

ASSESSMENT OF AVAILABILITY AND USE OF
INFORMATION AND COMMUNICATION TECHNOLOGY IN
BROILER MARKETING: THE CASE OF PERI-URBAN
BROILER FARMERS IN NJIRU DISTRICT-NAIROBI COUNTY

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A DISSERTATION SUBMITTED TO THE BOARD OF POSTGRADUATE
STUDIES, UNIVERSITY OF NAIROBI DEPARTMENT OF
AGRICULTURAL ECONOMICS, IN PARTIAL FULFILMENT FOR THE
REQUIREMENT OF AWARD OF THE MASTER OF SCIENCE DEGREE
IN AGRICULTURAL INFORMATION AND COMMUNICATION
MANAGEMENT



2012



DECLARATION

This dissertation is submitted to the University of Nairobi in partial fulfillment of the requirements for the degree of Master of Science in Agricultural Information and Communication Management. It is my original work and has not been submitted to any other University for academic Award.

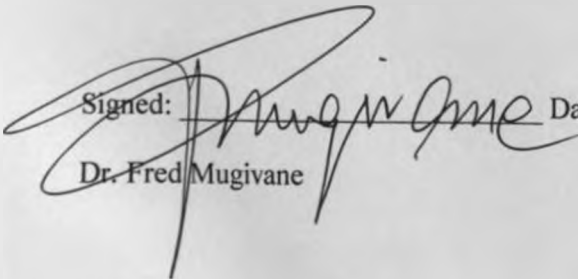
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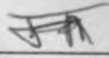
Reg. No.: A56/76494/2009

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ACKNOWLEDGEMENTS

I wish to acknowledge the assistance of the Livestock Production staff in Njiru District (Muturi, Pilisi and Caleb) who made data collection possible through their tireless effort despite the harsh July weather. I sincerely want to thank Mr. Frank Chege for his research methods advice and input.

I would also like to most sincerely thank Dr. Fred Mugivane and Dr. Joseph Othieno who inspired me to work hard and finish on time. My appreciation also goes to Kuria Gathuru and the entire Mazingira Institute for the facilities that enabled timely completion of this document.

Last but not least, I acknowledge the assistance and endurance of my son Victor for the duration of this course.

ABSTRACT

The poultry industry in Kenya has progressed over the years to become one of the most important livestock enterprises according to GoK (2009). The current estimated poultry population is 32 million and they are the most numerous species of farm animals in Kenya, whereby domestic chicken account for 98% and others 2% (GoK 2009). Poultry provides eggs, meat and other by-products. This meat has low fat, low calorie and high protein and it's more cost effective compared to other meat sources if production and marketing systems are efficient.

Broiler farming offers great opportunities to ensuring food security, income generation and resource utilization due to fast growth rate of broiler chicken (5-7weeks) and hence quick returns to investment. The short time in production cycle shows that broiler farming can be commercialized with quick returns to investment and very ideal in ensuring food security and source of livelihood. Due to price fluctuations in broiler marketing, farmers' income is unpredictable and at times results in great economic losses leading to pulling out of production by farmers with resultant lack of poultry products and hence higher prices. Information networks among the producers and the market agents could therefore aid in predicting when to produce, for whom, and how much. Currently, farmers mainly source for markets individually and mostly after they are already in production which results in inefficiency and costly ventures.

Broiler production in Kenya is mainly by small scale farmers and there is lack of organized marketing system. The brokers and middlemen on whom they rely for information seem to be inadequate. There is therefore need to investigate the extent to which they know or have access to Information and Communication Technology(ICT) which can also enable them access market information. Knowledge of ICT will enable majority of broiler farmers access broiler markets hence increase their production and sales of broilers.

There exists information and communication technology tools such as mobile phones, computers, internet services, print and electronic devices which can be used to access market cheaply. This would increase efficiency of the marketing system and thereby increase production capacity. Although such communication tools have been used in marketing of large livestock in arid and semi-arid areas through Livestock Information Network and Knowledge Systems(LINKS), their usage in broiler marketing has not been assessed, hence importance of this research in Kenya.. The overall objective of the project was to develop an understanding of the components of a successful broiler food system and assess whether use of ICT tools could increase production and market by broiler farmers. The study sought to identify broiler farmers and information channels, current ICTs used by farmers along the broiler supply chain and hence suggest strategies which can enhance use of ICTs in broiler food system.

The research was carried out in Njiru District, one of the 9 districts in Nairobi County where peri-urban farming is being practiced. Sixty nine (69) households were involved and semi structured questionnaires used to get the required data. Key findings showed that majority of broiler farmers were women (81.2%), while males were 18.8%- majority of these fall within 31-50years age category whereby 31-40 were 41% and 41-50 years 33%,implying that the farmers are relatively young. The study showed that the farmers are fairly literate with 64% having attained secondary education, 19% tertiary education and 3% university level.

Information service providers were identified as extension workers (48%), other farmers (42%) and input suppliers (10%).This shows that farmer to farmer network is important in broiler farming. On ICT skills, it was noted that 32% have no computer skills, 36% fair, 23% good and 9% very good despite the literacy level. The results of the study shows that mobile telephone as a communication tool was being highly utilized (87%) to source for the broiler inputs, either through calls or SMS, showing high usage of the telephone for agricultural purposes. It is evident that management information service is the most sought (50%) followed by inputs and markets services (38%), showing importance of need for management skills and marketing in broiler production.

Despite the Kenya Agricultural Commodity Exchange, (KACE) being available (www.kace.org), 98% of the respondents had no idea of such an organization or what benefits it offers along the broiler supply chain, though the information is available in

most handsets(get-it) by Safaricom mobile service provider and in the internet upon registration. The results show that farmers lack skills on how to use the tools which limit ability to effectively use them. Suggested government intervention to facilitate use of ICTs include: training farmers on the use of ICTs (44%);subsidizing the communication rates(11%);opening up service centers(11%);improving ICT infrastructure(10%);increased marketing of products online(2%). which shows that the respondents require skills on ICTs and maybe opening up service centers in the local areas would facilitate their training.

