

**SELECTED FACTORS AFFECTING THE DEVELOPMENT OF INDIGENOUS
POULTRY VALUE CHAIN IN VIHIGA DISTRICT, VIHIGA COUNTY**

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**A Project Report Submitted to the Graduate School in Partial Fulfillment of the
Requirements for the Award of Degree of Master of Science in Agricultural
Extension of Egerton University**

EGERTON UNIVERSITY

APRIL, 2013

DECLARATION AND RECOMMENDATION

Declaration

This project report is my original work and has not been presented for an award of a degree, diploma or certificate in a university.

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EM12/2341/09

Recommendation

This project report has been submitted for examination with my approval as university supervisor.

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Florence Sibitali Murekefu

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DEDICATION

To my husband Wycliffe Murekefu, children; Eric Bateta, Timothy Mahalang'an'ga, Faith Fwenda and Samuel Amakobe and my parents; Priscillah Vuyanzi and the late Phillip Akolo.

ACKNOWLEDGEMENT

I highly acknowledge the professional guidance I received from my supervisor; Dr. Maurice Udoto. His tireless effort and insistence on quality saw me through my research work. This has taught me that with determination, passion, and above all God's guidance all things are possible.

I am indebted to my husband Wycliffe and children; Eric, Tim, Faith and Sammy and my mother Priscillah for their encouragement and support. Much gratitude to my husband Wycliffe who provided the material support I needed in a timely manner and in sufficient amounts that I was never worried or anxious. I also acknowledge the support I got from my colleagues in Vihiga especially Madam Flora Musanga, and Mr. Kunyu for encouraging me while I was doing my research work. I give all the Glory to God for good health, all the nice people I interacted with, and all his abundant provisions without which I could not have accomplished anything.

ABSTRACT

The value chain approach embraces the full range of activities which are required to bring a product or service from conception, through the intermediary phases of production, delivery to final consumers, and final disposal after use. Traditionally extension agents have concentrated their efforts on technology transfer that targeted production aspects of a poultry and ignored other factors of the value chain. Most farmers specialize in production and may be excluded from decision making about issues that affect them outside their farms. There exists a knowledge gap of what potential there is for income generation and employment creation in the indigenous poultry value chain. Despite their hard work farmers continue to have low incomes resulting into low living standards. There are several factors that influence the indigenous poultry value chain. This study aimed to explore how selected factors of disease control, credit, market infrastructure, and skills development affect the development of the indigenous poultry production value chain in Vihiga District. The study employed a descriptive survey research design. The target population consisted of 600 farmers who were members of 30 local poultry commercialization Common Interest Groups, 17 Agrovets attendants, 20 local poultry traders, and seven Field Extension Officers. A random sample of 103 farmers was drawn using purposive sampling method. Quota sampling was used to sample nine agrovets, and ten local poultry traders. All the seven extension staff were included in the study. The reliability coefficient for the farmers' instrument obtained was 0.87. This was considered adequate for the study. Data was analyzed using frequencies, means and multiple regression at $p = 0.05$. Results from the study indicated that reconstitution of the Newcastle vaccine and market access had statistically significant effects on the development of the indigenous poultry value chain in Vihiga District. Additionally market facilities for slaughter, cold storage and dedicated sell outlets for table birds were completely lacking in all the major market centers in the study area. Extension agents should embrace the value chain approach and provide information on marketing. Local authorities in consultation with relevant technical departments to invest in market infrastructure at fresh produce markets that will enhance sales of table birds and other poultry products.

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ABBREVIATIONS AND ACRONYMS

AFC	Agricultural Finance Cooperation
BP	Bird Population
BS	Birds Sold
CIG	Common Interest Group
CV	Coefficient of Variation
DAO	District Agricultural Officer
DLP	Director Livestock Production
DLPO	District Livestock Production Officer
ES	Eggs Sold
GD	Grading
IIRR	International Institute of Rural Reconstruction
IP	Intensive Production
IPVC	Indigenous Poultry Value Chain
KCB	Kenya Commercial Bank
KIT	Royal Tropical Institute
KNBS	Kenya National Bureau of Statistics
KPHC	Kenya Population and Housing Census
KWFT	Kenya Women Finance Trust
Mkt	Market
MoLD	Ministry of Livestock Development
MR	Bird Mortality
NALEP	National Agriculture and Livestock Extension Programme
NCD	New Castle Disease
NGO	Non-Governmental Organization
PDLP	Provincial Director of Livestock Production
SK	Skewness
TIIP	Total Income from Indigenous Poultry
VC	Value Chain

CHAPTER ONE

INTRODUCTION

1.1 Background of Study

In Kenya out of 31.8 million chickens kept, local chicken account for 81% (25.7 million) and 19% (6.1 million) are exotic chicken (KNBS, 2010). Local poultry production is an integral part of the farming systems in Western Kenya and represents almost the total poultry flock in the region, with each household keeping between 10-20 birds. Western Province has a population of 4,404,328 chicken out of which 94.1% (4,144,351) are local and 5.9 % (259,977) are exotic. This trend is reflected in Vihiga District where the local chickens account for 92.8% (199,210) of a total flock of (214,578) while 7.2 % (15,368) are exotic chicken (KNBS, 2010). These birds are raised mostly under scavenging free-range systems with minimum resource inputs. The productivity of these chickens and utilization (sales and consumption) of meat and eggs within households is generally low. The average annual egg production ranges from 36 to 97 eggs per hen, with a very small egg size of about 46g compared to a potential of 140 eggs per annum with an egg size of 60g (Okitoi, 1997).

The indigenous chicken sector has the potential of contributing to family income considering the existing popularity, suitability to the local conditions, low cost investment, quick returns on investment and their potential for growth in business and business development services. Indigenous poultry is a suitable enterprise where land is limiting. Indigenous chicken are kept for various reasons, including cultural ceremonies which vary from one culture to another. Virtually every household keeps some indigenous chicken (Director Livestock Production, 2008). The population increase in Kenya is about one million people per year (Kenya National Bureau of Statistics, 2010). There's an increasing demand for white meat in the urban areas, this demand is not in tandem with the supply from the rural areas where most of the local chicken are reared (Director Livestock Production, 2008).

Consumption is shifting from basic food stuffs to fruits, vegetables, and white meats especially in urban areas (Tropical Royal Institute KIT, Faida MaLi and International Institute of Rural Reconstruction, 2006). Food markets have changed over time from supply chains to value chains. Food value chains in the developed world are very advanced, consumers demand for high quality products as well as traceability requirements. In Africa the food value chains are rapidly changing. The high requirements in terms of investment, technology and business skills suggest that small and remote farmers will be excluded from such markets. Nevertheless there are opportunities for small producers and traders who can organize themselves effectively to meet these demanding standards. This poses a new challenge as well as new opportunities for Kenyan indigenous poultry keepers. The question is, how can they upgrade their products and activities so that they can meet these demands?

Okitoi (2007) and Wachira (2003) have reported that the productivity of indigenous chicken can greatly be increased. Poultry diseases, notably Newcastle Disease (NCD), are a major cause of high chicken mortality. NCD can only be controlled through vaccination. The vaccine is handled through a cold chain and this is a challenge in the rural areas where cold storage is not available. Affordability and administration of the vaccine also limits its usage among small scale poultry keepers. The NCD vaccine is packaged in large doses while the farmers keep few birds.

Access and type of credit contribute to the extent one engages in the poultry business. Requirement of collateral may lock out potential farmers especially those without tangible assets especially women. Credit may also be used to offset other household needs such as school fees.

Market infrastructure is important for any enterprise to flourish, this includes transportation, processing facilities packaging, and selling outlets. Market availability encourages the producer to produce for the market and not just market what they have produced. Consumption is determined by other factors apart from the purchasing power

of the consumer. The product should be available in the desired form and quantity. Consumers should be able to buy preferred chicken parts as opposed to whole birds.

Technologies developed for improvement of poultry often are geared towards large commercial exotic flocks in confinement (layers and broilers). The value chain approach has been used in mainly crop based enterprises and not much in livestock production systems. Kaplinsky (2000) defines the value chain as “the full range of activities which are required to bring a product or service from conception, through the intermediary phases of production, delivery to final consumers, and final disposal after use”. Poultry value chains describe the processes through which birds and other inputs pass during the production processes, including information on the place each process occurs and on the people involved. Understanding the poultry value chain, is a starting point for understanding how small-scale poultry development can contribute to household income and well-being.

Despite efforts made by various agents, especially Ministry of Livestock Development (MOLD) and NGOs to promote indigenous chicken industry through provision of information and skills development, the levels of commercialization of the enterprise are low. Information on the value chain in terms of potential for income and employment generation is generally lacking. Extension agents need to view the whole value chain as they advise farmers and other stakeholders. Analysis of the indigenous poultry value chain will identify obstacles that hinder its development and possible solutions to mitigate the constraints. In Vihiga District the indigenous poultry value chain maybe one that links a farmer with their friends in the village who occasionally buy a bird or few eggs from them in a week. The value chain might be shorter but despite the status there is a greater need to understand this value chain by interrogating selected factors that affect its development.

1.2 Statement of the Problem

Farmers in Vihiga District have small land sizes, are food insecure with limited

opportunities to engage in off-farm income generating activities and have low standards of living. The poverty index in Vihiga District is 58% (KNBS, 2009). Indigenous chicken farming is an integral part of farming activities in Vihiga. Despite efforts made by Ministry of Livestock Development (MOLD) and interested Non-Governmental organizations (NGOs) to develop the indigenous chicken industry through provision of information on production, commercialization, organization and linkage development, the productivity of indigenous chicken still remains low. Disease control is poor, vaccinations against poultry diseases is low as cyclic chicken deaths are experienced every year. Information on the value chain in terms of potential for income and employment generation is generally lacking

Indigenous poultry meat and eggs are relatively more expensive than those from exotic poultry yet they are preferred by most consumers. Despite this popularity of indigenous poultry, farm incomes remain low and so low living standards of the people. Indigenous chicken production can greatly be enhanced to positively impact household incomes and food security thus helping to improve the living standards of the farmers in Vihiga District.

1.3 Purpose of the Study

The study's aim was to determine how defined Institutional factors of credit and Extension, disease control and, market infrastructure affect the indigenous chicken value chain in Vihiga District.

1.4 Objectives

- (i) To establish how control of NCD affects the development of the indigenous poultry value chain in Vihiga district.
- (ii) To determine how access and type of credit affects the development of the indigenous poultry value chain.
- (iii) To determine how market infrastructure affects the development of the indigenous poultry value chain.

(iv) To determine the contribution of extension services in the indigenous poultry value chain.

1.5 Research Questions

- (i) How does control of NCD affect the development of the indigenous poultry value chain?
- (ii) How does access and type of credit affect the development of the indigenous poultry value chain?
- (iii) How does market infrastructure affect the development of the indigenous poultry value chain?
- (iv) What is the contribution of Extension services to the development of the indigenous poultry value chain?

1.6 Significance of the Study

Indigenous chicken sector has the potential of contributing to family income considering the existing popularity, suitability to the local conditions, low cost of investment and quick returns. It is possible that bottlenecks within the value chain hinder the commercialization of local poultry. Understanding the poultry value chain, is a starting point for understanding how small-scale poultry development can contribute to household income and well-being. The local farmers will benefit from a fully developed indigenous poultry value chain as they will be able to produce and sell poultry in an environment they understand better. Farmers will get more income from indigenous poultry and have better living standards. Poultry traders and transporters will operate more efficiently and improve their functions, while veterinarians and input suppliers will be able to predict the demand of inputs and gaps that might exist along the value chain. New innovations like development of a hatchery for day old chicks of local chicken could emerge as the indigenous poultry value chain develops further. Service providers will benefit by offering a wider range of services including poultry slaughter facilities. The quality and range of poultry products will increase through value addition. Employment opportunities will emerge when the indigenous chicken value chain is fully developed.

1.7 Scope

The study involved indigenous poultry farmers who belonged to local poultry commercialization common interest groups, local poultry traders, Agroveter attendants and Extension officers in Vihiga District. This group of farmers was chosen on the assumption that they had commercialized their indigenous poultry enterprise. The farmers were the major study group, while the Agroveter attendants, poultry traders and Extension officers' data was to corroborate data from the farmers to avoid bias from one end of the indigenous poultry value chain. The study restricted itself to selected factors that affect the indigenous chicken value chain in Vihiga District. These factors were availability, affordability and administration of vaccine against NCD as it is the major cause of chicken mortality, access to and type of credit, market infrastructure, and the role of Agricultural extension services in the indigenous chicken value chain. The components of the value chain include specific inputs, production, collection and processing, transport and trading, and consumption.

