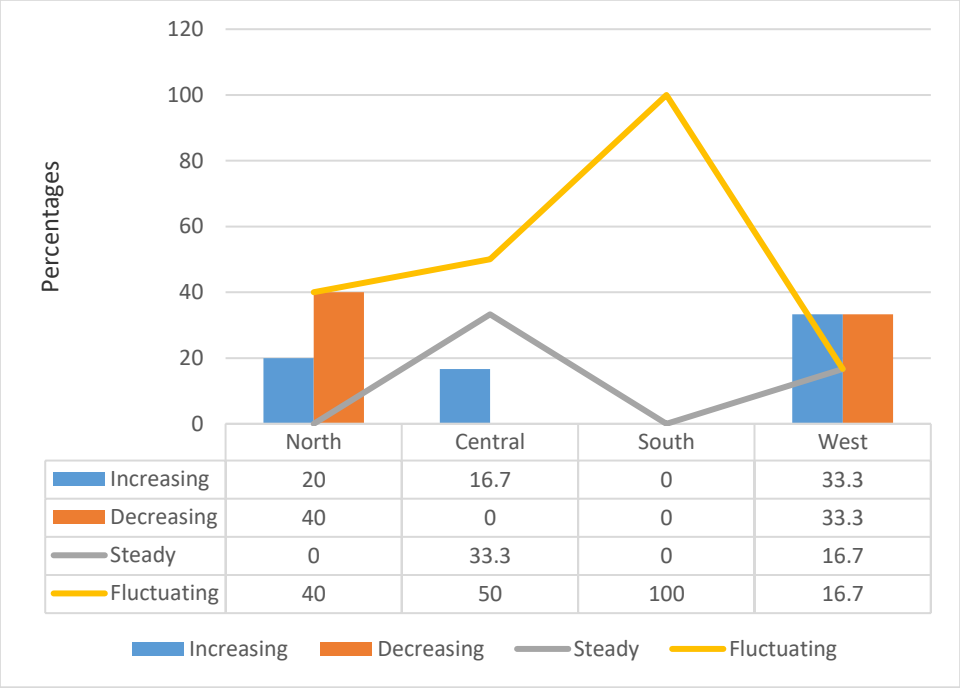
Figure 29. Terms of Supply



3.1.7 Chicken Supply

It was also deemed necessary to establish the nature of chicken supply in the county. As evidenced figure 30, chicken supply has not been consistent. In most of the cases, it has been fluctuating. There has been an increase in chicken supply in only North, Central and West sub-counties. Further, the chicken supply in Pokot Central sub-county is steady to some extent. The production of local chicken needs to be carefully planned and managed to match the fluctuating chicken supply.

Figure 30. Chicken Supply



3.1.8 Chicken Supply Trends

As evidenced in table 11, chicken traders asserted that, there were fluctuations in local chicken trade across the months of the year. The highest demand for local chickens coincided with the major social and religious festivals of the year. These are the Christmas and New Year season (December- January) and Easter season (April). On the other hand, January to May and March to August were reported to have the lowest demand for local chickens. Aklilu (2007) similarly reported high sales of local chickens in periods like Easter and Christmas.

The differences in the demand of local chickens in times of the year can be attributed to the tastes and preferences of consumers. Religious festival days are associated with increased poultry consumption and sales. These patterns cause strong fluctuations in prices of local chickens and is reflected as one of the problems faced by traders. Demand for local chicken increases in the onset of festivities and later decreases. If poultry production in West Pokot County could be carefully planned and managed to match the market demand, high economic benefits might be realized.

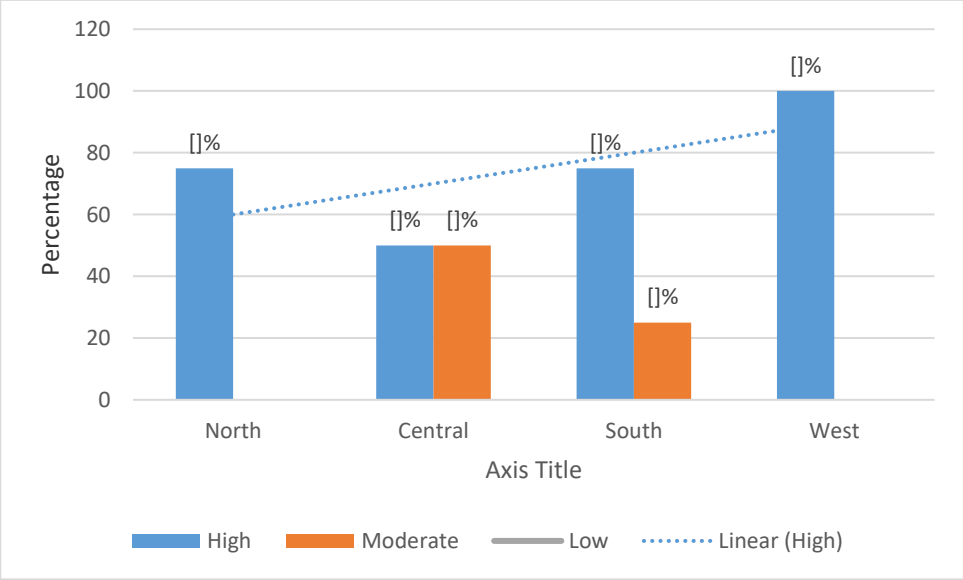
Table 11. Chicken Supply Trends

			Central	North	South	West
Supply	Month	Chicken	Mean price	Mean price	Mean price	Mean price
Oversupply	April - June	Cock	0	450	500	0
Oversupply	April - June	Hen	0	250	400	0
Oversupply	Oct - Jan	Cock	460	0	0	400
Oversupply	Oct - Jan	Hen	300	0	0	300
Oversupply	April - December	Cock	686	0	0	0
Oversupply	April - December	Hen	350	0	0	0
Undersupply	March - August	Cock	521	0	0	0
Undersupply	March - August	Hen	530	0	0	0
Undersupply	January - May	Cock	690	500	600	500
Undersupply	January - May	Hen	543	300	450	400

3.1.9 Chicken Supply Compared to other Counties

Figure 31 presents a comparison of chicken supply between West Pokot and other counties. When compared to other counties, chicken supply in Pokot West County has been on an increase with the highest chicken supply being in Pokot West sub-county. The findings are consistent with the SNV (2013) baseline survey which indicates that local chicken production has been on an increase with 400,000 estimated birds. Further, the report indicates that Chepareria and Kapenguria divisions are the leading producers of poultry with an average population of 160,200 and 100,300 birds respectively. This tallies with the findings of the study.

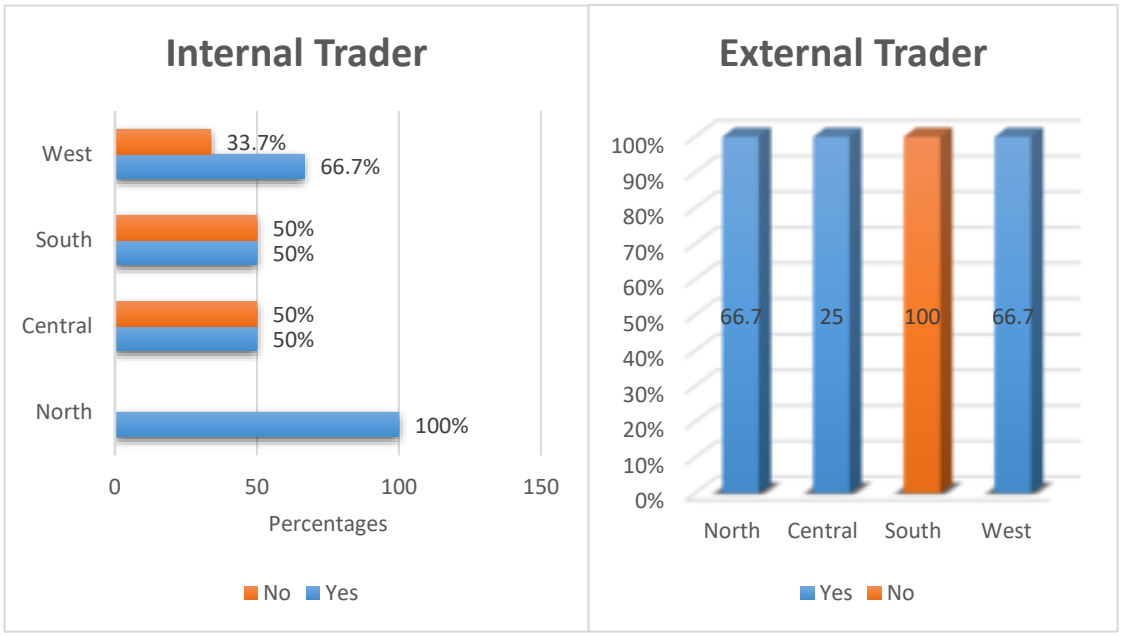
Figure 31. Chicken Supply Compared to other Counties



3.1.10 Sufficiency of supply sources

The sufficiency of supply sources are presented in figure 32. As shown in the figure, the supply of chicken is evidently high in Pokot North and West sub-counties. As such, traders have a consistent supply of high-quality chicken. However, it is relatively low in Pokot Central and South. Therefore, efforts have to be made to improve productivity of indigenous chicken in a sustainable way. Emphasis should be given in curbing diseases and parasites which adversely affect Central and South sub-counties. This could be a possible cause of low chicken supply. Organizing input supply system for feed, vaccines and veterinary drugs is also a plausible solution to increase the supply. In contrast, external traders from North, West and Central sub-counties confirmed that they get enough for their needs. However, those from Pokot South affirmed that the sources of supply were insufficient for their needs whenever they visit.