Poor access to markets was rated as number one constraint in broiler marketing. In order of priority, constraints faced by farmers in broiler supply chain mainly relate to marketing issues such as accessibility, pricing and delayed payments. The results indicate importance of market access by broiler farmers who seem to struggle alone to get market outlet. The newly created_Ministry of Information and Communication Technology shows willingness by the government to enhance growth of ICT for economic development, though the initiative needs to be cascaded in all sectors including Agriculture which is still the mainstay of the economy.

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ABBREVIATIONS AND ACRONYMS

AEZ	Agro-Ecological Zone
CDW	Cold Dressed Weight
DLPO	District Livestock Production Officer
FAO	Food and Agriculture Organization
GOK	Government of Kenya
ICTs	Information and communication technologies
IFPRI	International Food Policy Research Institute
ISP	Information Service Providers
IT	Information Technology
KACE	Kenya Agricultural Commodity Exchange
LINKS	Livestock Information, Network and Knowledge Systems
MOLD	Ministry of Livestock Development
NARS	National Agricultural Research Services
NGO	Non Governmental Organization
SPSS	Statistical Package for Social Sciences
UA	Urban Agriculture
USD	United States Dollar

CHAPTER ONE

INTRODUCTION

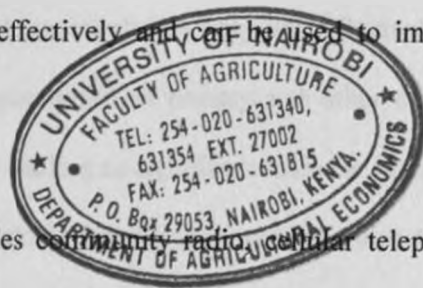
1.0 Background Information

Poultry industry in Kenya has progressed over the years to become one of the most important livestock enterprises. This is as reported by GoK (2009). The current estimated population is 32 million and are the most numerous species of farm animals, however domestic chicken account for 98% and others 2%. Domestic chicken comprises of layers, broilers and indigenous birds and the industry is an important source of food, income, and employment and also has integral linkage with other sectors of the economy that include feeds industry, hotel industry and input suppliers. It also enhances integration of hatcheries, growing farms, processing facilities, and laboratory and marketing outlets as reported by Yoau (2008). Poultry provides eggs, meat and other by-products, whereby meat has low fat, low calorie and high protein and can be more cost effective compared to other meat sources if production and marketing systems are efficient.

Broiler farming offers great opportunities to ensuring food security, income generation and resource utilization due to faster growth rate and hence quick returns to investment. Major challenges to broiler production include loss of genetic diversity, low productivity, fluctuations in production, demand levels and poor marketing infrastructure. Since the production takes a very short time (5-7 weeks) to reach market weight of 1.2-1.5kg (cdw) cold dressed weight, access to market is key to success of the broiler farming system. Other challenges include pests and diseases, inadequate research and development. The short time in production cycle shows that

broiler farming can be commercialized with quick returns to investment and very ideal in ensuring food security and source of livelihood. Mugume (2011) noted that modern breeds of birds are popular suppliers of fast food kiosks, restaurants, hotels and other catering units. Available information by Hosny (2006) shows that marketing can be local, regional and international provided the quality standards are observed, in line with food safety. Good example: meat of broiler chicken in Egypt was consumed locally and also exported while in India, it found a ready market in international outlets which grew from 0.34% per annum in 1981-91 to 8.14% during 1992-2001.

There is increasing demand for poultry products especially in urban areas due to urbanization and increasing human population but this may be constrained by the noted challenges. The potential of poultry to increase household incomes, creation of employment and ensure food and nutrition security can only be realized if improved strategies and modern technologies are put in place involving all the poultry supply chain players (Buiten et al;2003). Some of the communication technologies used includes payphones and computers. Use of ICTs has contributed to building the ability of smallholder groups to network effectively and can be used to improve poultry industry.



Other initiatives in the use of ICT, includes community radio, cellular telephony, especially SMS and the Internet through telecenters, information kiosks, multipurpose community centers among others. There is therefore potential for developing the broiler industry in Kenya as it has been done in other countries which can be exploited to increase the employment and house hold income both in rural and urban areas. This project aims to analyze the role of using available Information and

Communication Technologies (ICTs) in enhancing broiler supply chain and possibility of improving production in Njiru district.

The broiler industry in most countries as indicated by Sahdev S. (2006) operates as a live bird market (or 'wet' market), with birds retailed as live birds and slaughtered in front of the customer in the retail shops. It's estimated that in India almost 98% of the consumption is in live-form limiting therefore the area that can be catered from a production centre. Customers have over the years developed a perception that fresh poultry meat purchased as live bird and slaughtered on site in their presence is better in quality as problems may be difficult to detect until it is thawed if frozen. In Kenya however, major outlet for broiler meat is fast food kiosks offering ready to eat meat and hotels of all classes. Others include individual buyers who prefer freshly slaughtered carcasses, sometimes slaughtered on the spot.

Field experience shows that broiler bird trading is very volatile whereby prices are determined based on demand and supply in a given market for the day. The broiler prices fluctuate widely and even short surpluses result in a very wide fluctuation in market prices GoK (2009). In Kenya, Consumption of poultry and other meats is positively affected during religious festivals leading to significant increase in demand and high prices. This affects production period whereby farmers time when to rear broiler birds to get high returns. Due to lack of market information, the resultant would be overproduction, which results in lower prices, or no market at all thereby pushing some producers out of production.