1.8 Limitations of the Study

The study noted the following limitations:

- (i) The findings of this study may have limited generalization since only members of CIGs were considered as the rest of the farmers were left out due to limited time and financial resources.
- (ii) Most responses were derived from recall as not many farmers kept records. The researcher overcame the limitation by probing the respondents further and corroborating information through the local extension staff.
- (iii) There are other factors that affect the IPVC that this study did not consider.

1.9 Assumptions of the Study

That the respondents gave honest responses and there were uniform cultural practices across the region.

1.10 Definition of Terms

Agrovet: A sales outlet of veterinary goods and services. Most of these outlets are small businesses in local market places. They stock among other inputs, vaccines, animal feeds, and veterinary drugs. Animal treatment services may also be available. The operator of the Agrovet is a professional Animal health practitioner.

Commercialization: Rearing local chicken for income generation through the sale of chicken meat, breeding stock, eggs, and manure. A hen hatches 10 chicks three times in a year. With a 25% mortality rate 23 survive and are sold as table birds at four months for a whole sale price of ksh 350 a bird. The revenue from each hen per year is ksh. 8,050. Revenue from 17 hens is ksh 136,850, which translates to a net profit of ksh 80,733. This profit is comparable to an income of one individual engaged for manual labor in one year (240 working days exclusive of weekends) at a rate of ksh 324.40 totaling to ksh.77, 856. For purposes of this study, respondents who will cite their annual income as ksh 136,850 and above will be classified as having commercialized in local chicken production.

Common Interest Group (CIG): Farmers interested in the same production enterprise for Income generation. The National Agriculture and Livestock Extension Programme (NALEP) has embraced the CIG approach for extension in the line ministries. In this study indigenous poultry farmers who have come together for purposes of rearing and selling local chicken as a group are a CIG. Members demand for extension services which they require such as training workshops, tours and market information. Jointly the members can bulk their birds and eggs for sell and also acquire inputs like vaccines.

Development: A change with a specific direction; progress through a sequence of stages. The indigenous poultry production over time is changing from subsistence to commercial. Farmers practice intensive production through feed supplementation, housing, vaccinating birds against diseases and selection of breeding stock. Chicken are no longer kept mainly for subsistence but as a source of livelihood. Household incomes increase. Efforts towards commercialization bring in other actors such as traders of poultry and poultry products, input suppliers and other service providers and hence the value chain.

Free Range System: Birds are left to scavenge for feed on their own. The birds are left free to roam in the homestead and beyond. They feed on kitchen waste, insects, grass and any other edible matter. Feed supplementation is rare. Basic housing is provided for; especially as night shelter. Predation especially on the young birds is a common menace.

Indigenous Chicken: These are also described as backyard chicken, local chicken or scavenging chicken. In this study any flock of chicken that is not classified as a conventional exotic commercial chicken breed will qualify to be indigenous. Indigenous chicken lay between 8 and 15 eggs per clutch. They are broody and hatch about 80% of the eggs they sit on.

They attain 2-3 clutches in a year. The indigenous chicken attains a reasonable slaughter weight at the age of 4 months.

Newcastle Disease: Poultry disease that is highly infectious. Symptoms are, respiratory and/or nervous signs: gasping and coughing, drooping wings, dragging legs, twisting of the head and neck, circling, depression, inappetence, complete paralysis. Partial or complete cessation of egg production, egg is rough-shelled, thin-shelled and contains watery albumen. Greenish watery diarrhea. Swelling of the tissues around the eyes and in the neck. The mortality rate is high; sometimes the whole flock is lost.

Market Outlet: Dedicated area at shopping center where indigenous poultry products are sold. The products include eggs, meat, skins, bones and, feathers.

Vaccine Administration: Vaccine like for New Castle Disease is packaged in vials of hundreds of doses. The vaccine is reconstituted by diluting with distilled water. The procedure is simple enough to be done by a lay person but many farmers shy away. The farmers who cannot access a technician fail to vaccinate their birds leading to chicken deaths.

Value Chain: Value chain is a complex system of stakeholders and processes. The local chicken value chain consists of specific inputs, breeding, production, collection and processing, transport and trading, and consumption. In chicken, the value chain starts from what happens to the egg up to when the chicken is on the plate. The people involved in various activities such as producers, service providers, traders and consumers are chain actors.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews literature on general poultry production, indigenous poultry production, characteristics of the indigenous poultry value chain and factors which affect the poultry value chain such as disease control, credit, marketing and skills development. The chapter concludes by describing the theoretical and conceptual frameworks that guide the study.

2.2 General Poultry Production

In the world as a whole poultry consumption is projected to grow by 2.5% per annum to 2030 with other meats growing at 1.7% or less. Poultry production in developing countries is expected to grow at 3.4% per annum to 2030 (FAO, 2007). In the developed world poultry production is industrialized. Commercial laying hens can produce as many as 325 eggs per year and broilers which can reach 2.5 kg in 42 days. In Kenya the exotic commercial layers produce on average 240 eggs per annum and broilers attain 1.5 kg at 42days (DLP, 2008).

2.3 Indigenous Chicken Production

Small scale poultry production systems either in form of small semi- or fully scavenging household flocks or slightly larger more intensive units have developed in a larger number of developing countries around the world as a source of livelihood support for the rural poor. In recent years there has been growing recognition among the development community of the role of small scale commercial poultry production in accelerating the pace of poverty reduction and reaching out to the poorest of the poor. There is also growing evidence to demonstrate the role of small scale poultry in enhancing the food and nutrition security of the poorest households and in the promotion of gender equality (FAO, 2007). Indigenous breeds make up 63% of the world's poultry population. In Europe 52% of the poultry is indigenous, while in Africa indigenous poultry account for 80% (Gueye, 1998).

In a large number of low income countries, local chicken production is the largest system of poultry production and a critical source of income and nutrition for poor households. Even in countries with a relatively large modern industrial poultry production sector, India for example free ranging chicken running around in backyards of rural households are a common sight especially in areas with high incidences of poverty and account for a very large proportion of the national poultry population. Ahuja, and Sen, (2007) provide some figures on the approximate proportion of total poultry population made up by birds kept under small-scale family production systems in selected African countries. These are presented in Table 1.

Table 1: Proportion of National Poultry Flocks Accounted by Local Chicken

Country	Percent of local chicken of national Population of poultry
Cameroon	70
Central African Republic	80
Cote d'Ivoire	73
Ethiopia	99
Gambia	90
Kenya	81 ^a
Malawi	90
Mali	90
Nigeria	93
Senegal	70
Sudan	75
Tanzania	70
Togo	70
Uganda	80

Source: Ahuja, and Sen, (2007).

^a note the figure for Kenya has been adjusted to the KPHC, 2009 report.

In Ethiopia almost all the chicken (99%) are local birds, while for the other countries local chicken account for 70% and above of the total chicken population.

Royal Tropical Institute (KIT) and International Institute of Rural Reconstruction (IIRR), (2008) suggest that developing the indigenous chicken value chain can lead to improved livelihoods of people on the African Continent.

In Kenya, the poultry sub-sector is an important component of the national livestock production system yet there is insignificant support at national level as compared to dairy and beef sub-sectors.

Indigenous chicken account for 81% (25,756,487) of the chicken population (KPHC, 2009). Indigenous chicken are one of the sources of protein in most rural households. Western Province is the home to 4,144,351 indigenous chicken, which is 16% of the national flock. Most rural households sell local chicken to satisfy basic needs. Local chicken production trends in Western Province are shown in Table 2.

Table 2: Local Chicken Production Trends in Western Province

Year	Local chicken population
2005	2,667,819
2006	2,517,622
2007	2,644,148
2008	2,214,305
2009	^a 4,144,351

Source: Provincial Director of Livestock Production annual reports 2005-2008

^a number of local chicken as per the KPHC,2009 report.

Indigenous chicken in Vihiga comprise 92.8% of the chicken flock (KNBS, 2009). Households keep 10 to 20 chickens for food and occasional sales to meet domestic needs.

2.4 Poultry Value Chain

Kaplinsky (2000). defines the value chain as “the full range of activities which are required to bring a product or service from conception, through the intermediary phases of production, delivery to final consumers, and final disposal after use”. Poultry value chains describe the processes through which birds and other inputs pass during the production process, including information on the place each process occurs and on the people involved. The value chain (VC) is made up of functions, operators, service providers, framework conditions and attitudes. Understanding the poultry value chain, and value of poultry to owners and traders, is a starting point for understanding how small-scale poultry development can contribute to household income and well-being. Figure 1 shows the poultry value chain

The Poultry Value Chain

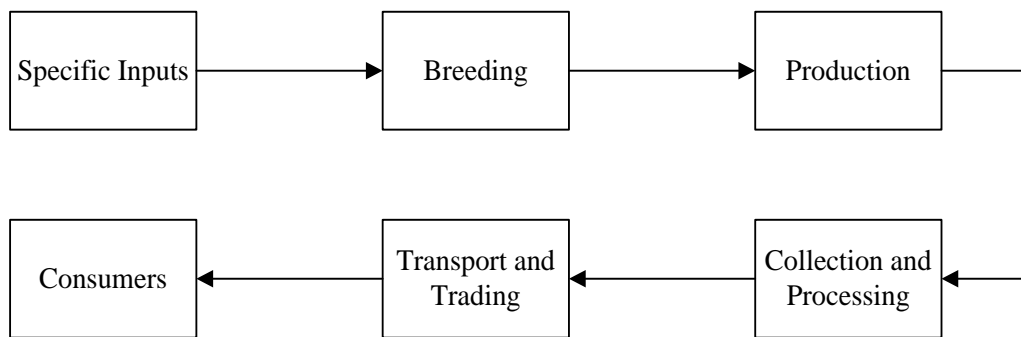


Figure 1: The poultry value chain

Source: KIT et al. (2006)

2.4.1 Components of the Value Chain

Specific Inputs – Feeds, Vaccines, Drugs

Breeding – Breeding stock, Hatching and Brooding

Production – Feeding, Housing, Chick survival, Disease control

Collection and Processing – Collection and processing of eggs and chicken

Transportation and Trading – Transportation and handling of live birds and eggs to markets by middlemen. Market outlets in most shopping centers that operate on daily basis.

Consumption – Adding value on poultry through slaughtering and packaging of meat. (Mathuva, 2005). Consumers being able to find poultry products as they wish, such as chicken parts as opposed to the whole chicken.

Value chains are affected by:

- (i) Market infrastructure
- (ii) Price variations (short or long term)
- (iii) Access to knowledge and emerging technologies
- (iv) Groups that can directly influence the dynamics of the value chain.

2.4.2 Actors in the Indigenous Chicken Value Chain

Actors are those involved in producing, processing, trading or consuming the indigenous chicken. They include direct actors (producers, traders, consumers) and indirect actors who provide financial or non-financial support services such as credit agencies, business service providers, researchers and extension agents.

Each actor plays specific roles at different points of the value chain (KIT, et al 2006). Households produce birds and eggs, they exchange breeding stock with neighbors, or buy from traders, market and hatchery. Eggs are sold to primary egg collectors, neighbor, and local market to local consumers. Secondary traders transport eggs from rural areas to urban markets where they sell to urban consumers through supermarkets, shops and restaurants. Live birds are given as gifts to friends, sold to poultry group, primary collector, or sold directly to local market. Secondary traders transport live birds to urban wholesale markets. Tertiary traders buy birds from the whole sale market to shops, supermarkets and restaurants. The chain ends with the urban consumers.

Figure 2 shows the different actors in a well developed indigenous chicken value chain.