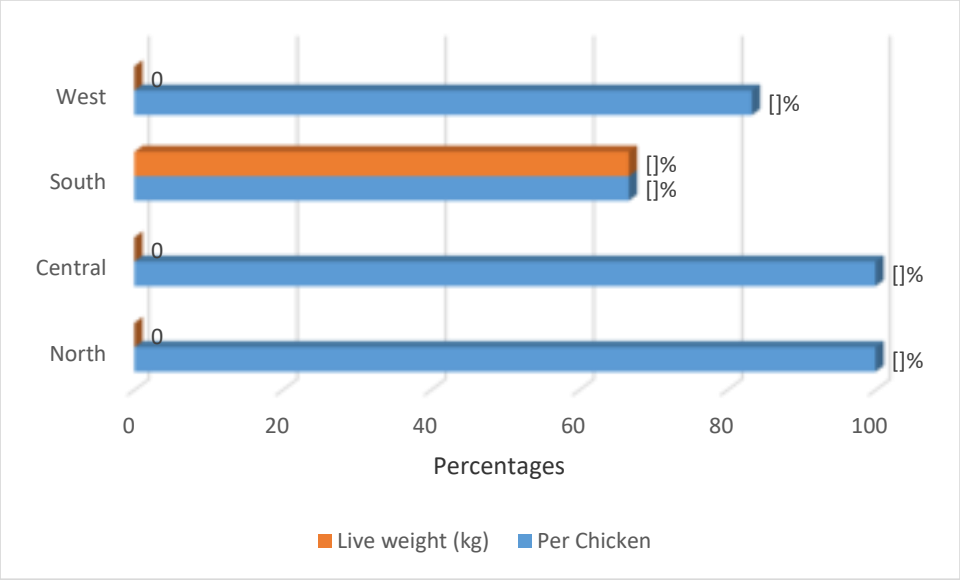
Figure 32. Sufficiency of supply sources



3.1.11 Mode of Purchase of Chicken

The findings in figure 33 indicate that internal traders buy their chicken per chicken rather than per live weight. It is only in Pokot South sub-county where chicken was bought per chicken and also per live weight. This implies that the price of chicken remains constant irrespective of its weight. As such, producers in Pokot Wes sub-county said, "*There is need to introduce the sale of chicken per weight*."

Figure 33. Mode of Purchase of Chicken



3.1.12 Number of birds per Single Visit of External Traders

Table 12 presents the results on the number of birds per single visit. The average number of birds sold per single visit ranged between 150 to 300 birds while the minimum number of birds per single visit was 40 to 80 birds.

Table 12. Birds per Single Visit of External Traders

	Minimum	Maximum	Mean
Pokot North	40	150	96.67
Pokot Central	80	300	172.5
Pokot South	50	300	150
Pokot West	50	200	150

3.1.13 Cost of Birds

There has always been high potential for indigenous chicken in the county. The local chicken are in high demand hence farmers not only keep them for food but mainly on commercial basis. Internal traders buy their chicken per chicken rather than per live weight. This implies that the price of chicken remains constant irrespective of its weight. As such, producers in Pokot West sub-county said, "*There is need to introduce the sale of chicken per weight*." The sale of chicken per weight will enable farmers to get the value for their money. Table 13 shows the cost of the birds. On average, internal traders purchase cockerels at an average price of Ksh400 to Ksh650. Hens are purchased at a price of Ksh250 to Ksh500 per hen. Chicks are rarely sold in the county and they fetch as high as Ksh200.Pullets have a somewhat higher price with the lowest fetching Ksh150 and the highest Ksh350. The eggs from local chicken are often preferred because of their deep yellow colored yolks. They are purchased at a uniform cost of Ksh10 per egg.

Table 13. Cost of Birds (In Kenya Shillings)

	North			**Central**			**South**			**West**		
	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
Cocks	400	500	440	450	650	558	400	600	525	400	600	491.67
Hen	250	350	320	300	450	392	300	400	366.7	300	500	375
Chicks	0	100	20	0	0	0	150	200	162.5	0	200	83.33
Pullets	200	300	240	150	350	245	200	300	266.7	150	350	266.67
Eggs	0	10	7.4	5	10	9.33	10	10	10	0	10	7

3.1.14 Selling price of Birds

The selling price of chicken by the internal traders was put into account. The results are presented in table 14.Chicken traders noted that they sell their cocks for as high as ksh700 thereby making reasonable profit considering that they bought it at a price of ksh400 to 650.Hens are sold at least at ksh350 and at most at ksh550.Chicks price ranges from ksh200 to ksh350 while that of eggs ksh10 to ksh14.Additionally, pullets are sold at a price of ksh250 to ksh350 by the traders.

Table 14. Selling price of Birds (In Kenya Shillings)

	North			Central			South			West		
	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
Cock	550	650	580	600	750	664	500	700	616.7	500	650	558.33
Hens	350	400	370	350	550	459	300	500	433.3	400	550	450
Chicks	0	200	40	0	0	0	200	300	225	0	350	91.67
Eggs	0	15	7.8	10	15	14.3	10	400	92	0	250	49.5
Pullets	0	0	0	0	0	0	250	350	300	0	0	0

3.1.15 Payment per Unit

To external traders, there is general preference for local chickens over their exotic counterparts because of the belief that they are tastier. This puts the demand for local chicken on the higher side. Table 15 illustrates that the payment per unit for whole chicken ranges from ksh300 to ksh700.Cockerels are purchased for as low as ksh300 and pullets price ranges from ksh100 to ksh500. Hens' price also ranges from ksh300 to ksh700.

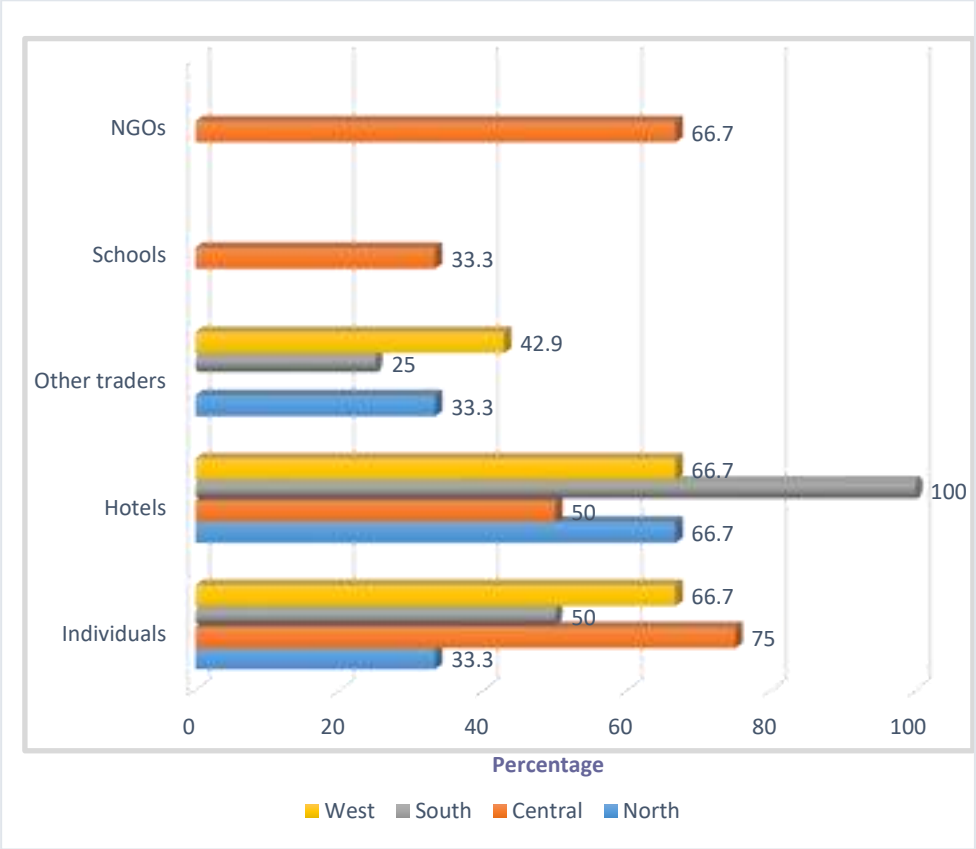
Table 15. Payment per Unit

	North			Central			South			West		
	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
Whole chicken	300	650	433.33	350	500	425	400	700	566.7	0	650	216.7
Egg	0	7	2.33	0	10	6.67	300	450	383.3	0	0	0
Cocks	500	750	600	550	650	600	350	800	587.5	550	700	600
Pullets	0	300	100	250	400	333.33	200	500	366.7	0	0	0
Hens	300	450	366.67	300	400	350	300	700	500	400	500	433.3

3.1.16 Main Buyers of Chicken

Marketing of chicken in the county is informal and poorly developed. As shown in figure 36, the main buyers of chicken were hotels and individuals. Other traders also contributed a higher percentage of the buyers. From Pokot central the main buyers were NGOs (66.7%) and schools (33.3%). The sale of chicken is as evidenced in ILRI (1995) where chicken are sold to villages and in local and urban markets.