In some countries such as India, Sahdev Singh (2006) the market for frozen or chilled poultry products is only limited to a few institutions i.e. hotels, fast-food restaurant chains and to a negligible extent to urban consumers. This very small segment of consumers is served by processing sector, whose volume account for hardly 2% - 3% of production. However, certain State Governments are envisaging discouraging slaughtering of birds within the Municipal jurisdiction limits due to pollution and other issues. If such measures are pursued, the sale of slaughtered chicken is expected to increase and the processing units would simultaneously advertise on the quality aspects of dressed chicken and the consumers could be advised to pay slightly higher amount for frozen/chilled chicken for their health. In view of this, there is scope in the coming decade for new chicken processing plants to come up and sale of processed chicken will increase both to cater for domestic market as well as export markets. Provision of cold storage facilities could enhance productivity due to predictable marketing outlet and ease of access by the consumers.

1.2 Statement of the problem

Broiler farming is one of the poultry production systems which can contribute to food security and economic empowerment to the farmers but it is not used by many farmers and farmers lack information about it. There is an already established Agricultural Marketing Information System by KACE whose usability has not been reviewed. Neither have the capacities, abilities, knowledge and skills of the Peri-Urban farming households in utilization of Information and Communication Technologies (ICTs) been assessed.

Due to price fluctuations in broiler marketing, farmers' income is unpredictable and at times results in great economic losses leading to pulling out of production by farmers with resultant lack of poultry products and hence higher prices. Information networks among the producers and the market agents could therefore aid in predicting when to produce, for whom, and how much. Currently, farmers mainly source for market individually and mostly after they are already in production which results in inefficiency and costly ventures.

Broiler production in Kenya is mainly by small scale farmers and there is lack of organized marketing system. The brokers and middlemen on whom they rely for information seem to be inadequate. There is therefore need to investigate the extent to which they know or have access to ICT which can also enable them access market information. Knowledge of ICT will enable majority of broiler farmers access broiler markets hence increase their production and sales of broilers. This will increase income at household level and also increase food security. This project sought to analyze usage of Information and Communication Technologies (ICTs) in broiler marketing.

1.3 Justification of the study

Poultry production has great potential to ensure household food security and employment creation in urban and peri-urban areas due to proximity to market outlet. Through maximization of small spaces, poultry production and marketing can be practiced by all persons irrespective of gender. Broiler farming, which has short growing period (5-7 weeks), offers the greatest opportunity to urban and peri-urban

food security and income generation due to fast growth rate and short maturity interval.

There exists Information and Communication Technology tools such as mobile phones, computers, internet services, print and electronic devices which can be used to access market cheaply and hence increase efficiency of the marketing system and thereby increase production capacity. Their usage in broiler marketing has not been assessed, hence importance of this research. Available information shows that most farmers in Kenya continue to keep averages of 250-500 broilers which fall below the break-even point due to marketing problems among other factors.

1.4 Objectives of the study

To evaluate the availability and degree of use of Information and Communication Technologies (ICTs) within the broiler production and marketing systems within Nairobi County.

1.4.1 Specific Objectives

1. Identify the broiler farmers and the ICTs available in Njiru District of Nairobi County.
2. Identify current ICT tools used by the broiler farmers along the supply chain in Njiru District of Nairobi County.
3. Enumerate the main challenges to broiler production and marketing in Njiru District of Nairobi County.

1.4.2 Research questions

1. What are the characteristics of broiler farmers and what channels do they use to access information?
2. What ICT tools do broiler farmers use and what information do they seek using these tools?
3. What are the challenges and their possible solutions in broiler marketing system?

CHAPTER TWO

LITERATURE REVIEW

2.1 Role of Information and Communication Technology (ICT) in agriculture

As in other sectors, the use of computers and their applications are growing in the Agricultural sector. This development is not only seen within the farms themselves, but also in the communication with companies related to these farms. According to Buiten A.V et al (2003), More demands are being made on the safety of consumer products, thus it is important to increase the possibilities to track and trace the origin of these products and the production methods used. ICT is a very valuable tool towards ensuring that this food safety information can be obtained by relevant stakeholders along the agricultural value chain. However, for a successful introduction of ICT in the agricultural sector, the interest has to come from the stakeholders such as farmers and marketing agents themselves.

According to Sahdev Singh (2006), Agricultural policies of most countries in the Asia-Pacific region, though indicating use of ICT, lack sufficient clarity on how ICT are to be used in agricultural development. While rural telecommunications can play a vital role in supporting and providing farm and non-farm livelihoods, access to markets, education, health services and governance, the costs of connectivity are still somewhat high. Farming is the major economic activity in the rural areas of the region and, therefore, agriculture must play an important role in defining telecommunications strategies for rural development. ICTs have been used in Agriculture and have been seen to empower women groups in Kenya, India among others in enhancing communication and organization, access to information for

marketing and inputs supply, access to resources and peer networks within smallholder groups. (<http://www.cordinator.org>;2010)

Information technologies used in information sharing and access include payphones and computers Seepered (2003). Use of ICTs has contributed to building the ability of smallholder groups to network effectively thereby reducing transaction costs. Other initiatives in the use of ICT as reported by Seepersad, J(2003), includes community radio, cellular telephony, especially SMS and the Internet through tele-centers, information kiosks, multipurpose community centers among others. These have been tried through the National Agricultural Research Stations (NARS) institutes, National and International Non Governmental Organizations (NGO) including farmer based organizations. In India and some South-East Asian countries such as Laos, the national NGO sector, private, public-private and public-private-community partnerships are emerging as main providers of information through ICT enabled initiatives. Thus, ICTs are transforming conventional agricultural extension to facilitate access to information.

A common learning from these ICT enabled initiatives for agricultural development has been that farmers' information needs being satisfied through use of ICT are for market related information including price trends, accessing input and support services. Others include solving individual and community agricultural problems, especially diagnosis of disease and pest problems and getting solutions to them (Singh, 2006).