Actors in the Indigenous Poultry Value Chain

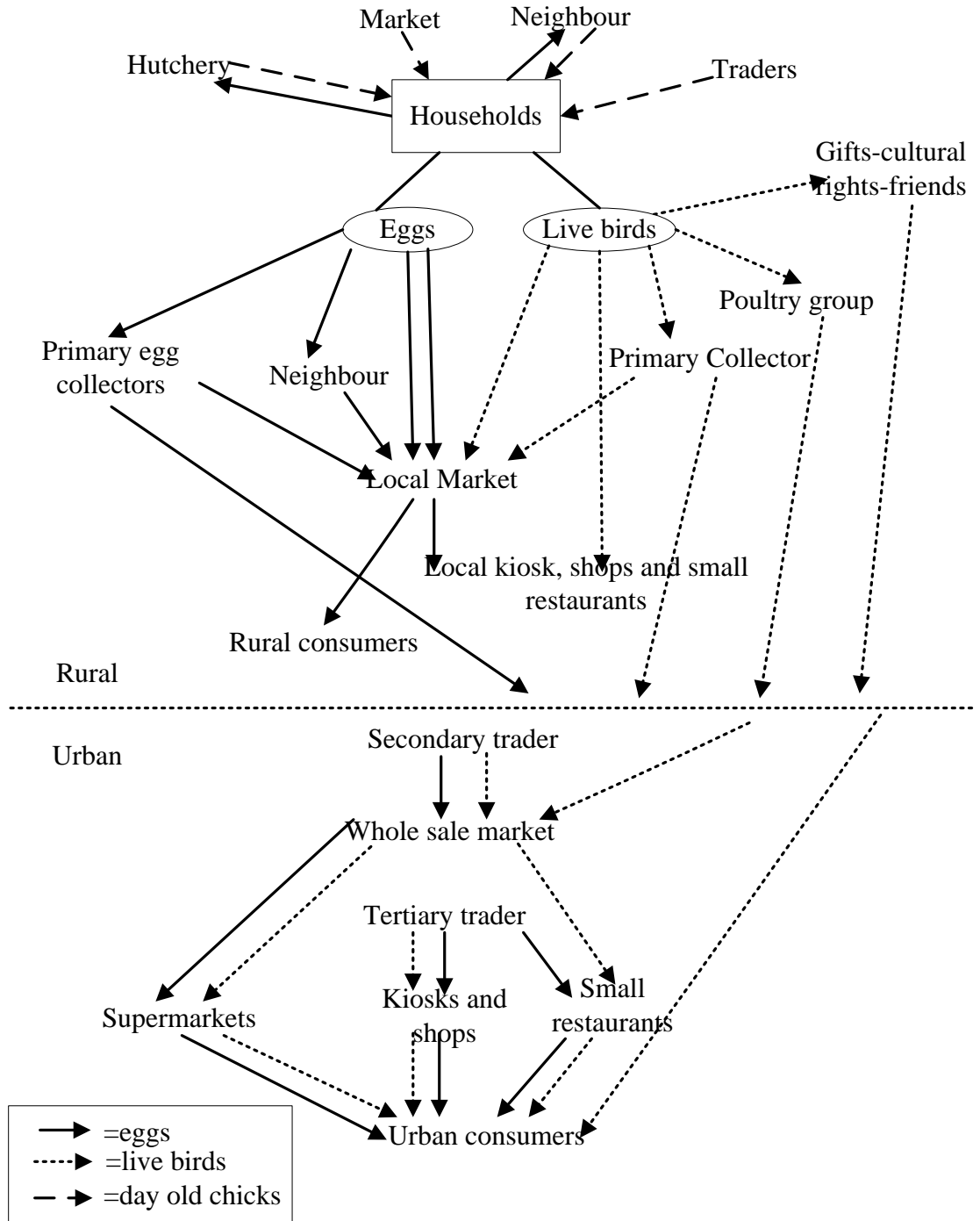


Figure 2: Actors in the indigenous poultry VC. Adopted from Nick Taylor, 2000.

2.5 Factors Affecting the Indigenous Poultry Value Chain

There are many factors that affect the IPVC, however this study selected four factors for consideration. The factors are disease control, credit, market infrastructure and access to extension services. They are discussed in detail in the following sub-sections.

2.5.1 Disease Control

There are many poultry diseases that affect indigenous chicken such as Newcastle, Gumboro, coccidiosis, Fowlpox, and Fowl Typhoid. This study considered Newcastle disease as it causes the highest mortality in poultry. Newcastle disease is a poultry disease that is highly infectious. Symptoms are, respiratory and nervous signs: gasping and coughing, drooping wings, dragging legs, twisting of the head and neck, circling, depression, inappetence, complete paralysis. Partial or complete cessation of egg production, egg is rough-shelled, thin-shelled and contains watery albumen, greenish watery diarrhea and, swelling of tissues around the eyes and in the neck. The mortality rate is high, sometimes the whole flock is lost. The Disease is controlled only by vaccination. The vaccine is kept under a cold chain and is reconstituted before it is administered (Odwaso, Wesonga, and Okitoi, 2006).

2.5.2 Credit

This study intends to give insights on the effect of credit on the indigenous poultry value chain in Vihiga District. Inputs are critical in any production system. In many households in Vihiga District, indigenous poultry are fed on food wastes from the kitchen and left to scavenge. Chicks are occasionally fed on commercial feeds. Housing for poultry is not a common practice (District Livestock Production Officer Vihiga, 2010).

For the farmer to shift from subsistence indigenous poultry rearing to commercial, they would have to increase flock size and intensify management (Kaudia, and Kityali, 2000). Potential exists to commercialize local poultry rearing if improvements are made on housing, feeding, disease control and breeding. Capital is required to implement the improvements. Credit facilities that provide affordable loans would be a financial source of capital for development of indigenous poultry production.

2.5.3 Market Infrastructure

Meat and eggs from indigenous poultry are highly priced compared to those of the exotic poultry. They are regarded as more tasty and safe since they are produced in a natural environment without food additives like growth hormones (FAO, 2007). Consumers of poultry and poultry products are located in urban areas. Indigenous poultry produced in rural areas has to be transported to the urban centers. There is need for good roads in rural areas leading to the urban areas, and markets with appropriate facilities in the urban centers for the sale of poultry. These facilities include slaughter areas, cold storage, processing and packaging and dedicated selling outlets (Mathuva, 2005). The farmers also need to be trained to be business minded to produce indigenous poultry for the market and not just market what they produce. Farmers should understand the conditions they operate in outside their farm gates.

2.5.4 Access to Extension Services

According to Farooq et al (2000), accessibility to extension service significantly improves free range indigenous poultry production systems. Inability to access extension services can be an indication of unfavorable government policies (Adebayo, and Adeola, 2005). Indigenous poultry enterprise is common among rural households as it is better adapted to production circumstances of scavenging systems characterized by continuous exposure to disease incidence, inadequate quantity and quality of feeds, poor housing and health care (Gueye, 1998). To increase productivity, extension agents from the public and private domains have continually disseminated management intervention packages to small holders to mitigate these constraints. However farmers choose which interventions to adopt and hardly realize the benefits of the whole intervention package. The intervention package designed to improve productivity of indigenous poultry includes housing, feeding, disease control, breeding and brooding (Njue, Kasitii, and Gacheru, 2006). This study included marketing and credit as issues of concern that ought to be disseminated by extension agents since it was addressing the indigenous poultry value chain.

2.6 Theoretical Framework

Traditionally Extension service providers both public and private have based their advice to farmers on principles of maximization of production. Factors such as value addition and marketing were subsidiary. This scenario has sometimes resulted in produce which the farmer cannot sell or get the best bargain. The value chain approach looks at all processes necessary to produce, process, and market a product. It therefore follows that analysis of the value chain is necessary. The value chain analysis will later guide the identification of entry points for necessary intervention by the various stakeholders.

The indigenous poultry value chain can be divided into functions, operators, service providers, framework conditions, and attitudes. The study explored how selected factors of control of NCD, credit, market infrastructure, and skills development affect the indigenous poultry value chain. Control of NCD greatly reduces mortality to less than 25 %. Membership to a common interest group facilitates bulking of eggs and birds to reach a critical mass for sale, and also joint acquisition of inputs like NCD vaccine. Access to credit empowers the farmer to invest in the indigenous poultry enterprise. Market outlets spur growth of the poultry enterprise. Provision of public extension services approach is currently the shifting focal area approach with main emphasis on group extension. It is envisaged that after one year of intensive interaction between the CIGs and extension staff, the groups can continue their activities with minimal follow up from extension staff.

2.7 Conceptual Framework

The independent variables were disease control, credit, market infrastructure and extension services. The intervening variables were farmer personal characteristics such as level of education, experience in local poultry production, exposure, age, and location of the farm in relation to accessing services and the markets. The level of development of the poultry value chain was the dependent variable. Indicators of development of indigenous poultry value chain included, household incomes, the number of indigenous birds, bird mortality, intensified production, grading of eggs and meat, and consumption

of eggs and meat. The local poultry CIGs were vehicles for commercialization of indigenous poultry and subsequently develop the value chain.

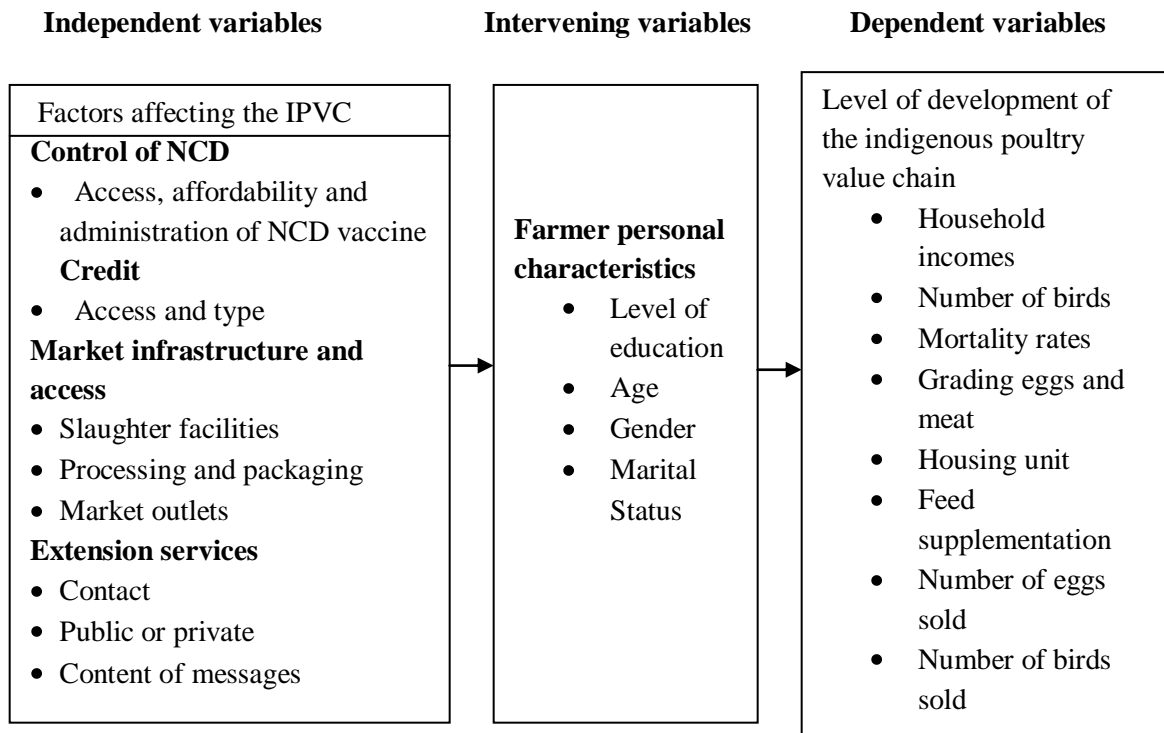


Figure 3: Conceptual framework for determining how selected factors affect the development of indigenous poultry value chain

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The chapter covers the research design, location of the study, target population, sampling procedure and sample size, instrumentation, data collection procedures, and data analysis.

3.2 Research Design

A descriptive survey was done using questionnaires to collect data from indigenous chicken farmers, chicken traders, Agrovets, and field extension officers to avoid biased opinions from one end of the value chain. The design provides self-reported facts about respondents, their inner feelings, attitudes, opinions and habits (Kombo & Tromp, 2007).