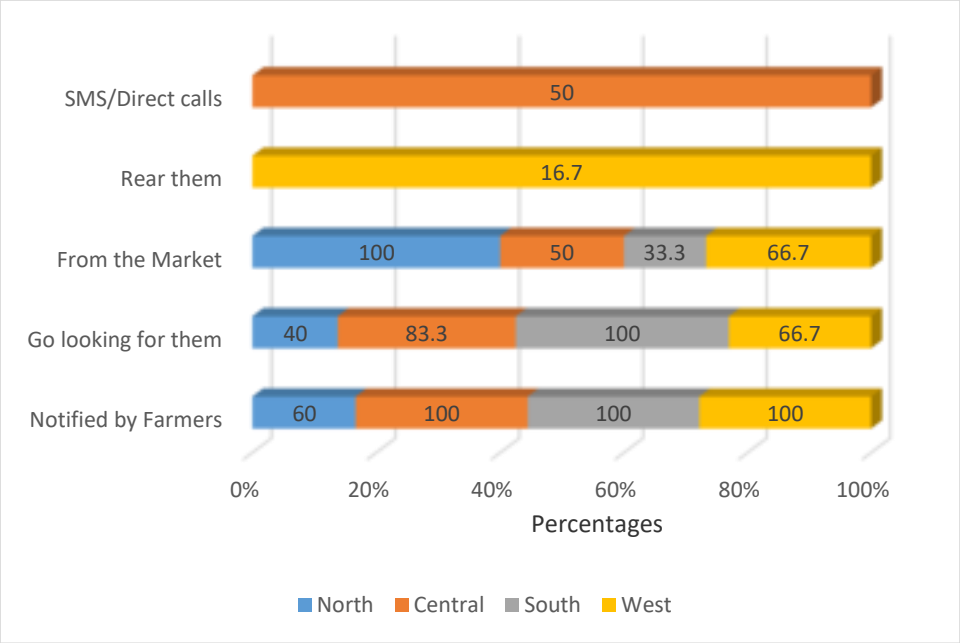
Figure 34. Main Buyers of Chicken



3.1.17 Sourcing for Chicken by Internal Traders

The study put into account how internal traders get their chicken. The results are illustrated in figure 35.As evidenced in figure 37, traders are majorly notified by farmers of the availability of chicken. Also, some of the traders go looking for them. Further, SMS/Direct calls is also a major source of conveying information on the availability of chicken while internal some traders also rear chicken.

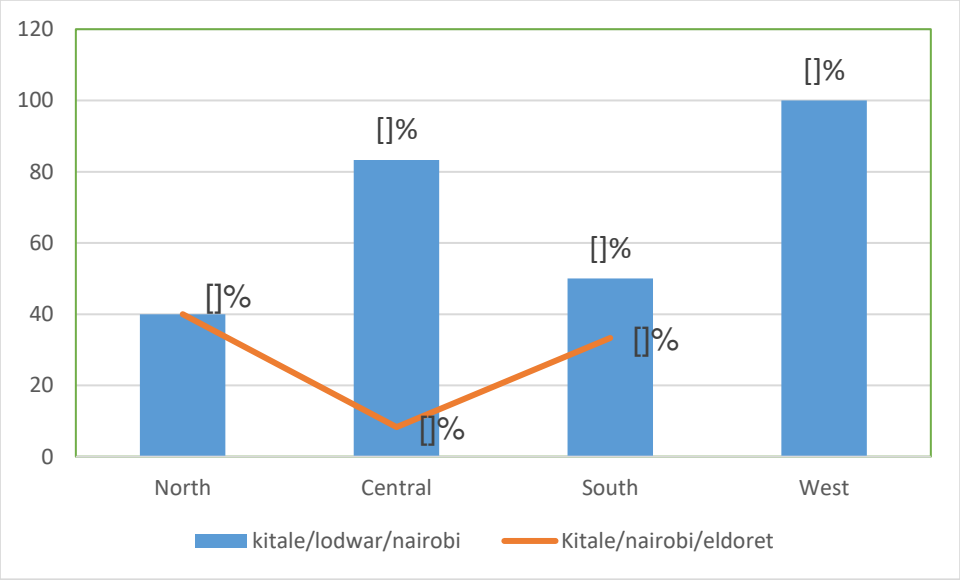
Figure 35. Sourcing for Chicken by Internal Traders



3.1.18 External markets for Chicken

Chicken provide major opportunities for increased protein production and incomes for smallholder farmers. This is due to high rate of productivity and the ease with which its products can be supplied to different areas (Muchenje *et al*. 2000).According to the ASDSP (2014) value chain analysis, Kitale, Eldoret and Nairobi are the main external markets of local chicken. This is as evidenced in figure 38.Consistently, the county department of veterinary annual report (2013) indicates that chicken traders move the birds from West Pokot County to Umoja in Nairobi, Embakasi in Nairobi and Kitale in trans-nzoia. This indicates great potential for the development of local chicken trade. Specifically, traders said, "*buyers in Nairobi were willing to pay more money for local chicken since they are tasty and disease free*".

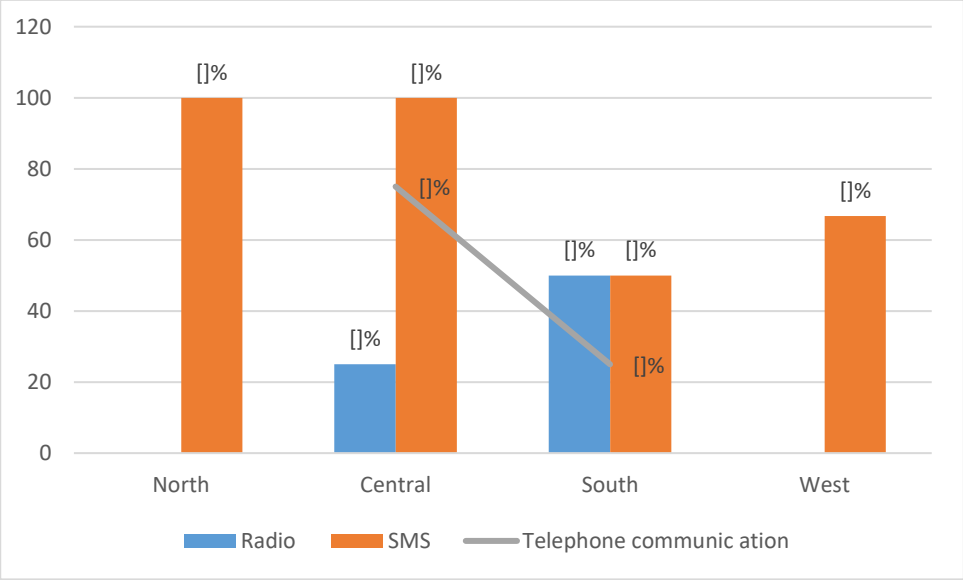
Figure 36. External Markets for Chicken



3.1.19 Form of market Information

The form of market information was also sought by the study. The results are presented in figure 39.As shown in the figure, the major source of information was basically SMS (Short Message Service) and radio communication. This is a clear indication that marketing of farmers' produce is done at individual level rather than as a group. The results are consistent with the ASDSP value chain analysis (2014) indicating that the degree of integration in the local chicken value chain is minimal in the County. This points to the need of collective effort to market farmers' produce at group level.