Research by Jayathilake et al (2004) noted that use of ICTs can lead to more efficient communication and increased demand for products and services and this would lead to increased productivity including agriculture and hence spur economic growth. Access to information promotes competition and improves market performance. It has also been reported by Jayathilake et al (2004) that Information may also increase the level of trust on consumers in a product or firm leading to increased demand and therefore higher sales by the producers.

Information and Communication Technologies (ICTs) offer the ability to increase the amount of information provided to participants and decrease the cost of disseminating the information (Thompson, 2000). ICTs in Agricultural sector facilitate knowledge sharing within and among a variety of agricultural networks including researchers, exporters, extension service providers and farmers and can also be used to access inputs by linking with input suppliers. ICTs enable vital information flows by linking rural agricultural communities to the internet both in terms of accessing information and providing local content. According to Wainaina M. (2005), advances in ICTs have progressively reduced the cost of managing information, enabling individuals and organizations to undertake information related tasks much more efficiently and has significantly reduced poverty in certain sectors. However the use of these technologies in agricultural development faces challenges which limit efficient use.

Other uses of ICT relate to communication whereby numerous methods of information delivery exist to bring communication technology to communities where less than five(5) years ago, no method beyond face to face discourse existed to convey information as reported by Leah et al(2003). ICT helps to bridge the language barrier

and facilitate learning, hence importance in education and information dissemination such as agricultural extension.

2.2 Information Technology (IT) and poverty alleviation

According to Accascina G. (2000), information technology contributes to poverty alleviation mainly through availing the information to the users through the technology, i.e. information and the conduit used to facilitate access. IT usage can be defined at local, national and global whereby local can be defined as village, district or urban area. IT provides citizens with information about market prices and social services such as health, knowledge and education.

At national level, complete IT systems are those that carry information about jobs, investment opportunities or goods and services, applicable in all development sectors of which agriculture is one of them. At global level, IT refers to systems that connect to the global information infrastructure and these facilitate connection to global information pathways. The poor locals, benefits from information at local level directly by getting daily market prices and can subsequently buy inputs at 20% less and sell products at 20% more by eliminating middleman choosing whom to sell to as reported by World Watch(2011).

Though the technology may only reach the centre at the district nearby and get to the farmer by a word of mouth or through a paper, the farmer still benefits from the information. Indirect benefit of information could be where the benefits are felt upstream but may trickle down through socio-economic fabric, e.g. when a child from

a poor family manages to attend school, works in the capital city at a job that uses IT and with money, supports the family in the village. Accasciana (2000)

The third type of intervention refers to using technology to support poverty reduction mechanisms and development projects such as databases that organizes and monitors the progress of poverty alleviation projects by development organizations such as direct polling of information from the field, email, informative websites and monitoring and evaluation data among others. Prerequisites to implementing IT may include use of it in conjunction with new market opportunities and the provision of goods and services. Accasciana (2000)

Leah et al (2003) states that in Ghana where per capita GDP is US dollar 350, women in marketing can save a four-day round trip and gain valuable productivity time by making one phone call to place an order for market delivery, showing importance of telephone technology in economic development.

Broiler farming in Kenya could benefit from such intervention to take advantage of the expanded East Africa common market recently opened, thereby enhancing production levels to meet demands of new market through use of available technologies such as mobile telephone. (MOLD; 2009). With expanding market, agricultural products that take a short time to mature such as broilers could be targeted for improvement through IT infrastructure and hence contribute to poverty reduction strategies. Internally, farmers working in groups' e.g. cooperatives will access wider market and hence expand production. They can work on a wider scale and cost of technology to each farmer to access the wider market would decrease. Farmer using

IT at local level will get information about prices through buying and selling from the market which allows farmers to diversify activities such as choice of where to sell products (World Watch, 2011). An example of information technology that has gained prominence in communication is mobile telephony which has played great role in accessing information.

However review of relevant websites ([http://www. KACE](http://www.KACE): 2011) shows gaps in agricultural marketing information to farmers, while they continue to use low technology methods such as travelling to source for the market. Observations in the urban farming environment reveal that the scales of production of most agricultural products such as poultry remain very low while the prices in the market remain high. These disconnect results in low consumption of the products due to high prices, thereby negatively affecting production levels.

In Kenya, total population of all poultry is estimated as 32million(GoK,2009),while human population was 38million,too low compared to other African countries such as Nigeria with a poultry population of 150m(FAO,2008).Like Kenya, most of the poultry birds are local and exotic being minority. In Nigeria, most farmers have 1000 layers and 500 broilers, category referred to as backyard farmers unlike in Kenya where such would be categorized as medium producers. In most countries such as Nigeria where poultry farming is on a higher scale, poultry meat is derived from broiler birds, local or free range, spent layers and spent parent stock, unlike in developed countries such as US where broilers form major source of poultry meat. (<http://www.ers.usda.gov/news>)

According to research done by FAO (2008),poultry farming in Nigeria is on expansion trend despite rise in feed cost, inadequate credit and global financial crises and it was anticipated that the increase would be in urban and peri-urban zones. This shows importance of poultry industry in income generation. Marketing remains a major factor in determining direction of poultry production and in Nigeria, there is an association of poultry producers referred to as Poultry Association of Nigeria (PAN), similar to Kenya Poultry Farmers Association (Kepofa) of Kenya, which aim to assist poultry farmers (GoK 2009).PAN of Nigeria benefits large scale producers who can pay subscription fee thereby neglecting majority of the small scale producers, who need help more. According to FAO (2008), strong poultry associations could be a good source of information and offer mechanism for efficient management. This would also enhance interaction of producers and consumers and hence increase returns to farmers.