3.3. Location of the Study

Vihiga District covers an area of 201 km² out of which 167 km² is arable land. Land parcels are small ranging from 0.2ha to 2ha (District Statistics Office, 2010). According to the Kenya population census done in 2009, the district had a human population of 221,294 of which 105,111 are males and 116,183 females. The population density was 1,101 persons per km² which is among the highest in rural districts in Kenya. The district consists of 48,221 households which translate to an average of 5 persons per household and a poverty index of 58 % (KNBS, 2009). Indigenous chicken (199,210) outnumber exotic chicken (15,368) KNBS, 2009. Vihiga experiences a bimodal rainfall pattern. Long rains start in March and last to June while short rains are in August to October. The average annual rainfall is 1900mm. Small scale tea growing is a major Agricultural economic activity (District Agricultural Officer, 2009). The district covers two administrative Divisions, namely Vihiga, and Sabatia. Indigenous chicken are reared throughout the year. Mbale is the major town in Vihiga District and is located 24km to Kisumu, 25km to Kakamega, and 55km to Kapsabet and is well linked with major roads to these destinations and beyond. These towns are potential big markets of local poultry products from Vihiga.

3.4 Target Population

The target population comprised about 600 members from 30 local poultry commercialization CIGs. The average membership per CIG was 20 persons. The rationale for choosing farmers from CIGs was that they had been exposed to farming as a business and therefore it was envisaged that they had commercialized their indigenous poultry enterprises. The National Agriculture and Livestock Extension Programme (NALEP) had been promoting the formation of CIGs in all the locations of Vihiga district since 2004.

There were 17 Agrovets which provided farm inputs and other services in the District. Fifteen local poultry traders operated daily on four markets and received supplies mainly from middle men. Three livestock production staff were deployed in Sabatia Division but there was none in Vihiga Division but farmers were served from the District Headquarters or by the staff of the Ministry of Agriculture from the Division. (DLPO, 2011). Table 3 shows the distribution of Agrovet shops and poultry traders at the major market centres.

Table 3: Distribution of Agrovets and Poultry Traders in Vihiga District

Market center	No. of agrovets	No. of local Poultry traders
Mudete	0	7
Chavakali	2	4
Mbale	6	5
Majengo	5	4
Gisambai	1	0
Bukuga	2	0
TOTAL	17	20

Source: DAO, Vihiga

3.5 Sampling Procedure and Sample Size

Purposive sampling was used to select CIGs from lists of local poultry CIGs which were provided by the DLPO Vihiga. Ten CIGs that were formed from the year 2006 to 2010 were selected. In order to get a representative sample from a population, Kathuri and Pals (1993) recommend that when a survey targets a major sub-group, at least 100 cases should be investigated. The researcher used proportions to select a total of 120 members from the selected 10 CIGs. The selection of respondents from each CIG was done using simple randomization. The higher figure was to cater for non-respondents, natural attrition and those who might have migrated from the area. Due to the small number of Agrovets and poultry traders, high proportions of each category were used to get samples that were representative. Nine Agrovets and ten local poultry traders were selected. All the seven extension staff from the two Divisions were selected since they were few. The total Sample size was 156. Table 4 shows a summary of the distribution of the samples.

Table 4: Sample Size by Category

Category	Total No.	Sample	Percentage
Farmers	600	120	20
Agrovets	17	9	53
Poultry traders	15	10	66.7
Extension staff	7	7	100
Total	639	156	24.4

3.6 Instrumentation

A questionnaire was used to collect data from farmers who keep indigenous poultry. Three other sets of questionnaires were used to collect data from poultry traders, agrovets, and Extension Officers. Data from the three sets was to corroborate data from the farmers to avoid bias from only one chain actor.

The questionnaire for indigenous poultry farmers was divided into six sections. The first and second sections were to collect data on the respondent's background and the local poultry enterprise respectively. The third section was designed to collect data on

vaccination against NCD. This constituted availability, cost, and reconstitution of NCD vaccine and bird mortality rate per year. Section four was on credit for local chicken enterprise. The section was to collect data on credit type and availability of loans to invest in the indigenous poultry enterprise. Market infrastructure was section five which covered issues of access to markets, type of market. Section six was on extension services. This sought data on the extension services provider, frequency of contact, the menu of extension messages given, and other sources of information on indigenous poultry value chain (IPVC). The instrument had total of 27 closed-ended items and two open-ended items, (Appendix A).

The questionnaire for local poultry traders was used to corroborate data collected from the farmers. The instrument had one section with seven closed- ended items and two open-ended items. The data required was on volumes of sales of birds and eggs, type of market facilities available, sources of stock and market information, (Appendix B).

The questionnaire for Agroveter attendants had one closed-ended item and four open-ended items. The data from this instrument covered the availability and cost of NCD vaccine, the quantities sold and other services offered to local poultry farmers.

The questionnaire for Extension staff was to seek the perception of Extension officers regarding the use of NCD vaccine by farmers using two closed-ended items. The officers were asked to rate the level of development of the IPVC on a four-point likert scale. The scale was; well developed (1) moderately developed (2), not developed (3) and don't know (4). Their opinion on what they would consider a well-developed IPVC was sought for. The instrument consisted of three-closed ended items and one-open ended item, (Appendix D).

3.6.1 Validity

According to Kathuri and Pals (1993) validity refers to the appropriateness of the measure for specific inferences that result from the scores generated by the measure. To test for the validity of the instruments, the researcher presented the instruments to her supervisor for guidance. The advice, suggestions and recommendations were incorporated in the final draft of the research instruments. This further improved the content and face validity of the instruments.

3.6.2 Reliability

Reliability is the measure of the degree to which a research instrument yields consistent results after repeated trials (Babbie, 1992., Mugenda & Mugenda, 1999). The questionnaires were pre-tested with 25 farmers in Emuhaya District. The internal consistency technique was employed to determine the reliability of the instrument. Internal consistency reliability is the extent to which items in a single test are consistent among themselves and the test as a whole (Gay, Mills & Airasian, 2006.; McMillan, 1992). The reliability of the questionnaire was tested using Cronbach's Alpha Coefficient. Mugenda, and Mugenda, (1999) recommend a threshold level of 0.70 for an acceptable reliability Coefficient. The Alpha obtained was 0.87.

3.7 Data Collection Procedures

The researcher submitted the research proposal to Graduate School, and obtained a letter to apply for a research permit from the National Council of Science and Technology. After obtaining the permit the researcher visited the offices of the Vihiga District Livestock Production Officer and District Agricultural Officer for introduction. During the survey the researcher met the farmers in their respective farms after making appointments through the Divisional Livestock Extension Officers. Meeting them on their farms was convenient for them as well as for the researcher to physically see the local chicken enterprise. The respondent on the farm was the owner, the spouse or a responsible person. Most respondents preferred the researcher to read to them questions as she filled in the questionnaire, five filled for themselves including one deaf farmer.

The researcher met attendants of Agrovets and local poultry traders at their points of operation to collect data. The Extension staff self-administered the questionnaire.

3.8 Data Analysis

A total of 129 questionnaires were completed for the survey, 103 farmers, ten traders, nine Agrovets attendants and, seven Extension staff. The researcher perused each of the questionnaires to ensure they were filled correctly. Each questionnaire was given a code. Data from the farmer survey was analyzed using statistical package for social Sciences (SPSS) while data from the traders, Agrovets and Extension staff was analyzed manually since the cases were few. Responses to open ended questions were described and given variable values. The researcher described the sample population by giving demographic and socioeconomic characteristics. Frequency distributions were determined for background data on age, sex, marital status, level of education, and household head. Observations recorded in the field during the survey generated valuable information.

To achieve objective (i) responses on availability, cost, reconstitution, and use of NCD vaccine were analyzed and frequency distributions determined. Data from Agrovets on whether they stocked NCD vaccine, what volumes they sold and whether they reconstituted the vaccine was analyzed and included in the report

For objective (ii) the responses to knowledge of existence of credit facilities by listing them, whether collateral was required or not were analyzed for frequency distribution. The need for a loan and how much one would take if available to invest in local chicken was also analyzed as proportions of respondents who would take a loan, how much and those who would not take any.

To achieve objective (iii) data on market accessibility for eggs and chicken, to whom they sold, and mode of sell by the farmer was analyzed for frequency distributions to determine whether farmers faced any difficulty disposing their eggs and birds. The outcome was then corroborated with data from the traders.

Objective (iv) was achieved by analysis of data from farmers concerning contact with Extension staff whether private or public, frequency of the contact, and the type of information that was provided about the indigenous poultry value chain. Table 5 gives the summary of data analysis.

Table 5: Summary of Data Analysis

Research question	Independent Variables	Dependent Variable	Statistical Analysis
(i) How does control of NCD affect the development of the IPVC?	NCD control availability of vaccine Cost of vaccine Vaccine Reconstitution	Development of the indigenous poultry value chain household income number of birds mortality rates grading eggs and meat intensive system eggs and birds sold	means, percentages frequencies correlations
(ii) How does access and type of credit affect the development of the IPVC?	Credit Access Type	Development of the indigenous poultry value chain. household income number of birds mortality rates grading eggs and meat intensive system eggs and birds sold	Means, percentages frequencies correlations
(iii) How does market infrastructure affect the development of the IPVC?	Market infrastructure Market access Slaughter facilities Processing and packaging Market outlets	Development of the indigenous poultry value chain. household income number of birds mortality rates grading eggs and meat intensive system eggs and birds sold	Means percentages frequencies correlations
(iv) What is the contribution of Extension services to the development of IPVC?	Extension services Contact Public or private Extension messages menu	Development of the indigenous poultry value chain. household income number of birds mortality rates grading eggs and meat intensive system eggs and birds sold	Means percentages frequencies correlations

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents major findings of the study. These include demographic and socio-economic characteristics of respondents, control of Newcastle disease (NCD), access to credit, marketing and market infrastructure, and the role of Extension services in the indigenous poultry value chain in Vihiga district.

4.2. Demographic Characteristics

About 59 % of the respondents were household heads. Most respondents (48%) were aged above fifty years while those aged between 21-30 years were a minority (11.7%). This trend indicates that it is the older people who engage in rearing indigenous poultry. Female respondents were 63.1% while male were 36.9%, it can be suggested that more women stayed on the farm while majority of men were engaged in off-farm activities. Those who were married were a majority at 72.8%, singles 4.9% and a substantial 19.4% widows. Respondents with secondary level of education were 45.6%, primary 41.7%, tertiary 9.7%, and no education were 1%. Majority (99%) had attained at least primary school education. Imparting knowledge and skills on indigenous poultry production to such a population can be done with a high level of success. Table 6 gives the details of the disaggregated demographic characteristics.

Table 6: Selected Demographic Characteristics of Farmers in Vihiga District

Age category (years)	%
21-30	11.7
31-40	21.4
41-50	19.4
>50	47.6
Marital status	
Married	72.8
Single	4.9
Widow	19.4
Widower	1.9
Divorced	1.0
Level of Education	
Primary	41.7
Secondary	45.6
Tertiary	9.7
Adult education	1.9
None	1.0

4.3 Socio-economic Characteristics

Number of local chicken kept at the time of survey was a mean of 25 birds per household with a standard deviation of 18. This flock size compares well with the study carried out by Tobias et al (2011) where the mean was 23.9 birds per household. In this study flock size ranged from 7 to 43 birds per household. This range was higher than that reported in a study in South Nyanza (Kenya) in an extensive management system (Olwande et al, 2010). In that study the flock size ranged from 15 to 19. This could be explained by fluctuation in chicken population due to seasons and time and also the fact that some farmers were practicing semi-confined and confined systems of production which always have a high carrying capacity than extensive system.

Income was cited as the main purpose of keeping local chicken by 66.0% of the respondents while those who kept mainly for food were 34.0%. Kaudia and Katalyi, (2000) in a study in Nyando District (Kenya) documented the purpose for keeping indigenous chicken for income as 39.4% and for food as 36.2%. The percentage of farmers who reared the chicken for mainly food compares well with what this study found. Annual income from eggs ranged from zero Kenya shillings to 4000 with a mean of 626 while income from chicken ranged between zero Kenya shillings and 150,000, with a mean of 15,937. Total annual income was between zero and 150,000 with a mean of 16, 563. Table 7 gives the details on annual income from eggs and chicken.

Table 7: Statistics on Income from Eggs and Indigenous Chicken in Vihiga District

Income	Division	Mean	Std. Dev.	T	P-Value
Income from eggs (Ksh)	Sabatia	662	753	0.569	0.570
	Vihiga	593	463	0.557	0.579
Income from chicken (Ksh)	Sabatia	15948	28291	0.005	0.996
	Vihiga	15927	17015	0.005	0.996
Total Income (Ksh)	Sabatia	16610	28145	0.020	0.984
	Vihiga	16519	17314	0.019	0.985
Total income (ksh)	District	16,563	22,990		

An annual income from chicken of Ksh 15,973 at the price of Ksh.400 per piece, translates to 39.9 birds sold per household per year. This figure greatly contrasts that of 10.6 birds sold per household per year in a study by Kaudia et al (2000) in Nyando District, though the average flock sizes were comparable (24 birds for Nyando case and 25 for Vihiga).