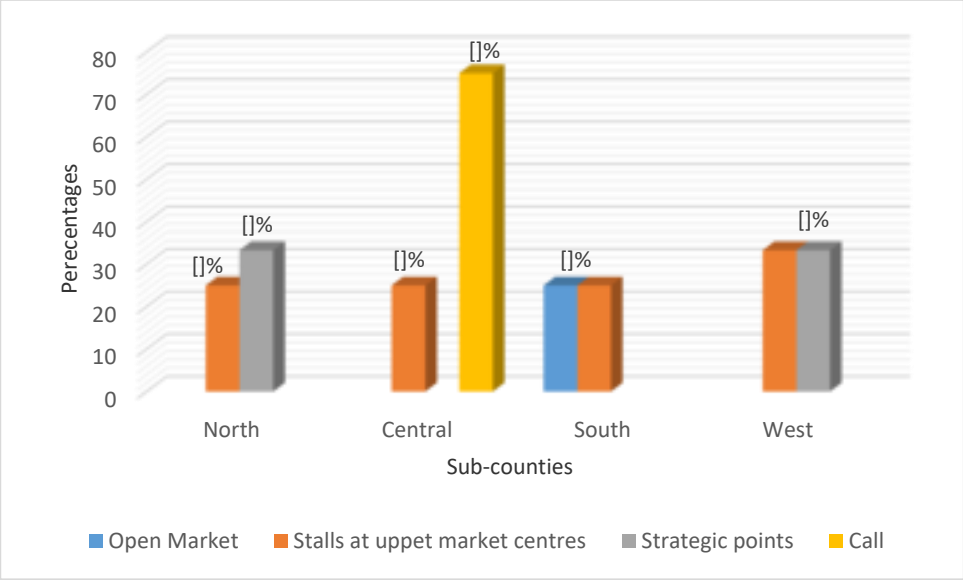
Figure 37. Form of market Information



3.1.20 Means of accessing buyers

The study established in figure 38 that external traders reach their buyers at stalls in the market. As well, in Pokot central, traders reach their buyers through the use of telephone communication. Further, there are strategic points in North and West sub-counties for conducting trade.

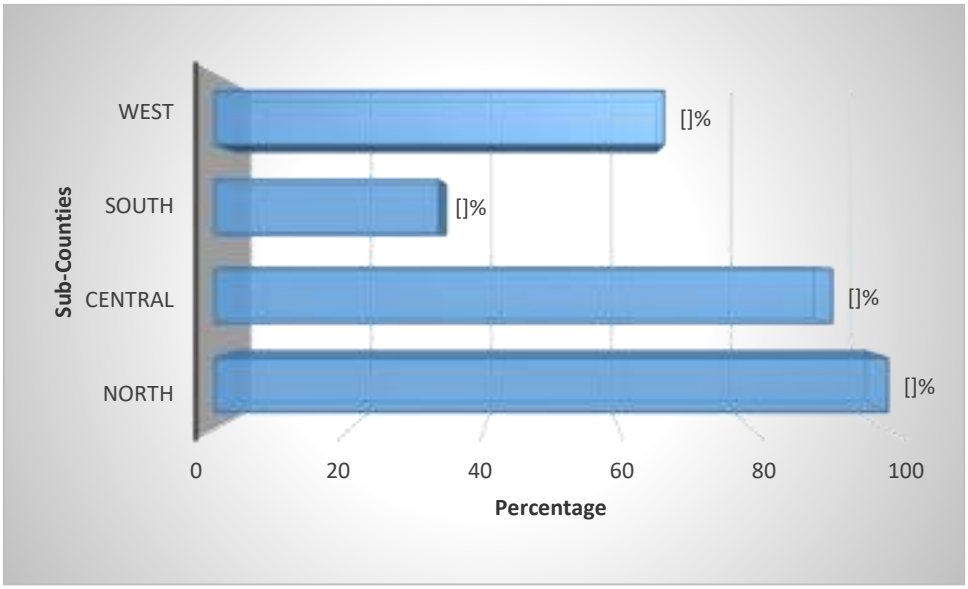
Figure 38. Means of accessing buyers



3.1.21 Cartels

With reference to cartel behaviour, the internal traders couldn't discern and distinguish what a cartel is and who forms a cartel. As such, figure 39 highlights their perceptions on cartel like behaviour. Majority of cartels are in North and Central sub-counties while those in South sub-county are few. Cartels exist between traders and middlemen hence they have control over the prices of poultry products. As earlier established, women are more responsible for chicken rearing in both male and female headed households. As such, they are also involved in selling the chicken. This provides room for exploitation by traders who are especially male. Particularly, farmers from Cheptiangwa cattle dip group noted this and said, "*Since women are the ones that take chicken to the market, they are exploited by traders who are especially male*".

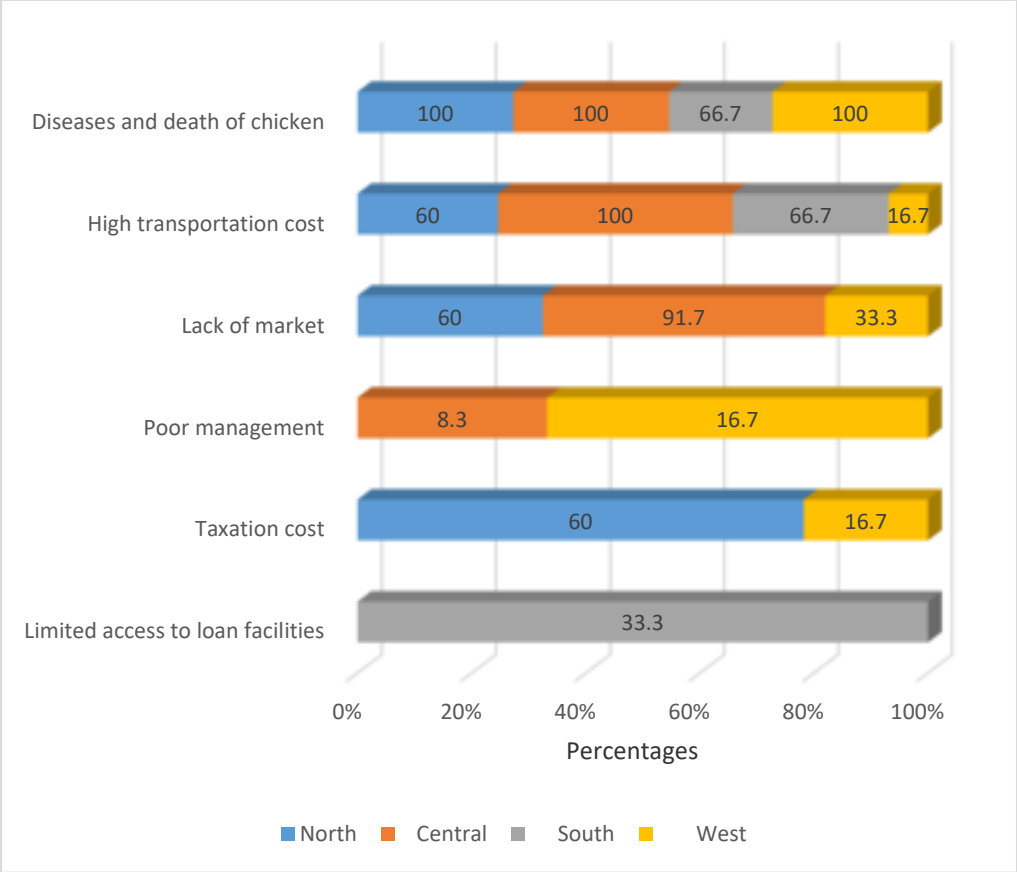
Figure 39. Cartels



3.1.22 Constraints faced by Internal Traders

Despite the benefits that chicken trade offers, there are number of challenges that face it. As evidenced in figure 40, traders are adversely affected by diseases and high transportation cost. The market for chicken and its products is also not sufficient enough in the county. Finally, the taxation burden and limited access to loans have made it difficult for traders to conduct chicken trade.

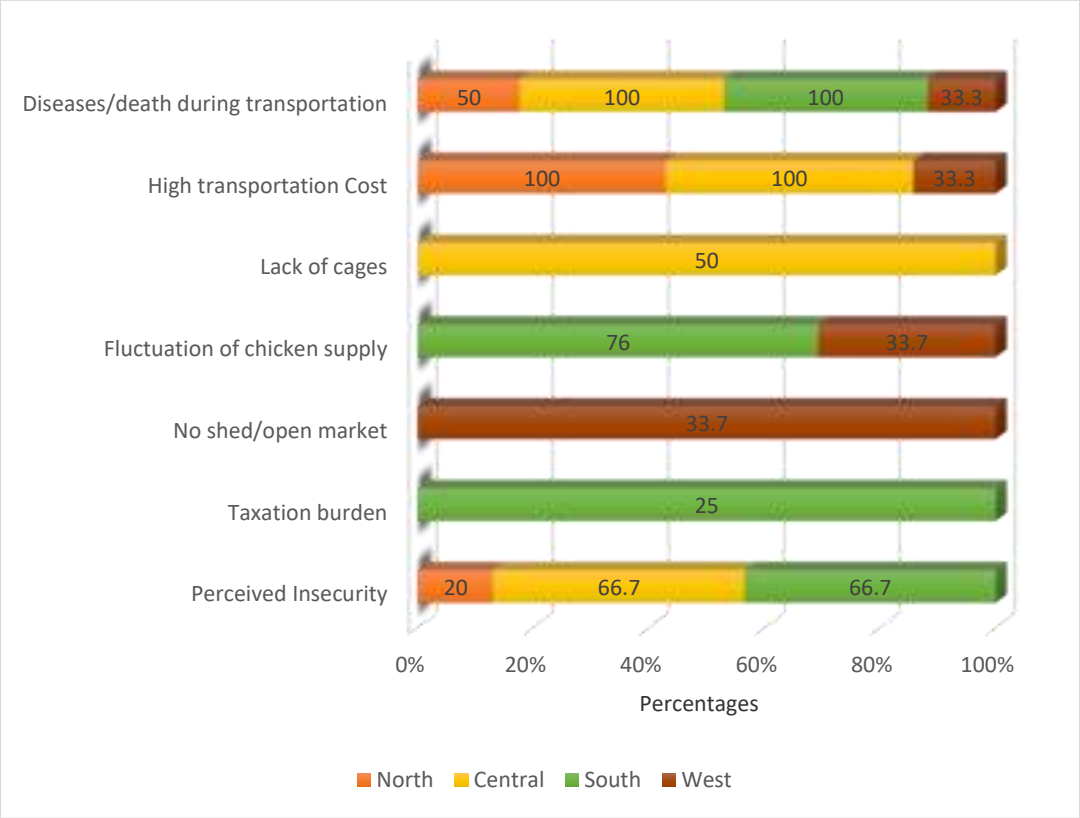
Figure 40. Constraints faced by Internal Traders