Other countries where poultry plays significant role in economic development include Egypt whereby by 2006, poultry meat was 647,380 tones according to Hosny (2006). The paper reported that in value terms, poultry contribute 26% of livestock products in Egypt. In the same country, broiler meat production represented 84% of total meat production with a per capita annual poultry meat consumption of 9kg. Small scale producers play significant role in poultry production in Egypt and keep average of 5000 birds per rearing house, unlike in Kenya where most producers keep average of 300 to 500 birds.

Poultry keeping in Egypt started in 1964 through large scale production, as a solution to providing fast growing human population with high quality affordable animal

protein, contributing to food and nutrition security. The growth of poultry industry was further enhanced by government economic policies which included subsidy of feeds ingredients, low interest loans which resulted in low production cost. According to FAO (2008), poultry production can play a vital role in food security as a source of animal protein, income and employment creation in both rural and urban/peri-urban areas, hence importance in poverty reduction. Formation of marketing bodies could enhance broiler production due to access to market.

In Egypt according to Hosny (2006), poultry farmers have a central price broker where farmers report once birds attain acceptable marketing weight, a marketing structure established to control prices, unlike in Kenya where farmers source for own market. However, farmers in Egypt can still access market individually but would compare price offers.

This research project aims at analyzing constraints to broiler production and what role usability of ICTs in marketing would play to improve the performance of the industry. Demand for white meat remains high and reduced prices would encourage more people to consume poultry meat and hence spur poultry productivity.

2.3 Factors affecting the use of ICTs in agriculture

According to Taragola et al (2005), use of ICTs in agriculture has been influenced by: Complexity of farm operations, degree of external support, age of the farmers, time, and network, availability of information, personality and approach to learning have led to diminished or enhanced farmers' computer use. Other factors include lack of ICT proficiency, lack of ICT benefit awareness, lack of technological infrastructure,

cost of technology, trust level in ICT system, lack of trainings, system integration and software availability which limit the use of ICT by farmers.(Taragola and Gelb;2005) Despite the limitation of ICT use, world agricultural sector reveal that there are several good examples for ICT adoption and applications within agricultural sector. Examples include Kenya Agricultural Commodity Exchange which is harnessing the ICT technology to disseminate market information and intelligence in Kenya. (KACE, 1997) An illustration of a potentially beneficial application of new technologies is found in mobile telephony which has become a common communication tool.

In Philippines, supply, access to resources and peer network is achieved through technologies such as payphones and computers. ICTs have been found to build the ability of Smallholder groups to network effectively hence offering great potential to improving welfare. According to Jayathilake et al (2004), Use of ICTs can lead to more efficient communication and increased demand for products and services and hence spur economic growth even in Agricultural sector. Information promotes competition and improves market performance and may also increase the level of trust on consumers in a product or firm leading to increased demand.

2.4 Urban and peri-urban agriculture: Cities producing food

Urban agriculture has been recognized as important response used by millions of families to obtain food. Internationally, right to food has been recognized as reported by FAO (2006) and any opportunities geared towards food production should be supported including urban agriculture. It's estimated that millions of people are producing food in cities, not only in poor countries but in wealthy ones as well, Smith et al. (2006).

According to Jose (1998), urbanization has resulted in escalating urban poverty and desire to source for alternative sources of livelihood. These include agricultural practices such as poultry farming. The demand for livestock products by the increasing number of urban population encourages farming households to engage in livestock keeping. Due to quick growth of broilers, poultry farmers find the livestock system desirable though the scale is still low in developing countries. According to Hosny (2008), broiler birds have a low food conversion ratio (FCR) of 1:1.8 compared to local breeds which have 1:3 FCR implying that broilers are efficient in feed conversion into meat. They also take less time of 35 to 42 days compared to locals which take 60-80 days, making broiler production ideal in food and nutrition security.

Food production has been recognized as something that needs to be integrated into urban planning to allow access to information on best practices and avoid conflicts. Towns have been places of food production since the dawn of human history whereby livestock were always closer home. In 19th century, migrants met their vegetable and animal food needs from their own production in summers and preserved food to eat during cold winters as reported by Urban Harvest (2007), while indigenous birds gave meat and eggs.

Broiler industry has been identified as an important source of animal protein due to the ability of the birds to grow very fast (5-7 weeks) which also mean that it can greatly contribute to food security and source of income to the farmers. It's one of the farming activity practiced in urban and peri-urban areas of Nairobi County as an economic activity. Broilers are known to be efficient converters of feed grain into

meat compared to cattle as reported by Unang, (2005), whereby feed conversion efficiency refers to amount of feed required to produce one unit of meat or eggs as reported by Daniel(2002).

Due to the importance of broiler food system, some countries such as Indonesia, the government offers subsidy on feeds and the broiler industry as a whole which makes it cost effective as reported by Unang (2005). The initiative results in reduced price of the poultry meat and hence reduced consumer price.

To enhance profitability of the industry, measures need to be taken to address problems affecting the performance of the production system such as monopoly in supply of day old chicks, better marketing and cold storage facilities which would help small scale producers to access market through bulking. Research done by Unang (2005) indicates that chicken prices drop significantly when broilers are harvested and the oversupply results in lower prices for all suppliers. This calls for production strategy to match production with market access. The most affected are the small scale producers who have no access to large scale market outlets especially in rural areas.

Growing food and keeping livestock in the cities has some advantages over rural farming, due to proximity to markets, low transportation costs, and reduction in post-harvest losses. In times of conflict or other unrest, urban agriculture keeps people fed when food supplies from rural areas are interrupted and hence need to develop urban farming technologies to tap the benefits of market access.