4.4 Control of Newcastle Disease

The first objective was to determine how control of NCD affects the development of the indigenous poultry value chain in Vihiga District. The least average income was for those farmers who reported that the vaccine was never available; this implied that they did not vaccinate their birds. Table 8 shows the responses, average income and the standard deviations.

Table 8: Control of Newcastle Disease

N = 103

Availability of Vaccine	Cost of Vaccine	Reconstitution of Vaccine	No of Farmers	Mean Income (ksh)	Std Deviation
Regular/ Irregular	Low/Fair	Yes	11	21,008	46,482
Irregular	High/Fair	No	86	15,625	22,586
Never	Fair/ out of reach	No	6	2,250	1,414

4.4.1 Availability of Newcastle Vaccine

Availability of the Newcastle vaccine was reported as regular by 68.0% of farmers, irregular 26.2%, never 4.9%, and don't know 1.0%. Information gathered from Agrovets in Sabatia Division revealed that two Agrovets stocked NCD vaccine which they reconstituted on market days for sale.

In Vihiga Division, of the five Agrovets only one stocked the NCD vaccine and reconstituted ad hoc; not on any specified day. The availability of the NCD vaccine in the District is illustrated in Figure 4.

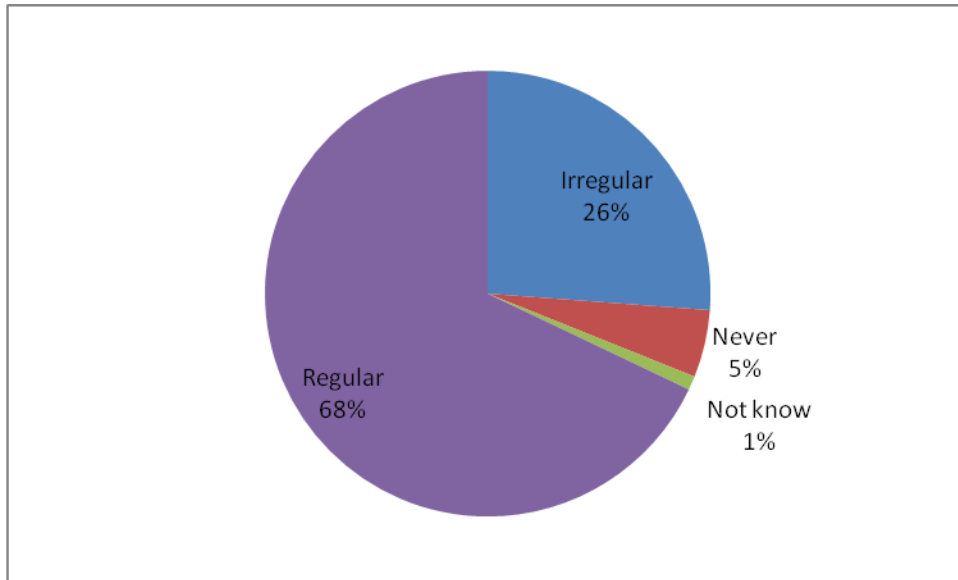


Figure 4: Availability of NCD vaccine in Vihiga District

4.4.2 Reconstitution of Newcastle Vaccine

Majority of the farmers, who were 89%, did not reconstitute vaccine by themselves. Their average incomes were way below that of the group that reconstituted the vaccine. Reconstitution of NCD vaccine in the Agrovets was the norm but this leaves the begging question on the efficacy of the vaccine. Reconstituted vaccine must be used within two hours after reconstitution. Farmers who reported as being able to reconstitute the vaccine in the District on the farm by themselves were 11% and had the highest income from indigenous poultry, (Figure 5).

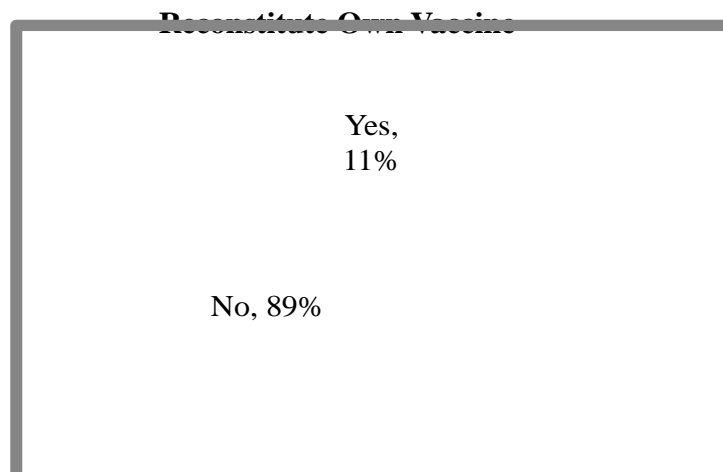


Figure 5: Reconstitute own vaccine

4.4.3 Cost of Newcastle Vaccine

The cost of vaccine in the District was scored as fair by 64.4%, high 25.7% and low 7.9%. A proportion of 1% did not know the cost of the vaccine this could be taken to mean that they didn't vaccinate their birds. The cost of vaccine was between three and five shillings per dose. The unvaccinated birds no matter how few could have the potential to spread NCD which is air borne and highly contagious. The challenge of the number of birds kept by individual households which was an average of 25 birds could limit the purchase of the NCD vaccine since it is packaged in doses of 100 and above. The responses on the cost of NCD vaccine are shown in Figure 6

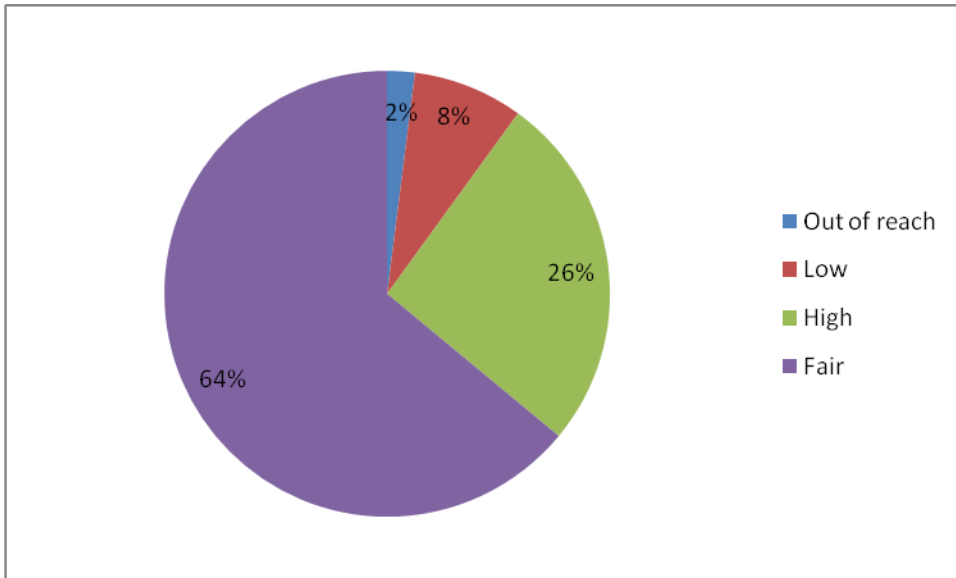


Figure 6: Responses on Cost of NCD Vaccine

Stockists of NCD vaccine in the study area were located only at major market centers. Farmers who purchased the reconstituted NCD vaccine had to walk long distances in the sun back home and sometimes had to wait for their birds to come home at night fall before they administered the vaccine. The proportion of respondents who said the vaccine was irregularly available (26%) is similar to those who felt the cost of the vaccine was high (26%). The farmers who reside far from the major market centers incur travel costs and time and this may be the reason they found the cost of vaccine to be high. Ondwassy et al, 1999 observed that expenditure on disease control for local poultry in Kakamega was minimal. Farmers did not give priority to disease control and the cost of vaccine was low. In this study the price of one dose of NCD vaccine ranged between Ksh 3 and Ksh 5. Efficacy of the vaccine should however be given more weight than the cost as the resultant losses from the disease can be devastating. All the Extension staff said that farmers were able to administer the NCD vaccine to their birds.

4.5 Access and Type of Credit

The second objective was to determine how credit affects the development of the indigenous poultry value chain in Vihiga District. The respondents were asked to list the available credit facilities in the study area. This was to indicate whether they were aware

of the existence of the facilities in their area. They were to state whether collateral was required or not, and how much credit they would take to expand their indigenous poultry enterprise. Eight credit facilities were mentioned as available in the study area (Table 9)

Table 9: Credit Facilities in Vihiga District as Listed by the Farmers

Name of Organization	Type of Loan	Division		District total	Collateral required	Interest rate %
		Sabatia	Vihiga			
Table Banking	Various	24.3%	18.5%	42.8%	Yes	10 /mth
Merry-go-round	Various	0.0%	2.9%	2.9%	Yes	10 / yr
Equity Bank	Various	1.9%	1.0%	2.9%	Yes	8-14 / yr
KWFT	Business	1.0%	0.0%	1.0%	Yes	8 / wk
AFC	Agricultural	1.0%	0.0%	1.0%	Yes	15 / yr
KCB	Various	1.0%	0.0%	1.0%	Yes	15/ yr
Tea Sacco	Various	1.0%	0.0%	1.0%	Yes	Not Known
Youth Ent. Fund	Various	1.0%	0.0%	1.0%	Yes	10 / yr
District Total				53.6 %		

The farmers who indicated that they could access any kind of loan were 53.6%. Table banking was listed by 42.8% of the farmers, Merry-go-round 2.9%, Equity bank 2.9%, and Kenya Women Finance Trust 1.0%.

Farmers who reported that collateral was required by the different organizations ranged from 20% to 70%. Those who said no collateral was required ranged from 30% to 80%. The researcher established from secondary data gathered that collateral in different forms was required by all the lending organizations. The different forms of collateral included; member shares, salary, title deeds, movable assets like furniture, radio, television sets, cookers and animals. It was apparent that a knowledge gap existed about the conditions of lending organizations. It was also observed that getting information on access and type of credit during the survey was not easy. Most farmers were initially not willing to even name the credit organizations in their area; the researcher had to be very persuasive

and assure them of confidentiality before they could give the information. There seemed to be apathy towards loans especially from formal institutions.

Table banking was most popular because the service was available at village level. Lending to members was at 10% interest and 20% for none members, all borrowers had to be guaranteed by members. Interest was on a monthly basis. Kenya Women Finance Trust (KWFT) is located in Mbale town and finances individual women and women groups for business ventures. Most organizations gave loans for varied purposes and collateral was negotiated. This kind of flexibility seems to be gaining popularity in the banking sector. If farmers were to take loans collateral not defined, they would take as shown in Table 10.

Table 10: Amount of Credit that Would be Taken by Farmers

N= 103

Amount of credit ksh	No of farmers	Average income (ksh)	Standard Deviation
None	12	5,108	3762
10,000 – 50,000	64	12,928	12310
60,000 – 100,000	15	17,273	17293
>100,000	12	46,512	49387
Grand Mean		20,455	

Farmers who would take a loan ranging between ksh10, 000 and ksh50, 000 were 62.1%. This illustrates the low cost investment in the indigenous poultry enterprise. Ndegwa et al, (2000) affirms that though credit was insignificant for local poultry production farmers needed credit to settle an array of needs including school fees, funerals, housing and food. The credit one would take is directly proportional to the current income; as the income increased the amount of credit one would take increased. Respondents, whose average income was ksh 5,108, would take no loan and this made logical sense.

The respondents who would invest more than ksh 100,000 were 12%. It was rather puzzling that such a proportion of the respondents would invest in the indigenous poultry enterprise despite its popularity and availability of market.

4.6 Marketing and Market Infrastructure

The third objective was to determine how market infrastructure affects the development of the indigenous poultry value chain in Vihiga District. Farmers were asked about market accessibility, whom they sold to and their criteria of pricing their birds. Poultry traders were asked to state what market facilities were available to them to facilitate trade of birds and eggs.