3.1.23 Constraints faced by External Traders

As shown in figure 41, external traders are mainly affected by diseases and death of chicken during transportation. The traders incur high transportation cost especially in North (100%) and Central sub-counties. Cages are minimal and they are hardly ever cleaned or disinfected. Also, organized marketing of free-range rural poultry is difficult because of small size of the output per household generated at irregular intervals leading to fluctuation of chicken supply. Traders also incur taxation costs which reduces their profit margin. Due to the long history of resource conflicts within the County, external traders perceived that there was insecurity in general, however, this is only a perceptual bias.

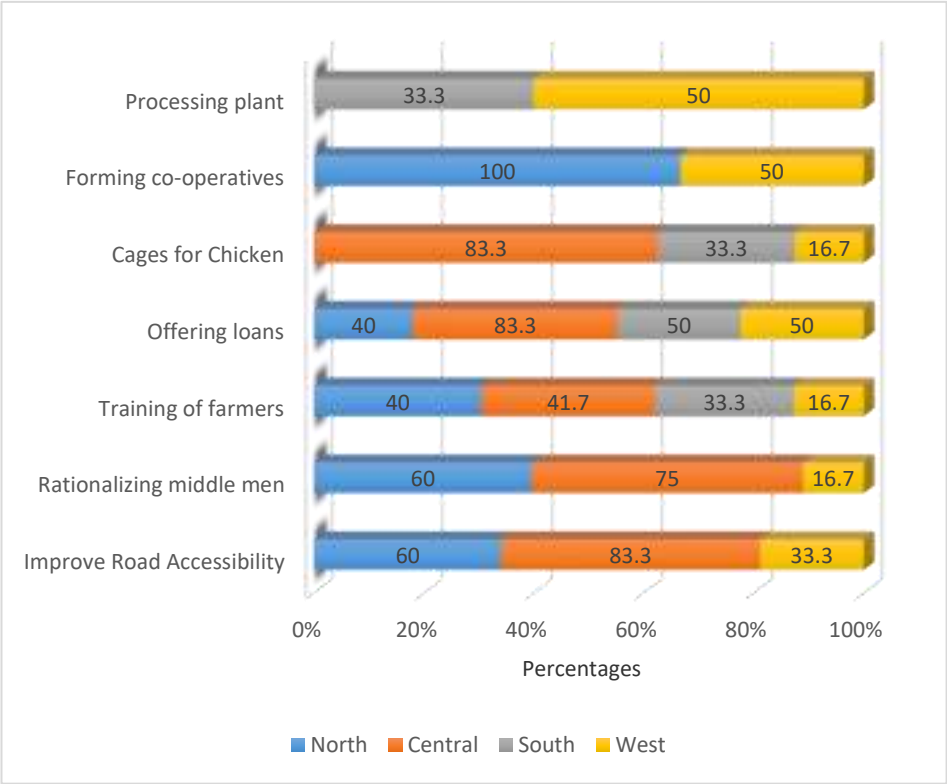
Figure 41. Constraints faced by External Traders



3.1.24 Ways and means to improve trade in Chicken

The ways and means to improve trade in chicken are presented in figure 42.There is need to improve on the transportation modes of chickens. There is also need to rationalize middlemen and form co-operatives in order to market local chickens and cut down the transport costs. Local chicken farmers need to be trained and encouraged to learn skills which could increase their credibility in chicken trade. There is also need for cages for transporting live birds so as to reduce on the high mortalities. Traders need to be offered with loans and a processing plant needs to be established so as to improve on the chicken trade.

Figure 42. Ways and means to improve trade in Chicken



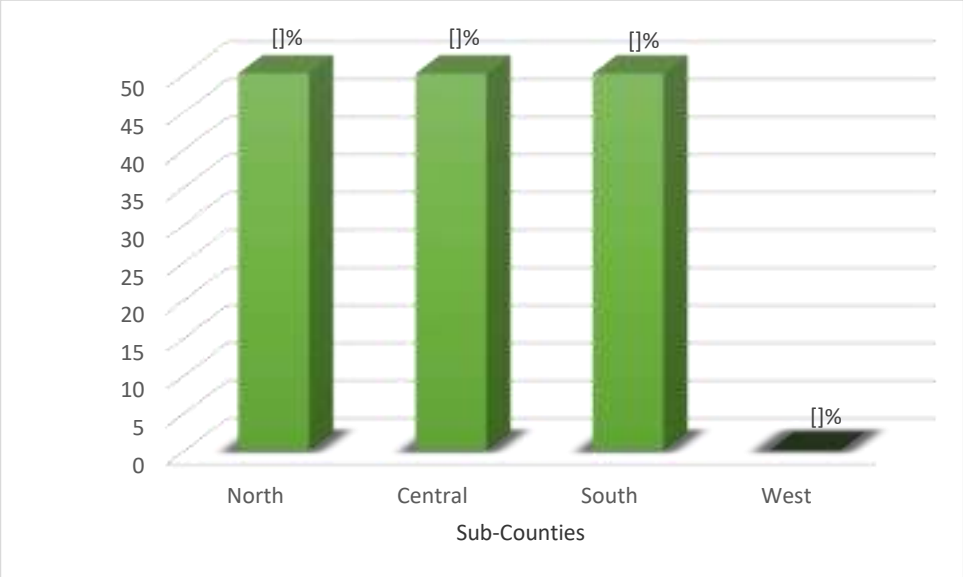
3.1.25 Chicken Processing and Packaging

According to the Government of Kenya (2012), there is need for Kenya's products to undergo value addition so as to be competitive in the domestic market. One of the ways products can undergo value addition is through packaging. The study was prompted by the need to establish the market, benefits and portability of processed and packaged chicken.

3.1.25.1 Market for processed/packaged Chicken

The study sought to establish whether there is market for processed/packaged chicken. The findings are presented in figure 43.As evidenced in the figure, there is market (50%) for processed meat in the county apart from Pokot West sub-county. This points out to the importance of packaging as it enables food to reach consumers, without it the product would lose its aesthetic value (Khetarpaul and Punia, 2008).

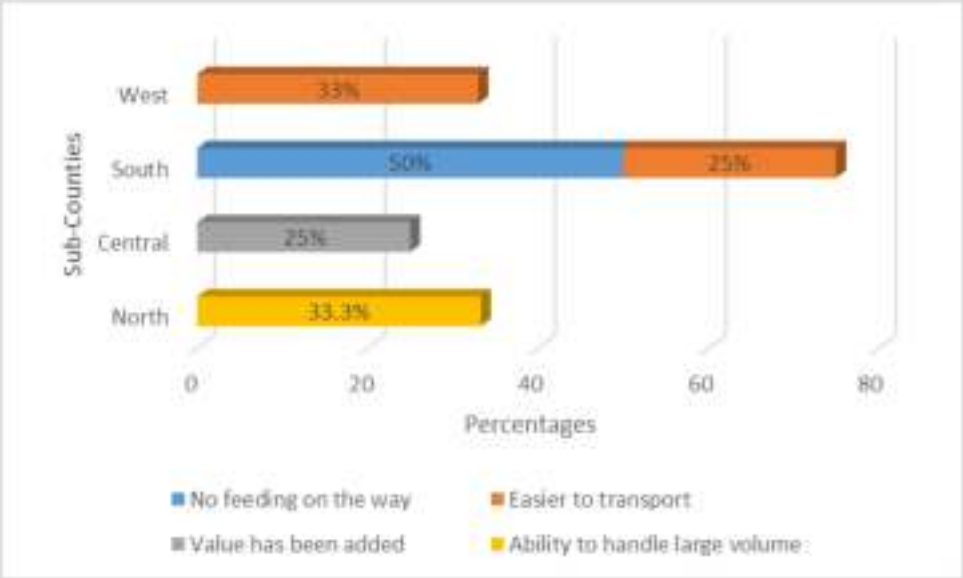
Figure 43. Market for processed/packaged Chicken



3.1.25.2 Benefits of Processed and Packaged Chicken

The benefits of processed and packaged chicken are illustrated in figure 44.As shown in the figure, external traders prefer their chicken processed and packaged because there is no feeding on the way (50%), it is easier to transport when processed and packaged (25%) and there is also value added (25%). Additionally, when chicken are processed and packaged traders will be able to handle large volume (33.3%).