World Watch Institute (2011) reported that Urban Agriculture(UA) also play vital role in building communities in that it brings city dwellers together and helps to generate social interactions. Such include self help groups of young people, women and vulnerable people who meet as a result of their involvement in agriculture, giving opportunity to share information and skills. It also helps to improve individual wellbeing and voice which would not be heard. Members also get technical skills and market opportunities; World Watch (2011)

2.5 Role of information access

According to research by Unang (2005), Broiler survival rate is dependent on capital and technical knowledge. Farmers who had access to technical knowledge experienced higher survival rates than those without. It was also noted that farmers in partnerships receive services such as vaccines, vitamins, extension and technical assistance from poultry shop partners, which was not received by autonomous producers. Available global trends indicate anticipated potential of increased market with estimate that between the years of 1997-2020, the consumer demand for milk, eggs and meat will increase by 50 %.(Delgado and FAO, WORLD BANK, IFPRI 1997). Factors which will lead to the increased demand are:

1. Increase in income levels to 2USD per day which will lead to increase in demand for livestock products.
2. Livestock production growth shifting to peri-urban areas due to ease of access to the market. (C.De Haan, World Bank; 2007)

Current trends show that Poultry farmers tend to be located in Urban and Peri-urban areas in developing countries due to ease of market access. Hovorka (2006) says that

with efficient marketing information system, poultry can be practiced in all areas due to predictability and ease of communication through use of appropriate ICTs. The information access infrastructures need to be developed and utilized by all players to take advantage of the great potential in increasing food needs. Only efficient systems will benefit from the anticipated global opportunities.

According to Kimberly (2003), ICT has contributed to increased education level and by implication income levels around the world due to enhanced communication and information access. The report says that ICT has facilitated communication and vital knowledge transfer across continents and countries benefiting all sectors including agriculture, whereby farmers have used internet to get their products in international market. Diverse farming systems such as vertical farming technology being practiced in urban and peri-urban livestock farming increases chances of commercialization of such species as poultry; a common practice being implemented in urban farming set-up at various levels of sophistication (Growing Power, 2009).

2.6 Conceptual framework

The project was premised on the analogy that information access and usage of available ICT tools in broiler production systems would lead to efficiency in marketing which would lead to increased production of broilers at farm level. This would also have positive implication to accessing production inputs, technical skills and hence reduce transaction costs. The net effect would be more income and better livelihood of the broiler farmers, hence contribute to food security and poverty reduction.

The following concept guided the study on actors and factors of ICT use

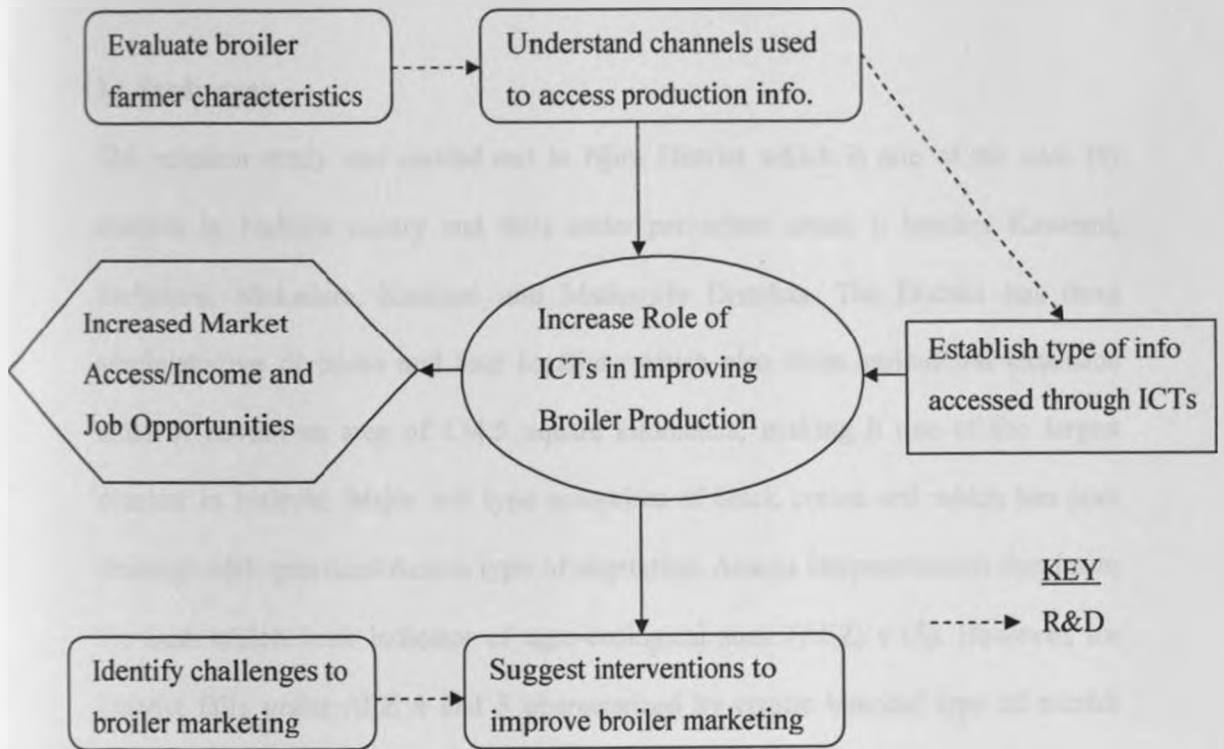


Figure 2.1: Conceptual Framework

The broiler-ICT-market sector pathway has a platform of research and development (R&D). All three sectors are heavily dependent on R&D to identify actors and factors that inform policy and legislation and impact significantly on income and employment in the three sectors. Yet research on role of ICT in broiler production and marketing seems to have been ignored in Kenya. While ICT is a strong sector with effective support policies and practices, its linkage, integration and utilization in the broiler sector remain vague

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Study area

The research study was carried out in Njiru District which is one of the nine (9) districts in Nairobi county and falls under peri-urban areas. It borders Kasarani, Embakasi, Makadara, Kathiani and Matungulu Districts. The District has three administrative divisions and four locations which also form agricultural extension units. It covers an area of 134.5 square kilometers, making it one of the largest districts in Nairobi. Major soil type comprises of black cotton soil which has poor drainage with grassland/Acacia type of vegetation. Acacia Drepanolobium dominates the bush which is an indicator of agro-ecological zone (AEZ) v (5). However, the District falls under AEZ 4 and 5 characterized by erratic bimodal type of rainfall pattern.