4.6.1 Marketting

Market access was reported as very easy by 73.7% and fairly easy by 26.2% of the farmers. No case was reported on access to markets as being neither difficult nor very difficult. Farmers who sold their birds to neighbors were 60.6%, local market 36.4%, primary collector 1% and to others including hotels 2%. Since most sells were locally done, there were minimal marketing costs. A similar observation was made by Emuruon et al, 2008 in a study on marketing of local chicken in Kampala. They observed that most of the local chicken farmers sold their birds in their local markets yet the consumers who could pay premium prices were in the urban areas. This pattern was supported by information collected from local poultry traders from Chavakali, Mudete, Mbale, and Majengo markets. Poultry traders got over 90% of their stock from other Districts such as Nandi, Uasin Gishu and Pokot. Responses of market access are shown in Table 11.

Table 11: Market Access

N= 103

Market access	No. of farmers	Average income (ksh)	Standard deviation
Very easy	76	18,240	25980
Fairly easy	27	11,840	9749
Difficult	0	-	-
Very difficult	0	-	-
Grand Mean		15,040	

Information from the poultry traders indicated that consumers preferred the indigenous table birds to the exotic ones. Physical observation was used by 84.1% of farmers to determine the selling price of birds, 9.9% considered age, and none measured weight using a weighing scale. Lack of standardized buying and selling measures may be exploitative especially to the primary producer. CIGs are purported to be avenues for members to bulk their produce and look for favorable markets (NALEP, 2000). No farmer reported selling birds to or through the CIG. Excess eggs were sold and the rest preserved for brooding. The eggs were graded by 18 farmers. One farmer had sold 3000 day old chicks at Ksh.30 each. The demand for day old chicks was high and buyers booked in advance. Table 12 shows the percentage of farmers who sold chicken and eggs.

Table 12: Percentage of Farmers who Sold Eggs and Birds

No. sold per year	% Farmers sold eggs	% Farmers sold birds
0	14.6	2.9
<100	62.1	85.4
100-200	17.5	8.7
201-300	2.9	1.9
301-400	1.9	0
>400	1.0	1.0

4.6.2 Market Infrastructure

The traders sold on average 65 birds per week and none stocked eggs. They all operated from makeshift shades at the market places and had to hire rooms to keep the left over birds at night or carry them home. The traders sold only live birds due to lack of slaughter and other facilities at the market centers. The marketing of live birds promotes the spread of NCD (Mckenzei, 1985). Mbale town has a built fresh produce market and has no provision for sell of chicken. Another fresh produce market in Chavakali was under construction but no provision had been made for sale of chicken whether live or dressed. It was not possible to establish at the time of this study which stakeholders were involved and if some of the infrastructure had been proposed in the design of these fresh produce markets. Lack of market infrastructure hinders the development of the local poultry chain (Emuruon, et al, 2008).

Poultry traders on the markets in the study area reported lack of facilities; they operated from under tree shades and temporary structures. There were no permanent traders at Bukuga and Gisambai markets. The details are in Table 13

Table 13: Market Infrastructure

Name of Market	No. of Traders	Market Facilities				
		Slaughter	Processing	Cold Storage	Store for Live Birds	Dedicated Sell Outlets
Chavakali	4	None	None	None	None	None
Mbale	5	None	None	None	None	None
Mudete	7	None	None	None	None	None
Majengo	4	None	none	None	None	None

Absence of dedicated sell outlets limited sells of indigenous poultry to live birds only. Traders got supplies from outside the district. The farmers had not satisfied the local market which was seasonal.

4.7 Contribution of Extension Services to the IPVC

The fourth objective was to determine the contribution of extension services to the development of the indigenous poultry value chain in Vihiga District. Extension services are the main change agents in Vihiga District concerning Agriculture. The farmers expect to get information from them to be able to make informed decisions on indigenous poultry production and the IPVC as a whole. Farmers indicated whether they were in contact with extension service providers stating whether they were public or private. They gave the frequency of contact and the type of information provided.

4.7.1 Contact with Extension Services

Farmers that had contact with Extension were 88.2%, of which public Extension served 68.5%, private 7.5% and 12.2% were served by both private and public Extension services. The average income of those who were in contact was higher (ksh 17,601) than for those who were not (ksh 10,074). Figure 7 shows the responses for contact with extension services.

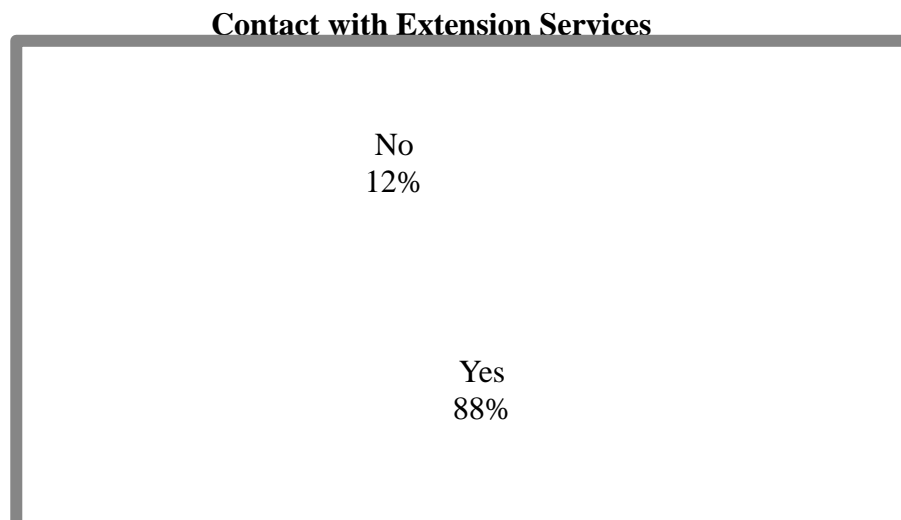


Figure 7: Contact with extension services

4.7.2 Frequency of Contact with Extension Providers

The highest frequency of contact was not consistent (55.9%). This is a reflection of the Government policy on demand driven Extension where the Extension officer does not follow a pre- determined routine. The Extension officer visits when the farmer has made a request to be visited. Monthly visits were 36.6%. Weekly visits were 4.3% and fortnightly were 2.2%. There was a considerable difference between the frequencies of monthly visits in Vihiga Division (25.8%) compared to Sabatia Division (10.8%). The frequencies of this category were more than double in the case of Vihiga Division. It seems there were more scheduled visits in Vihiga Division because there was no Livestock extension staff stationed in the Division but visits were arranged by staff from the District Headquarters. Figure 8 illustrates the frequency of contact between farmers and Extension service providers.

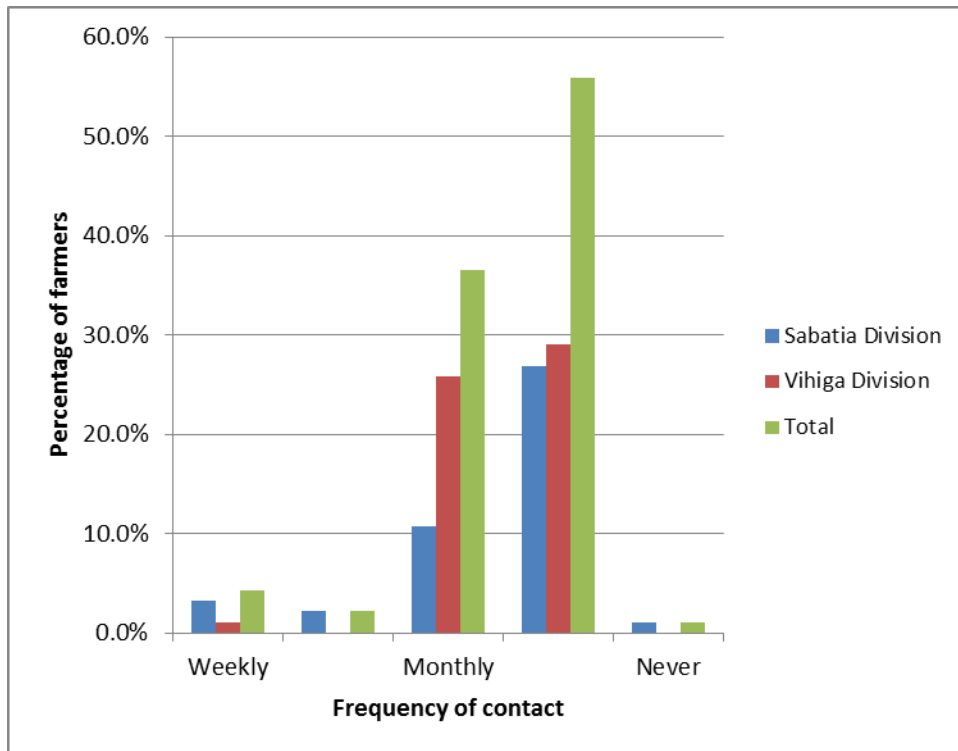


Figure 8: Frequency of contact with Extension in Vihiga District

4.7.3 Extension Messages Menu

The Extension messages menu comprised of (1) housing, (2) feeding, (3) credit, (4) disease control, (5) marketing, (6) breeding, (Njue, Kasiti, and Gacheru 2006). Respondents were given the opportunity to add any topic related to the subject that had not been listed.

The most frequently discussed topic was disease control (90%) while the least was marketing (18%). Feeding had a frequency of 84%, housing 63%, breeding 39%, and credit 21%. Disease control, feeding and housing took centre stage in the interaction between the farmers and the extension officers. Credit (21%) and marketing (18%) were lowest. This could be due to the attitude that indigenous poultry is for subsistence production and the change agents take it as business as usual. Emphasis on basic production components take precedence over other components which end up at the periphery and can easily be forgotten. Figure 9 displays the results of the extension messages menu.

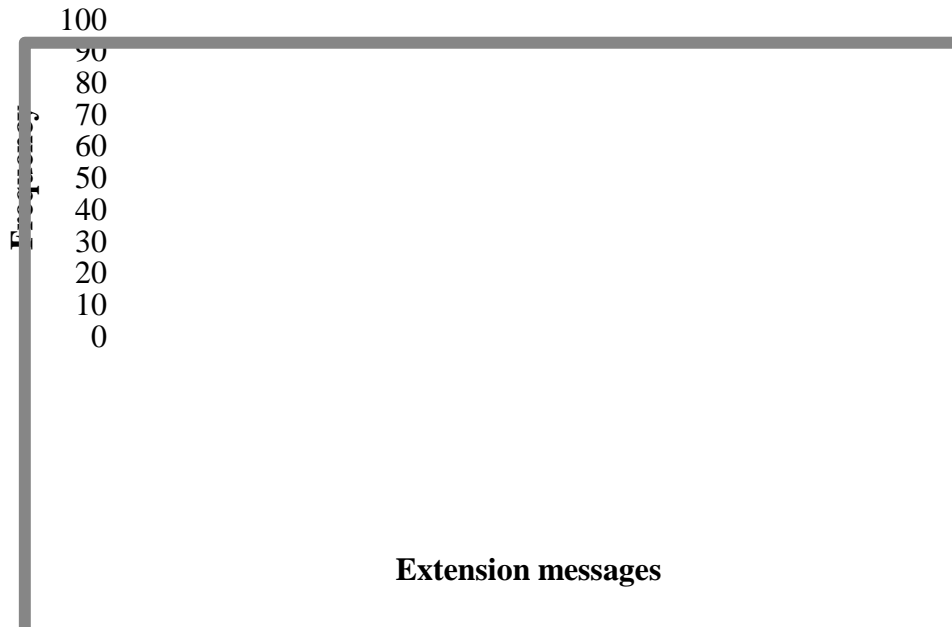


Figure 9: Extension Messages Menu

4.8 Statistical Analysis

The purpose of this study was to determine how control of NCD, credit access, market access and infrastructure and extension services affects the development of the indigenous poultry value chain. Data on independent variables were organized and presented in tables as means, median, standard deviations, skewness and co-efficients of variation. The researcher developed indices to bench mark threshold values to determine the extent of the development of the indigenous poultry value chain. The indices were for income, number of birds, mortality rate, and birds sold.

An annual income of Ksh 136,850 was the breakeven point where a farmer would be said to have commercialized in indigenous poultry. The number of birds one would have to sell at Ksh 350 per piece to earn Ksh 136,850 was 391. The minimum flock size was 50 birds and mortality rate of 25%. Scores were assigned to each of the independent variables which included control of NCD, credit access, market access and extension services. The details of the scores are in Table 14.