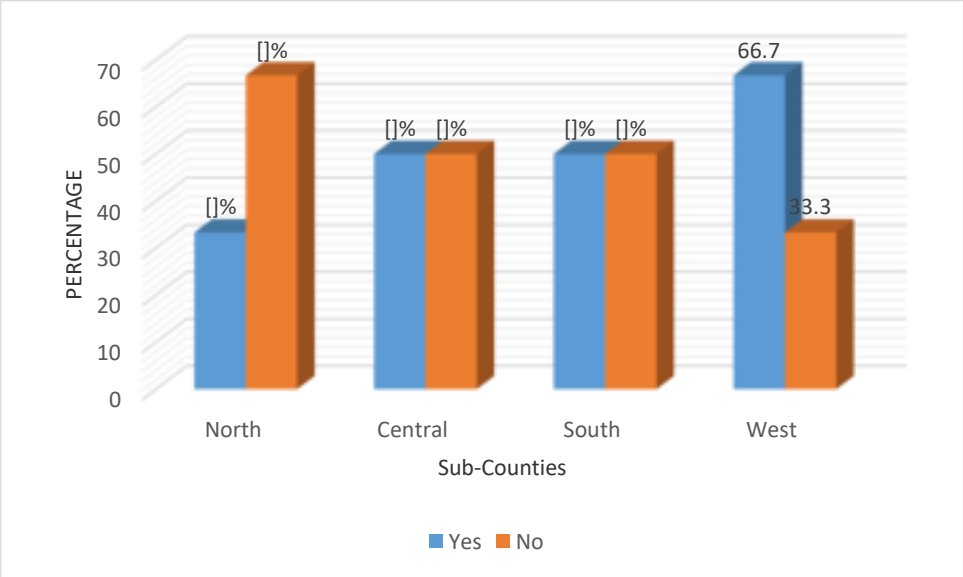
Figure 44. Benefits of Processed and Packaged Chicken



3.1.25.3 Portability of processed and packaged chicken

The study sought to find out if it would be easier to handle chicken if it were processed and packaged. The findings are illustrated in figure 45.In the event that chicken is processed and packaged, majority (66.7%) of the external traders from Pokot West sub-county found that it would be easier to handle. External traders from Central and South sub-counties were uncertain. Nonetheless, 66.7% of the external traders from North were of a contrary opinion.

Figure 45. Portability of processed and packaged



4.0 DISCUSSIONS

4.1 Vertical and Horizontal Linkages of the Local Chicken Value Chain

The vertical and horizontal linkages in the local chicken value chain exists among producers, internal and external traders. There are also indirect actors who provide financial or non-financial support services such as credit and extension services. Each actor plays specific roles at different points of the value chain (KIT, *et al* 2006).The study established that farmers obtain their breeding cocks from their own source. The households produce birds and eggs. They are sold mainly to local traders at stalls at upper market centres. Farmers are the main suppliers of chicken. There is also existence of middlemen in the local chicken value chain. A cartel like behavior is evident among traders and middlemen. The middlemen buy at low prices from farmers and sell it at higher prices at the market. Also, they secretly determine how much to pay the producers and end up exploiting them. The other buyers are external traders, travelers, schools, hotels and co-operatives. The chain ends with external traders.

4.2 Potential investment opportunities available in Local Chicken

The predominant management system practiced by farmers was an extensive oriented system in which chicken are left to scavenge. The scavenging feed resources are mainly vegetables, grains and termites. Transportation of chicken also posed a challenge. Due to poor handling of birds, most of the birds die while on transit. According to the County Government of West Pokot (2013), chicken are poorly handled during transportation resulting to about 10% death of birds in transit. This presents an opportunity for investment in value addition of chicken. Particularly, ASDSP (2014) annual report identifies limited processing facilities in local chicken value chain as a key infrastructural need that requires due consideration.

Additionally, chicken keeping was a subsidiary income generating activity to supplement their primary livelihood activity which was crop farming and livestock rearing. In the words of one of the farmers in the group: "*We have to sell our chicken so as to get money that we can use in crop farming*". Given the current supply of chicken, there is great potential in chicken rearing if farmers are to consider it as a source of livelihood and income.

4.3 Market Access in birds in the Local Chicken Value Chain

Local farmers sold their produce to local traders who in turn sold their produce to external traders. This was an impediment to the farmers since external traders who could pay premium prices were sold chicken to by internal traders. The traders sold only live birds due to lack of a chicken processing facility. Since most sells were locally done, there were minimal marketing costs. The form of market information was basically Short message Service (SMS) while the terms of supply were orders. External traders get an average of 90-150 birds per single visit. They reach their buyers at the upper market centre. However, there was no shed at the market places and traders had to incur high transportation cost due to poor road network. This was a limiting factor of the development of the poultry sector. As evidenced by the farmers, one of the plausible solutions to enhance marketing of poultry produce was the formation of cooperatives. The cooperatives would be of great benefit to the farmers since it would aid in looking for better markets.

5.0 DELIVERABLES

Potential linkages for the actors

Setting up a coordinating office within the directorate of livestock with the following purposes:

1. Link the whole producer groups in order to facilitate social entrepreneurship and group sharing. Through the office, the coordinator will act as an information disseminator for the producer groups with regards to the training, technology transfer and social capital. In this context, social capital refers to the interconnectedness of the local community and as such it may act as a catalyzer with regards to poultry business.
2. Act as a market information provider with regards to supply and demand. From, the study it is evident that there is a gap to access to market information and thus the coordinator will fill the gap.
3. Act as resource mobilizer for the producer groups. The resources will include: capital mobilization, group capacity improvements and mediate on behalf of the groups for credits and extension services.

6.0 POLICY GAPS

Findings from the study details that there are potential policy gaps in the poultry keeping:

1. There is disconnect within the community with concerns to poultry keeping business. The farmers from the community keep chicken for the sake of keeping them and 'as a hobby' as one participant put it succinctly. Since majority of the community are livestock keepers, their efforts, energies are geared towards the management and maintenance of livestock and thus an agricultural policy drawn to encourage livestock husbandry and chicken rearing concurrently will encourage them to venture into the poultry rearing practices.
2. The county government should set up an investment board whose function is to put forward investment plans for the poultry sector. The investment board will also devise and implement well-defined strategies for the development of investments in local chicken processing in the County.
3. The county government should put in detail the modalities and arrangements for a public - private partnerships with concerns to the community's economic activity. The policy should detail the role played by both actors, responsibilities shared, incentives offered by the county, available investment opportunities, modalities and arrangements for the partnerships. The collaborative linkage between the public and private sector will aid in devising appropriate strategies to enhance commercialization of local chicken.

7.0 SCOPE FOR PUBLIC PRIVATE PARTNERSHIPS (PPP) IN CHICKEN PROCESSING

The results of the study confirm that rearing of local chicken has an essential role in improving household income and nutrition. However, commercial expansion of local chicken production will require efforts by both the government and the private sector. The government will partner with the private sector in an attempt to share the associated risks and challenges while exploring the potential benefits of local chicken processing. Public private partnership aimed at financing and coordinating the activities related to chicken processing will go a long way in transforming local chicken processing into a viable commercial enterprise in the County.