According to the 2009 census, the district had the following demographics: total human population 376,546 categorized as: males-189,525 and females-187,023; there are 7800 farms and 7500 farm families. Some of the farms are owned by institutions such as schools and churches. Major occupation of the farming households is mixed farming with livestock being the major economic farming activity whereby poultry takes the lead. Poultry production is the major livestock enterprise kept by farmers of which broiler production is the leading though scale of production remains too low compared to world standards. This is due to unpredictable marketing system among other factors along the supply chain. The other livestock enterprises include Dairy, pigs, dairy goats, rabbits and beekeeping. Other farming activities include

horticultural crops, food crops, fruits and vegetables whereby green house farming system is being adopted.

3.2 Data sources

Apart from the authors own experience in the livestock extension sector, research issues were developed through conversations with people in the academic and community arena. Collection of data, site visits, interviews, surveys, volunteered geographic information, focused group discussions were also undertaken through questionnaires among other research instruments.

Methods of research used included library research where several books, magazines, various websites and field research were undertaken to get required information. Field research was conducted through use of questionnaire and in-depth interviews to elicit responses from respondents. The questionnaire was tailored to meet the specific objectives of the study.

Field research involved sampling with 69 questionnaires administered to the broiler farmers in 4 locations of Njiru District. In addition, market outlets such as fast food cafes, restaurants were interviewed on how they participate in broiler supply chain. Other stakeholders who were visited included: KACE and MOLD, marketing division.

3.3 Sampling Design

The staff in the three divisions provided list of broiler farmers which formed baseline data for the sampling frame. However, Dandora division was omitted due to its urban

status. The total number of poultry farmers in the district stood at 150 farmers, with about 50% (69 farmers) involved in broiler farming. The whole population of 69 broiler farmers was selected from the district as this number was small enough to be wholly sampled, as follows: Ngundu location (16 farmers); Ruai location (20 farmers); Njiru location (15 farmers) and Mihango location (18 farmers).

The research project was executed through conducting household surveys to broiler keeping farmers in Njiru District in Nairobi County. Random sampling was used whereby broiler producers in each of the three divisions formed sampling frame. Semi structured questionnaires were used which were administered with the help of enumerators in collecting required data. Broiler supply chain was also mapped whereby key players were identified. Marketing agencies such as KACE and other marketing channels were interviewed to establish roles and information needs.

3.4 Data analysis and presentation

The data was collected and entered into MS Excel spreadsheets for ease of entry and management. SPSS version 17 was used to run the analysis of the data, to produce the necessary percentages and frequencies with respect to the responses. Cross-tabulations were also done where possible to enable the analysis of relationships between the responses and respondents, with Pearson's chi-square test used to test the relationships (if any) between the variables and whether they were significant.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

The overall objective of the study was to develop an understanding of the components of a successful broiler food system and assess whether use of ICT tools could increase production and market by broiler farmers. The results sought to address specific objectives which were guided by research questions as follows;

4.1 Identifying the broiler farmers and the broiler production information channels

This task was guided by the question “What are the characteristics of broiler farmers? What channels do they use to access information?” The respondents (the broiler farmers), their basic characteristics and information channels used along the broiler supply chain were important in the research study and the outcomes were as shown below.

4.1.1 Household characteristics

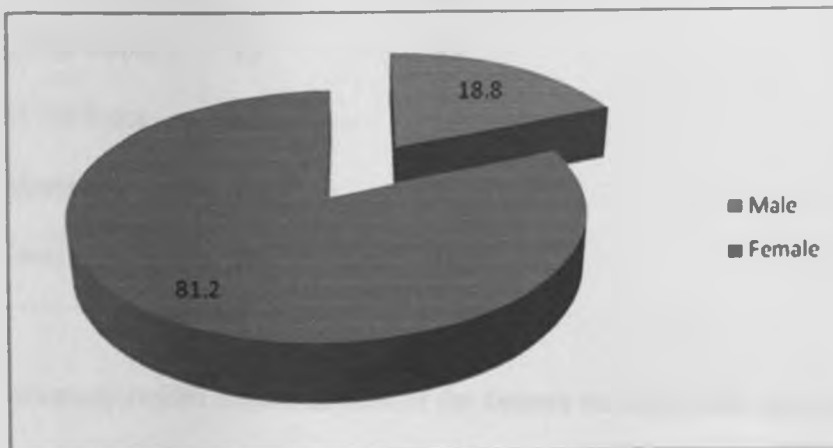


Figure 4.1: Category of farmers by gender

The farmers sampled comprised of 81.2%female and 18.8% males. This implies that most of the broiler farmers are females. Gender analysis in household involvement helps to understand who does what and hence guide in developing interventions which are gender friendly. In this research study, interventions to target broiler farming should be friendly to use by the female farmers since they are the majority.

4.1.2 Age of the farmers

According to Taragola et al (2005), use of ICTs in agriculture has been influenced by various factors such as: Complexity of farm operations, degree of external support, age of the farmers, time, and availability of information, personality and approach to learning. All these have led to diminished or enhanced farmers' computer use.

Table 4.1: Broiler farmers' age groups

Age Group	No. of farmers	Percentage
20-30 Years	4	6
31-40 Years	28	41
41-50 Years	23	33
51-60 Years	10	15
Above 61 Years	4	6
Total	69	100

The study results show that most of the farmers rearing broiler birds in the peri-urban set up fall under 31-50 years, with those in the 31-40 bracket being 41%, and 41-50 being 33%. It was noted that very few farmers are within 20-30 years age group (6%), same as those above 61 years. Broiler farming seems to be practiced by relatively

young farmers mostly below 50years of age. These groups of persons fall under the working class and hence need to be sensitive in designing interventions and how to deliver the same. Most extension messages are passed on to farmers through individual farm visits, demonstrations, barazas and field days which are face to-face approaches.