Table 14: Scores for Independent Variables

Variable	Score range	Criteria
Control of NCD	3-6	Vaccine available regularly ;yes = 2, no = 1 Vaccine affordable; yes = 2, no = 1 Can reconstitute vaccine; yes = 2, no = 1
Credit access	1-2	Access = 2, no access = 1
Market access	1-2	Access = 2, no access = 1
Extension services	1-8	For each topic a score of 1 given, full package = 8
Aggregate score	6-18	

The minimum aggregate score for the independent variables was 6 and the maximum was 18, the maximum implied that the NCD vaccine was regularly available, was affordable, the farmer could reconstitute, credit and market were accessible and they got the full package of extension messages. Means, median, mode, standard deviation, skewness and coefficient of variance were determined (Table 15).

Table 15: Means, Median, Standard Deviations, Skewness, and Co-efficients of Variation of Independent Variables

n = 103

Independent Variable	Score	Mean	Median	Mode	Std Deviation	skewness	CV
Control of NCD	3-6	4.5	4.5	5	1.118	0	.245
Credit access	1-2	1.8	1.5	2	.803	1.121	.535
Market access	1-2	2	1.5	2	1.077	0	.539
Extension services	1-8	5.2	4.5	6	2.267	.926	.504
Aggregate score	6-18	13.3	11.5	14	.430	1.667	.245

Control of NCD had a mean score of 4.5, a mode of 5 and a median of 4.5. The distribution had a skewness of zero and a co-efficient variation of 0.245 (24.5%). For

control of NCD 5.8% of the respondents scored the maximum (6). Credit access had a mean of 1.8, a mode of 2 and a median of 1.5. Respondents who had access to credit were 53.6%. The co-efficient of variation for credit access was 0.535 (53.5%).

The distribution of market access was skewed to the left since the mode was greater than the mean and median. All the respondents had easy access to market. Market access had a mean of 2, median of 1.5 and a mode of 2. The co-efficient of variation was 0.539 (53.9%).

Extension services had a mean of 5.2, a median of 4.5 and a mode of 6. The coefficient of variation was 0.504 (50.4%). The respondents who achieved the maximum score were 55%.

The aggregate score for independent variables ranged from 6 to 18. Respondents who scored above the mean were 42%. The highest score was 16 out of 18 achieved by 2.9% of the subjects. This scenario suggests that more than half of the respondents were below the mean and the value chain was less than 50% developed.

The dependent variables which included annual income, number of birds, mortality, grading of birds and eggs, birds and eggs sold, were given scores. Annual income had a critical point measure of Ksh 136,850 and mortality critical point measure of 25%. The number of birds sold per year had a critical point measure of 391, and a minimum flock size of 55 birds. The details are shown in Table 16.

Table 16: Scores for Dependent Variables

Dependent variable	Score	Criteria	Criteria
Income (Ksh)	1 - 2	Income = or > 136,180	yes = 2, no = 1
No. of birds	1 - 2	Flock size = or > 50	yes = 2, no = 1
Mortality (%)	1 - 2	Mortality = or < 25	yes = 2, no = 1
Grading eggs and meat	2 - 4	Grade eggs	yes = 2, no = 1
		Grade meat	yes = 2, no = 1
Intensive Production	2 - 4	Housing unit	yes = 2, no = 1
		Supplementation	yes = 2, no = 1
No. birds sold	1 - 2	Birds sold = or > 391	yes = 2, no = 1
Aggregated score	8 - 16		

The range of the aggregated score for the dependent variables was 8 to 16. At the lower end of score were those whose annual income was below Ksh 136,850, their flock size was less than 50 birds, mortality rate was more than 25%, eggs and meat were not graded, birds were not housed and not supplemented. Number of birds which were sold was below 391. The maximum score of 16 implied that the annual income was equal or higher than Ksh 136, 850, flock size was 50 Or higher, mortality rate was 25% or lower, eggs and meat were graded, birds were housed and supplemented, and 391 or more birds were sold.

Data on the dependent variables was also organized and the means, median, standard deviations, mode, skewness and coefficients of variations determined (Table 17)

Table 17: Means, Standard Deviations, and Co-efficients of Variations of Domains of Development of the Indigenous Poultry Value Chain

n = 103

Dependent Variable	Scale	Mean	Median	Mode	Std Dev.	Sk	CV
Income (ksh)	1-2	1.009	1.5	1	.701	-.713	.701
No. of birds	1-2	1.009	1.5	1	.701	-.713	.701
Mortality (%)	1-2	1.9	1.5	2	.750	.533	.395
Grading	2-4	2.18	3	2	.594	-1.380	.272
No. Eggs Sold	1-2	1	1.5	1	0	0	0
No. Birds Sold	1-2	1.009	1.5	1	.701	-.713	.701
Intensive production	1-2	1.16	1.5	1	.605	.562	.484
Aggregate score	8-16	9.3	10.5	9	1.871	-1.924	.201

The aggregate score of the dependent variables ranged between 8 and 16 with a mean of 9.3. The coefficient of variation was 0.201. Income, number of birds, and number of birds sold had similar scores for mean (1.009), median (1.5), standard deviation (0.701), skewness (-0.713) and co-efficient of variation (0.701). Respondents who scored above the mean were 31% and zero percent scored the maximum. Respondents who scored above the midpoint (12) of the dependent variable were 0.01%. Such a scenario implies that majority of the farmers are not half way to achieving the indicators of a developed IPVC.

4.8.1 The Relationship between Control of NCD and Development of the Indigenous Poultry Value Chain

The first research question was how control of NCD affects the development of the indigenous poultry value chain in Vihiga District. The seven domains which constituted the dependent variable were Total Income from Indigenous Poultry (TIIP), Bird Population (BP), Mortality Rate (MR), Grading of eggs and meat (GD), Intensive Production System (IPS), Eggs Sold (ES) and Birds Sold (BS). The means of the seven domains of development of the indigenous poultry value chain were computed and correlated with the mean responses of disease control. Table 18 indicates the Pearson Product-moment correlation results between disease control and development of the indigenous poultry value chain.

Table 18: The Pearson Product-Moment Correlation between Control of NCD and Development of the Indigenous Poultry Value Chain

n = 103

Dev of IPVC		TIIP	BP	MR	GD	IPS	ES	BS
Control of NCD		-.308	-.308	.716	.218	-.163	0	-.308
.598								

Table 18 indicates that there was a high positive correlation ($r = 0.60$) between disease control and development of the indigenous poultry value chain. However the correlation was higher between control of NCD and Mortality Rate (MR) at $r = 0.72$. The correlation between control of NCD and Total Income from Indigenous Poultry (TIIP) was low and negative at $r = -0.31$. The former was similar to the correlations between control of

NCD and Bird Population (BP) and disease control and Birds Sold (BS) $r = -0.31$. The correlation between control of NCD and Intensive Production System (IPS) was very low

and negative ($r = - 0.16$). Control of NCD and Grading (GD) of eggs and meat had a low positive correlation of $r = 0.22$. There was no correlation between control of NCD and Eggs Sold (ES) at $r = 0$.

4.8.2 The Relationship between Access to Credit and the Development of the Indigenous Poultry Value Chain

The second research question was how credit type and access affect the development of the indigenous poultry value chain in Vihiga District. The means of the seven domains of development of the indigenous poultry value chain were computed and correlated with the mean responses of access to credit. Table 19 indicates the Pearson Product- moment correlation results between access to credit and development of the indigenous poultry value chain.

Table 19: The Pearson Product Moment Correlation between Access to Credit and Development of the Indigenous Poultry Value Chain

n = 103

Dev of IPVC							
	TIIP	BP	MR	GD	IPS	ES	BS
Access to Credit	.411	.411	.600	.929	.230	0	.411
.376							

Table 19 indicates there was a low positive correlation ($r = 0.38$) between access to credit and the development of the indigenous poultry value chain. The correlation between access to credit and grading of eggs and meat was very high at $r = 0.93$. Correlations of Total Income from Indigenous Poultry (TIIP), Bird Population (BP), and Birds Sold (BS) with the development of the indigenous poultry value chain were similar ($r = 0.41$). These correlations were positive and moderate. Mortality Rate (MR) had a high positive ($r = 0.60$) correlation with access to credit. Intensive Production System (IPS) and access

to credit had a low positive correlation of $r = 0.23$. There was no correlation between access to credit and Eggs Sold (ES) $r = 0$. There was a low positive correlation between access to credit and development of the indigenous poultry value chain.

4.8.3 The Relationship between Market Access and the Development of the Indigenous Poultry Value Chain

The third research question was how market access affects the development of the indigenous poultry value chain in Vihiga District. The means of the seven domains of the development of the indigenous poultry value chain were computed and correlated with the mean responses to market access. Table 20 indicates the Pearson Product-moment correlation results between market access and development of the indigenous poultry value chain.

Table 20: The Pearson Product Moment Correlation between Market Access and Development of the Indigenous Poultry Value Chain

n = 103

Dev of IPVC							
	TIIP	BP	MR	GD	IPS	ES	BS
Mkt Access	-.656	-.656	.558	.141	.951	0	-.656
.459							

Table 20 shows market access had a moderate positive correlation with the development of the indigenous poultry value chain at $r = 0.46$. Furthermore Mortality Rate (MR) was moderately correlated with access to market. Total Income from Indigenous Poultry (TIIP), Bird Population (BP), and Birds Sold (BS) had similar high negative correlations with market access at $r = - 0.66$. Intensive Production System (IPS) had a very high positive correlation with market access. The correlation of grading of eggs and meat and

that of market access was very positive and very low, $r = 0.14$. No correlation existed between grading and market access.

4.8.4 The Relationship between Extension Services and the Development of the Indigenous Poultry Value Chain

The fourth research question was the role of Extension Services in the development of the indigenous poultry value chain in Vihiga District. The means of the seven domains of development of the indigenous poultry value chain were computed and correlated with the mean responses of the role of Extension Services. Table 21 indicates the Pearson Product-moment correlation results between the role of Extension Services and development of the indigenous poultry value chain.

Table 21: The Pearson Product Moment Correlation between Extension Services and Development of the Indigenous Poultry Value Chain

n = 103

	Dev. of IPVC						
	TIIP	BP	MR	GD	IPS	ES	BS
Ext. Services	.986	.986	1	-.238	-.735	0	.986
	.330						

Extension services had a low positive correlation with development of the indigenous poultry value chain at $r = 0.33$. In addition Total Income from Indigenous Poultry (TIIP), Bird Population (BP), and Birds Sold (BS) had similar high positive correlations ($r = 0.99$) with Extension Services. Grading and Intensive Production System (IPS) were negatively correlated to Extension Services, the correlations were low ($r = -0.24$) and high ($r = 0.74$) respectively. No correlation existed between Eggs Sold (ES) and Extension Services, $r = 0$.

4.8.5 Summary of Relationship between the Dependent and Independent variables

The summary of the relationship between the development of the indigenous poultry value chain and the four domains of the independent variables are given in Table 22.

Table 22: Correlations between the Development of Indigenous Poultry Value Chain and the Independent Variables.

	Control of NCD	Credit Access	Market access	Extension Services
Dev. of IPVC	.598	.376	.459	.330

Disease control had above average correlation ($r = 0.60$) to the development of the indigenous poultry value chain, Market access had an average correlation of $r = 0.46$, while credit access had below average correlation ($r = 0.38$). Furthermore extension services had a lower than average correlation of $r = 0.33$ with the development of the indigenous poultry value chain.

The findings of this study are similar to findings of Mckenzie (1985) in New Zealand. He reported that control of Newcastle Disease was significant in the indigenous poultry value chain. The practice of reconstitution of NCD vaccine by input suppliers was also reported in that study. Few farmers were able to reconstitute and administer the NCD vaccine to their poultry. Failure to vaccinate or poor handling of the vaccine resulted in death of poultry.

Ndegwa et al, (2000) found that credit was insignificant for indigenous poultry production. This study found credit access to have a low than average correlation with the development of the indigenous poultry value chain. For the enterprise to shift from subsistence to commercialization farmers need to invest and to do so additional resources would be required.