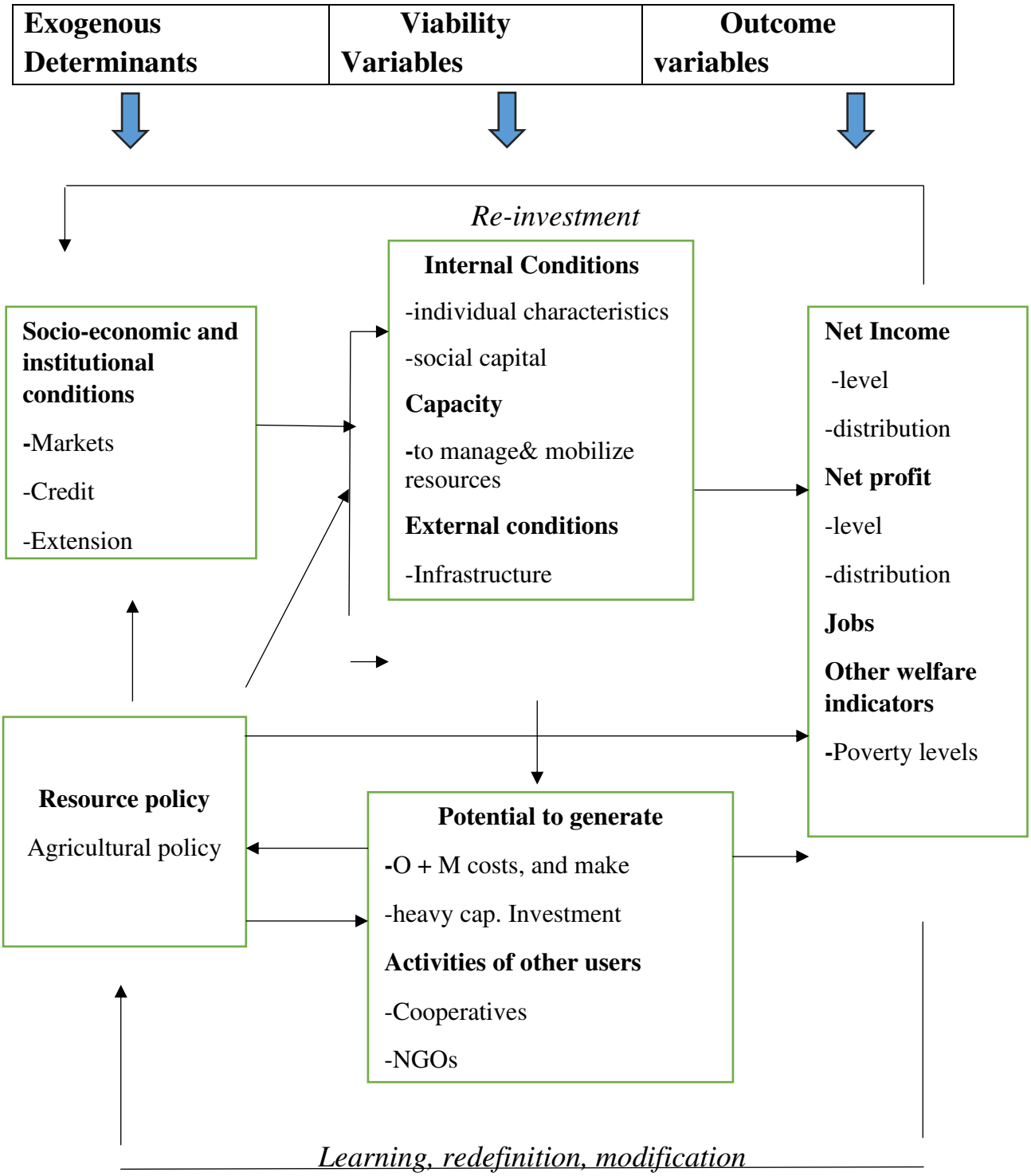
Through public private partnership, farmers will be availed with the much needed financing to commercialize local chicken keeping. For instance, availing of credit to farmers can be a joint service by both the public and private sector. Farmers will be able to receive interest-free loans and thereby keep much larger poultry flock sizes of local chicken. This way, they will be able to enjoy increased income from the poultry enterprise and also satisfy the daily bird requirements for the processing plant. Other poultry operators such as feed millers and agro-vet dealers would also benefit immensely from higher business volumes.

Additionally, efforts can be driven towards training and provision of information in order to promote new knowledge in poultry management: disease control; extension support; marketing; together with availing credit in order to increase investment in local chicken processing (see table 16).In a nutshell, the promotion of public private partnership will enable local chicken processing to gradually become independent. The government will only be required to monitor the services to ensure that the producers benefit. With this background, the following activities can be promoted under Public-Private Partnerships. Table 16 indicates the scope for promoting PPP for establishment of a processing plant.

Table 16 Scope for Promoting PPP in establishment of a Processing Plant

No.	Scope	Private service	Public service	Joint Service
1.	**Services**			
a.	Training and provision of information		√	√
b.	Veterinary services		√	√
c.	Testing against various diseases (D. I.)		√	√
d.	Extension support		√	√
e.	Marketing	√		
f.	Credit facilities		√	√
2.	**Inputs Production**			
a.	Water and Sewage Electricity		√ √	
b.	Personnel	√		
c.	Insurance	√		
d.	Packaging material	√		
e.	Installation, working capital, maintenance	√		
f.	Research on vaccines, medicines		√	√
g.	Land and Buildings	√		
h.	Plant and Equipment	√		

Figure 46. Framework for Analyzing Viability of Local Chicken Processing



8.0 ANALYZING VIABILITY OF LOCAL CHICKEN PROCESSING

As depicted in the conceptual framework above (figure 46), the socio-economic and institutional conditions must be in harmony with the prevailing internal and external conditions. At producer (farmer) level, productivity will largely depend on individual characteristics (education levels, entrepreneurial orientation, cultural dimensions) of the farmer and the capacity to manage and mobilize resources.

Social capital among poultry farmers is designed to improve productivity of indigenous poultry whereby poultry farmers share information on housing, feeding, and disease control, breeding and brooding in order to heighten production. Further, viability is dependent on external conditions such as Infrastructure in the County. Further, for producers to have the capacity to manage and mobilize resources, they need to undergo a paradigm shift in thought so that they can consider poultry farming as a source of livelihood and income.

Producers' capacity, internal and external conditions will further affect the ability to generate management and operational costs, and potential to invest heavily in chicken processing. In addition, the activities of other users such as cooperatives and NGOs will affect viability either directly through their production activities, or indirectly through lobbying and social net-working to shift the policy in their favor.

The effect of agricultural policy is felt directly or indirectly at the local chicken value chain. The outcome indicators may lead to policy redefinition through learning and modification. Further, the level and distribution of net income and net profits results in new technology, improvements in resource conditions and provision of institutional and support services (markets, credits and training) that further enhance viability and sustainability of the local chicken processing.

9.0 PROCESSING PLANT ECONOMIC, FINANCIAL AND TECHNICAL VIABILITY

A processing plant is viable from an economic perspective. This is because of the vast population of chicken in the county. According to the ASDSP (2014) value chain analysis, over 90% of the households in the County have at least 1 bird a clear indication that the production level is relatively high. The County has the potential to produce more chicken since it has a conducive climate for the rearing of chicken. Thus, there are sufficient numbers of poultry to support a processing plant. Also, producers are willing to expand poultry production if given technical and financial support. However, the seasonality of chicken production has to be looked into so that the County is able to meet the required number of chicken to be processed on a daily basis.

From a marketing perspective a processing plant that focuses on local chicken is viable. This is primarily due to the large and growing number of external traders. Further, a gap exists in poultry processing. As evidenced by Export Processing Zones Authority (2005), there were 65 operational slaughterhouses in Kenya in the year 2000.Out of the 65 slaughterhouses, sixty three of them dealt with red meat while only two namely, Farmer's Choice and Kenchic, slaughtered pigs and poultry. This presents a gap in poultry processing as commercial poultry processing is under monopoly. Once a processing plant is established in West Pokot County, processed chicken will be sold to consumers at an affordable price. Also, the plant needs a steady year round supply of chicken with the potential to increase production during festivity seasons.

A processing facility does not appear to be viable from a financial and technical point of view. Given the financial situation of producers, a processing plant does not appear to be viable from a financial point of view. Accessibility to credit and other means of financial aid would be necessary for a processing plant to be financially viable. If access to credit is enhanced, established producers will be able to keep much larger poultry flock sizes of local chicken. From a technical point of view, the method of brooding needs to be improved. According to the farmers, hens are used to brood and there is lack of improved variants of local breeds. The use of incubators could be embraced in order to increase the hatchability rate and thereby increase the production level of chicken. The county will also have to upscale its use of modern technology in accessing market information.

10. ENVIRONMENTAL ISSUES ASSOCIATED WITH CHICKEN PROCESSING

The establishment of local chicken processing plant will make tremendous adjustment so as to meet the increasing demand for supply of processed chicken. However, there are environmental issues associated with chicken processing that traverses throughout the County. As evidenced by the farmers, chicken processing is associated with water pollution. Since chicken processing requires large amount of water for the purpose of cleaning and cooling. The discharge of waste water into the environment from these activities results in water pollution.

Further, farmers noted that poultry processing is likely to cause air pollution. The activities that are undertaken at the processing plant lead to bad odor and attract flies and pests that carry diseases that affect both chicken and human beings. Decomposing waste products such as carcasses and feathers is the source of bad odor from chicken processing. This will affect the health of the individuals living within the vicinity of the processing plant. Additionally, the disposal of these decomposing wastes may also increase predators in the surrounding areas. Finally, there will be noise pollution resulting from operating machines in the processing plant.

Despite the aforementioned environmental issues associated with chicken processing, appropriate measures may be taken in order to reduce and control pollution resulting from chicken processing. For instance, amounts and strengths of wastes can be reduced by good practices such as providing screens on waste water collection channels, isolating and ventilating all sources of odorous emissions as well as keeping all working and storage areas clean.

11. CONCLUSION

Poultry keeping in West Pokot County is done at both subsistence and economic level. Women are more responsible for chicken rearing in both male and female headed households. Income generation and household consumption are the major reasons for keeping local chicken in the County. The main constraint of local chicken rearing is their high mortality resulting from diseases. Diseases such as Newcastle can be controlled through vaccination or timely administration of drugs. This is however not the case in the county since vaccines and drugs are insufficient and there is lack of professional administration by veterinary officers in good time.

Chicken are left to scavenge and they make use of scavenging feed resources. This practice results in low weight increase and poorly nourished chicken. They also lack supplementary feeds hence they have mineral deficiencies. Further, the young chicks are vulnerable to predators such as hawks. These constraints are as a result of low investment in vaccinations or drugs and chicken feeds.

There is also fluctuation in chicken supply. The rising demand of chicken by traders has not been met by an increase in production by the farmers. As such, supply is not reliable. This is also coupled with seasonality in chicken production whereby there is high demand during festivity seasons. If productivity could be increased, both traders and producers would benefit. The constraining factor however is lack of access to credit and other extension services.

There are a number of actors in the local chicken value chain. These include producers, middlemen, traders, hotels, NGOs, schools and direct consumers. These actors are responsible for the development of chicken production in the county. However, there is no collective effort to optimize the supply of chicken and bring down transaction costs. Additionally, there is lack of information sharing on supply opportunities between the producers and traders.

In a nutshell, local chicken rearing presents a lot of opportunities for the households in the County. Compared to livestock rearing, poultry farming requires relatively low investment. There is a lot of women involvement which presents an opportunity for women empowerment in the county. As well, the high demand of chicken from traders as far as Nairobi is an opportunity for the County to fully commercialize rearing of local chicken.

12. RECOMMENDATIONS

The following recommendations are made based on the results from the study in West Pokot County:

The producers asserted that they need training on new poultry management practices and technology associated with the poultry keeping. Training offered to the producers will advance their knowledge on good poultry keeping practices that will ultimately lead to improvement in chicken productivity.

Further, in order to realize the benefits of rearing local chicken, it is necessary for poultry farmers to provide their chicken with supplement feed. Also, technical support to farmers' experience of supplementary feeding would substantially improve productivity of local chicken.

There is also need to improve the quality of chicken by introducing better productive variants of local breeds. The government therefore needs to distribute cockerels from selected local breeds in order to improve the productive performance of local chicken. Additionally, it is utmost necessary to incorporate local knowledge in chicken production with substantial focus on women and youth.

The demand for chicken in the County justifies the introduction of an incubator that will heighten hatchability rate. To implement this, there is a need to make readily available credit services. Further, farmers will have to construct 'predator proof' houses that will protects young chicks from predators hence reducing losses.

There is a strong need for appropriate intervention in disease control in order to reduce chicken mortality and improve productivity. Control of diseases, mainly Newcastle, fowl pox and fowl typhoid, could be achieved through improvement in veterinary services. For instance, vet shop owners in each sub-county need to be sensitized of the importance of stocking more drugs specific for chicken diseases. Furthermore, in order to market farmers produce, there is need to collect and provide information on chicken production and sales to the media. As well, establishing a stable marketing chain is important so that farmers could obtain premium price for their products.

The findings of the study indicate that the establishment of a local chicken processing plant is viable. It would be prudent to run a small processing plant which supplies neighboring towns with processed meat. Such a venture would provide a market pull system thus encouraging more farmers and creating a multiplier effect in the poultry rearing business. By creating the multiplier effect, more farmers will be encouraged, there will be job creation and growth of industries such as extension services and feed millers.

Finally, there is need for the County government to involve the local community in activities towards realizing the establishment of the processing plant. The local community need to be sensitized of its importance and how the facility will be of benefit to them. Infrastructure particularly roads need improvement so that potential traders can easily access the County with minimal efforts. With the above put into consideration, the county will be able to exploit its potential as a centre of chicken processing and thereby improve the standard of living of its residents.

13. REFERENCES

Abdelqader A, Wollny CBA and Gauly M. 2007. Characterization of local chicken productionsystem and potential under different level of management practice in Jordan. *Journal of Tropical Animal Health and Production* 39:55–164.

Abubakar MB, Ambali AG and Tamjdo T. 2007. Rural chicken production: Effects of gender on ownership, and management responsibilities in some parts of Nigeria and Cameroon. *International Journal of Poultry Science* 6(6):413–416.

Alam J. 1997. *Impact of smallholder livestock development in some selected areas of rural Bangladesh.* Livestock Research for Rural Development Vol 9(3).

Aklilu HA, Almekinders CJM, Udo HMJ and van der Zijpp AJ. 2007. Village poultry consumption and marketing in relation to gender, religious festivals and market access. *Tropical Animal Health and Production* 39(3):165–177

Assefa Tadesse. 2007. Poultry management practices and on farm performance evaluation of Rhode Island Red, Fayomy and Local chicken in Umbulo Wachu water shade in Sidama zone. MSc thesis. Hawassa University, Hawassa, Ethiopia. 126 pp.

Doviet Minh. 2005. *Effect of supplementation, breed, season and location on feed intake and performance of scavenging chickens in Vietnam.* PhD thesis. Swedish University of Agricultural Sciences. 45 pp

Eshetu Y, Mulualem E, Ibrahim H, Berhanu A and Aberra K. 2001. Study of gastro-intestinalhelminths of scavenging chickens in four rural districts of Amhara region, Ethiopia. *Rev. sci.tech. Off. Int. Epiz.* 20(3):791–796.

FAO (Food and Agriculture Organization of the United Nations). 1997. *Guidelines for the inclusion of improved household poultry production. Diversification component of the special programme for food security.* FAO, Rome, Italy. 86 pp.

Gondwe TNP. 2004. *Characterization of local chicken in low input–low output production systems: Is there scope for appropriate production and*

breeding strategies in Malawi? PhD thesis. GeorgAugust-Universität Göttingen, Germany. 184 pp

Gueye EF. 1998. Village egg and fowl meat production in Africa. *World's Poultry Science Journal* 54:73–86

Halima Hassen Mogesse. 2007. *Phenotypic and genetic characterization of indigenous chicken* populations *in northwest Ethiopia.* PhD thesis. Faculty of Natural and Agricultural Sciences, Department of Animal, Wildlife and Grassland Sciences, University of the Free State, Bloemfontein, South Africa.

Hansen, J. C., Johnson, D.M., Lesley, B. V. (1991). *Developing and improving your farm records*, Department of Agriculture, University of Maryland.

Henderson, T. H., & Gomes, P.I. (1979). Profiles of Small Farming in St. Vincent, Dominica and St. Lucia: *Report of a Baseline Survey*, Barbados.

ILRI (International Livestock Research Institute). 1995. *Livestock policy analysis.* ILRI Training Manual 2. ILRI, Nairobi, Kenya.

Jones RB, Faure JM. The effects of regular handling on fear responses in the domestic chick. Behav Proc. 1981; 6:135–143

KIT, Faida MaLi, & IIRR, (2006).*CHAIN EMPOWERMENT supporting African farmersto develop markets.* Royal Tropical Institute, Amsterdam; Faida Market Link, Arusha; and International Institute of Rural Reconstruction, Nairobi.

Muchenje V, Manzini MM, Sibanda S and Makuza SM. 2000. Socio-economic and biological issues to consider in smallholder poultry development and research in southern Africa in the new Millennium.

Okantah, S.A., Aboe, P.A.T., Boa-Amponsem, K., Dorward, P.T., Bryant, M. J. (2003). Small-scale chicken keeping in peri-urban Accra and Kumasi, Final Technical Report of United Kingdom Department for International Development (DFID)-funded Project 74pp, DFID. R7631, Livestock Production Research Programme.

Tadelle Dessie. 2001. *The role of scavenging poultry in integrated farming systems in Ethiopia.* Debre Zeit Agricultural Research Center, Debre Zeit, Ethiopia. Livestock feed resources within integrated farming systems. pp. 377–399.

County Department of Livestock, 2013, West Pokot county livestock annual report

County Department of Veterinary, 2013, West Pokot County Veterinary annual report

County Government of West Pokot, 2013, First County Integrated Development Plan

ASDSP, 2014, West pokot county value chain analysis and upgrading strategy for local chicken

GoK, 2010, *Agriculture Sector Development Strategy 2010-2020*, Nairobi, Kenya

GoK, 2012, *National Agribusiness Strategy*, Agricultural Sector Coordination Unit, Nairobi, Kenya

ASDSP, 2014, West Pokot ASDSP-CCU Annual report 2013/2014 financial year

County Government of West Pokot, 2013, Livestock Sub-sector Strategic Plan 2013 – 2017

EPZA, 2005, Meat Production in Kenya, Export Processing Zones Authority, Nairobi, Kenya

SNV, 2013, Baseline Survey on Alternative Livestock Products Value Chains in Three Livestock Markets in Kenya (February- April 2013), SPARD Africa Consulting, Nairobi, Kenya