Lack of market infrastructure hinders the development of the local poultry chain (Emuruon, et al, 2008). Although this study found market access by the farmers to be moderately correlated to development of the indigenous poultry value chain, poultry traders on the markets reported lack of facilities. They operated from under tree shades and temporary structures. Farmers sold their birds in the locality and did not look for markets in urban areas

Skills development is a prerequisite for any venture. Branckaert et al 2000 advocates for a systematic process at both the farmer and extension levels that takes into account the objectives, results to be achieved and the activities. While it is to be appreciated that the farmers choose what to adopt they should be given the full range of knowledge and skills to make informed decisions (Gueye, 2000).

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the major findings, conclusions and recommendations for policy considerations and for further research.

5.2 Summary

The overall objective was to interrogate how control of NCD, access to credit, market infrastructure and extension services affect the development of Indigenous poultry value chain in Vihiga district.

The value chain approach embraces the full range of activities which are required to bring a product or service from conception, through the intermediary phases of production, delivery to final consumers, and final disposal after use. Traditionally extension agents have concentrated their efforts on technology transfer that targeted production aspects of poultry and ignored other factors of the value chain. Most farmers specialize in production and may be excluded from decision making on issues that affect them outside their farms. There exists a knowledge gap of what potential there is for income generation and employment creation in the indigenous poultry value chain. Despite their hard work farmers continue to have low incomes resulting into low living standards.

There are several factors that influence the indigenous poultry value chain. However this study aimed to explore selected factors of disease control mainly Newcastle Disease, credit, market infrastructure, and skills development among farmers in Vihiga District. The study employed a descriptive survey research design. The target and accessible population consisted of 600 farmers who were members of 30 local poultry commercialization Common Interest Groups, attendants from 17 Agrovets, 20 local poultry traders, and seven field Extension Officers. A random sample of 103 farmers was drawn using purposive sampling method. Proportions were used to select nine agrovets, and ten local poultry.

All the seven extension staff were included in the study sample. Reliability coefficient for the farmers' instrument obtained of alpha was 0.8. Data was analyzed using descriptive statistics and correlations. Results from the study indicated that the control of Newcastle disease had above average correlation of 0.6 with the development of the indigenous poultry value chain in Vihiga District especially by bird mortality rates that were above 25%. Market access had moderate correlation of 0.46 while credit access and Extension services had low correlations of 0.38 and 0.33 respectively with development of the indigenous poultry value chain. Overall the study showed that the selected factors had low to high correlations with the development of the indigenous poultry value chain in the study area.

5.2.1 Control of Newcastle Disease

Availability of the NCD vaccine was reported as regular by 68% of the respondents, and was available only at major market centers. The cost of NCD vaccine was reported as affordable by 72% of respondents. Eleven percent of respondents were able to reconstitute the vaccine. The Agrovets which stocked NCD vaccine except one reconstituted the vaccine before dispensing it to farmers. The respondents who got a full score for control of NCD were 5.8%.

5.2.2 Access and Type of Credit

Eight credit facilities were available in the study area and table banking was most popular (43%). Credit was accessible to 53.6% of the respondents. Collateral was required by all the credit facilities but varied in type. Majority of respondents (62%) were interested in small loans ranging from ksh 10,000 to ksh 50,000.

5.2.3 Marketing and Market Infrastructure

Market access was easy by all the respondents (100%). All the respondents sold their indigenous poultry within their locality. Eggs from the indigenous poultry were mainly preserved for brooding, few were sold. There were no poultry slaughter facilities, storage, nor dedicated butcheries for poultry despite the presence of fresh produce markets.

All the traders on major market centers operated from open spaces and temporary shelters and got most of their stock from outside Vihiga District.

5.2.4 Extension Services

Respondents who were in contact with extension providers were 88%. Frequency of contact between farmers and extension providers was not consistent (55%). Disease control in indigenous chicken was the most frequently discussed topic (90%), while the least discussed was marketing (18%). Respondents who received the full package of messages on indigenous poultry were 55%.

5.3 Conclusions

The findings showed that;

1. Control of NCD was not sufficiently done due to lack of knowledge and skills by the farmers to handle the vaccine.
2. The existing credit facilities had not been used to the maximum for the development of the indigenous poultry value chain.
3. Local poultry traders operated in difficult conditions and could not invest in value addition.
4. The opportunities in marketing of indigenous poultry were unexploited despite the popularity of indigenous chicken in and away from Vihiga District.

5.4 Recommendations

Based on these findings, the following recommendations were made:

- (i) The farmers should be educated more by extension service providers on how to reconstitute the NCD vaccine. The thermal stable NCD vaccine should be made available in the rural areas where electricity is not available.
- (ii) Commercialization of indigenous poultry production should be encouraged by leaders and development agents as a means of poverty reduction.

- (iii) Local Authorities should invest in market infrastructure that supports poultry sales. The facility should include an area for slaughter, processing, cold storage, and selling counters.

5.5 Recommendations for Further Research

- (i) There are other factors such as feeding and housing that affect indigenous poultry production that need to be investigated.
- (ii) There is need to investigate to what extent Common Interest Groups (CIGs) on commercialization of indigenous poultry are a driver in the development of the indigenous poultry value chain in Vihiga District.
- (iii) Need to carry out a study on why farmers are not investing heavily to expand their indigenous poultry enterprise despite the easy access to market and the popularity of indigenous poultry and its' products.

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APPENDIX

APPENDIX A

QUESTIONNAIRE FOR INDIGENOUS POULTRY FARMERS IN VIHIGA DISTRICT

The questions in this questionnaire are for extension research purposes only and all information given will be treated as confidential.

Section A: Respondent's Background Data

Date.....

1. Name (optional)

Division

2. Age in years (Tick as appropriate)

1. < 20 yrs [] 2. 21 – 30 yrs [] 3. 31 – 40 yrs []

4. 41 – 50 yrs [] 5. >50 yrs []

3. Gender

1. Male [] 2. Female []

4. Marital status

1. Married [] 2. Single []

3. Widow [] 4. Widower []

5. Divorced []

5. Level of education

1. Primary [] 2. Secondary [] 3. Tertiary []

4. Adult education [] 5. None []

6. Are you the household head?

1. Yes [] 2. No []

Section B: Local poultry enterprise

7. What is the main purpose of keeping local chicken?

1. Hobby [] 2. Family food []

3. Income [] 4. Others (specify)

8. How many local chicken do you have now? Specify number.....
9. Do you house your chicken?
1. Specific poultry house [] 2. Shared house [] other specify.....
10. Do you give feed supplements to your local chicken?
1. Yes [] 2. No []
11. How many birds do you sell per year?
1. <100 [] 2. 100 – 200 [] 3. 201-300 []
4. 301-400 [] 5. >400 [] 6. None []
12. How many eggs do you sell per year?
1. <100 [] 2. 100-200 [] 3. 201-300 []
4. 301-400 [] 5. >400 [] 6. None []
13. Do you grade your eggs?
1. Yes [] 2. No []
14. What is your annual income from sale of eggs and chicken?
- Specify 1. Eggs ksh.....
2. chicken ksh.....

Section C: Vaccination against New Castle Disease

15. Availability of New Castle vaccine
1. Regular [] 2. Irregular []
3. Never [] 4. Not know []
16. Cost of NCD vaccine
1. Low [] 2. Fair []
3. High [] 4. Out of reach []
17. I reconstitute the vaccine on my own
1. Yes [] 2. No []
18. What is your bird mortality rate per year?
- Specify %

Section D: Credit for Local Chicken Enterprise

19. What credit facilities are available for rearing local chicken? List them
- (i)..... (ii).....

20. For the listed above is collateral required? YES or NO

(i)----- (ii) ----- (iii)----- (iv)-----

21. How much credit would you take to expand your local chicken business?

1. None [] 2. Ksh 10,000 – 50,000 []
3. Ksh 60,000- 100,000 [] 4. > Ksh 100,000 []

Section E: Market infrastructure

22. Is the market accessible?

1. Very easy [] 2. Fairly easy [] 3. Difficult [] 4. very difficult []

23. I sell most of my birds to

1. Neighbors [] 2. Local market [] 3. Primary collector []
4. Poultry group [] 5. Hotel [] 6. Others []

24. I sell my birds by

1. Weighing (kg) [] 2. Age [] 3. physical observation [] 4. Other []

Section F: Extension Services

25. Do you have contact with extension services?

1. Yes [] 2. No []

26. Is your Extension provider from?

1. Public [] 2. private []

27. How often are you in contact with them?

1. Weekly [] 2. Fortnightly []
3. Monthly [] 4. Not consistent [] 5. Never []

28. What information does extension staff provide about local poultry value chain?

1. Housing [] 2. Feeding [] 3. Credit [] 4. Disease control []
5. Marketing [] 6. Breeding [] 7. Other specify

29. From what other sources do you get information about local poultry value chain?

(List them)

- (i).....
(ii).....
(iii).....
(iv).....

APPENDIX B

QUESTIONNAIRE FOR LOCAL POULTRY TRADERS IN VIHIGA DISTRICT

The questions in this questionnaire are for extension research purposes only and all information given will be treated as confidential.

Name (optional).....

Date.....

Division.....

1. Which local poultry products do you trade in. (tick)
1. Live chicken [] 2. Dressed chicken [] 3. Chicken cuts [] 4. Eggs []
2. How many chickens do you sell per week?
Specify:
3. How many eggs do you sell per week/
Specify.....
4. Do you get adequate supplies of chicken?
1. Always [] 2. Often [] 3. Never []
5. Are you in contact with Extension?
1. Yes [] 2. No []
6. Is the Extension worker public or private? tick
1. Public [] 2. Private []
7. What are your sources of market information? List
(i).....
(ii).....
(iii)
- (iv).....
8. What facilities are available at the market for poultry trade? Tick as appropriate
(i) Slaughter facilities Yes---- No----
(ii) Processing Yes---- No----
(iii) Cold storage Yes---- No----
(iv) Storage for live birds Yes---- No----

9. Selling is done from (tick)

(i) Open space

(ii) Temporary shade.....

(iii) Market outlet.....

(iv) Other specify.....

END

APPENDIX C

QUESTIONNAIRE FOR AGROVETS ON LOCAL POULTRY IN VIHIGA DISTRICT

The questions in this questionnaire are for Extension Research purposes only and all information given will be treated as confidential.

Name (optional).....

Date.....

Division.....

1. Do you stock NCD vaccine?

1. Yes

2.No

2. What dose quantities do you stock?

Specify:

.....

3. How many doses of NCD vaccine do you sell per month?

Specify:

.....

4. What other inputs do you stock for local chicken production?

Specify:

.....

5. What other services do you offer local poultry farmers? List

(i).....

(ii).....

(iii).....

END

APPENDIX D

**QUESTIONNAIRE FOR EXTENSION STAFF ON INDIGENOUS
POULTRY VALUE CHAIN IN VIHIGA DISTRICT**

The questions in this questionnaire are for Extension Research purposes only and all information given will be treated as confidential.

Name (optional).....

Date.....

Division.....

1. Farmers readily access NCD vaccine
1) Agree 2) strongly agree 3) Disagree 4) Strongly disagree
2. Most farmers are able to administer NCD vaccine.
1) Agree 2) strongly agree 3) Disagree 4) Strongly disagree
3. Do you think the indigenous poultry value chain (IPVC) in your division is:
(choose one)
1) Well developed 2) Moderately developed
3) Not developed 4) don't know

What would be considered a well developed IPVC?

Specify:
.....
.....
.....
.....
.....

END

APPENDIX E

**MAP OF KENYA SHOWING LOCATION OF
VIHIGA DISTRICT**



A – Vihiga District : Sorce Google maps

APPENDIX F

MAP OF VIHIGA DISTRICT



Sorce: District Development Officer Vihiga, 2009.

APPENDIX G

RESEARCH PERMIT

NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

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THIS IS TO CERTIFY THAT

Prof./Dr./Mr./Mrs./Miss./Institution

Florence Sibitali Murekefu

Of (Address) Egerton University

P.O BOX 536, Njoro

has been permitted to conduct research in

Location	Location
Sabatia & Vihiga	Districts
Western	Province


TOPIC: selected factors affecting the development of indigenous poultry value chain in Vihiga County Kenya.

for a period ending 28th February 2012

PERMIT No. NCST/RCD/10/011/31/5

Date of issue 9th January, 2012

Fee Received Ksh. 1000



Florence Murekefu

Applicant's Signature

[Signature]

Secretary

National Council for Science and Technology