Table 4.2: Category of broiler farmers by marital status

	No. of farmers	Percent
Married	61	91.0
Single	4	6.0
Widowed	2	3.0
Total	67	100.0

Farmers who responded to this question were 67 (sixty seven), of which 91% were married, 6% single and 3% widowed. This showed that most farmers have stable households and hence conducive environment for farming.

4.1.3 Education background

The results of the study show that 64% of the respondents had attained secondary level of education, while only 3 % had university education. This shows moderate literacy level which makes mode of communication easier especially with information service providers. According to Leah et al (2003), education has significant contribution in development whereby it contributes to process efficiencies which in turn lead to sustainable development. The literacy level shows that majority can be able to read basic skills in broiler farming and extension approach can incorporate

written messages which the farmer can use to refer. It also mean that farmers can be trained on basic ICT skills such as computer application to enhance information access through the available ICT tools which include mobile telephone, computers, internet among others. A good number of respondents (19%) have attained tertiary level of education which implies that their ICT skills can be improved, hence advancement in information access. They can also be targeted as trainers to other farmers within the local area set up. The research study results are graphically shown in table 4.3 below.

Table 4.3: Farmers' education background

Education Level	No. of farmers	Percent
Primary	9	14
Secondary	44	64
Tertiary	13	19
University	2	3
Total	68	100

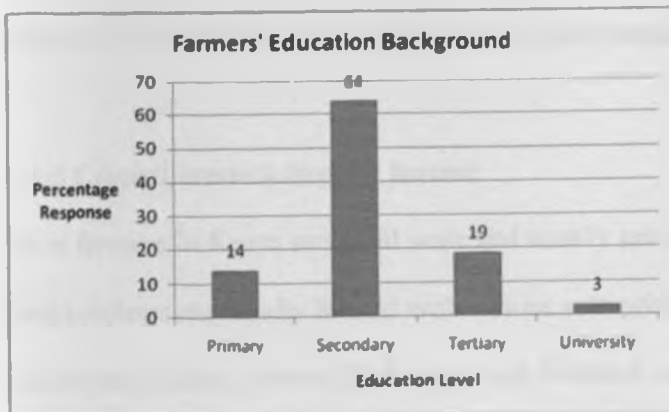


Figure 4.2: Graph of percentage education level reached by farmers

4.1.4 Broiler farmers' other occupations

Farmers in peri-urban set up usually have off-farm activities and only engage in agricultural activities as part time activity. The study reveals that half (50.7%) of the sampled respondents were engaged in off –farm activity such as business, while 11.6% were employed. 36% were in farming full time though some thought that they do nothing hence said, none. The results show that broiler farming is undertaken to supplement income from other sources and hence contribute to income generation and hence poverty reduction.

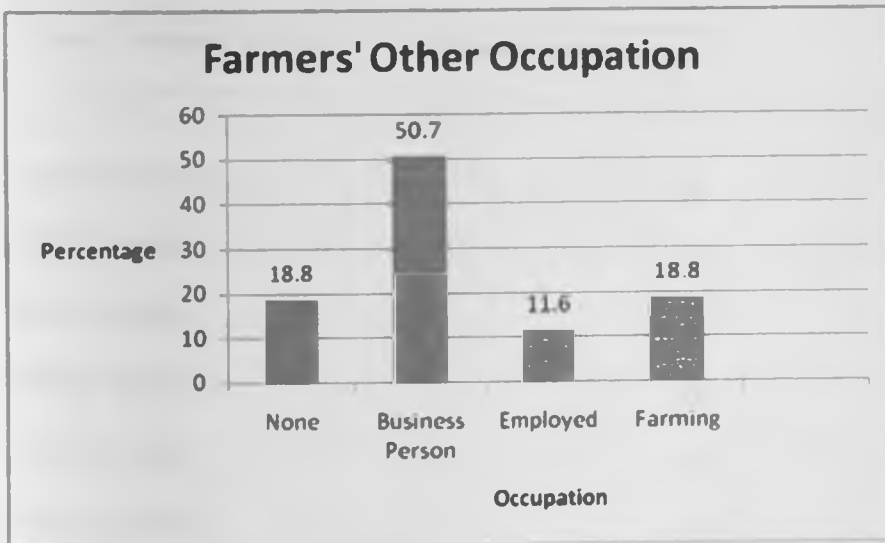


Figure 4.3: Graph of percentage farmers' other occupations

4.1.5 Crops/Livestock kept by farmer

Most farmers in Kenya are small scale and usually practice mixed farming. The small land holdings are usually littered with various enterprises and the same happens in the peri-urban farming system. Both crops and livestock are kept by the same farmer as shown by the research results in table 5.1.3 and figure 5.1.2 graphically. According to the respondents, major enterprise kept by the farmers was poultry (62%), while the

least was donkey (1%), major crops farming practiced by farmers include vegetable farming(12%). Other livestock species kept alongside poultry are: Rabbits (11%), sheep and goats (13%), dairy farming (7%) and fish (2%) which shows that farmers practice mixed farming system to maximize on farm output within the available small space. The farming system also addresses household food security and therefore mixer of farm enterprises. Small livestock such as poultry and rabbits require small space, hence preferred by most farmers. Farmers also have more than one enterprise.

Table 4.4: Crops/ Livestock kept by farmers

Crops /Livestock activity	No. of responses
Vegetable Farming	12
Maize Farming	5
Beans Farming	4
Poultry Farming	62
Rabbit Rearing	11
Donkey Rearing	1
Fish Farming	2
Dairy Farming	7
Sheep/Goat Rearing	13

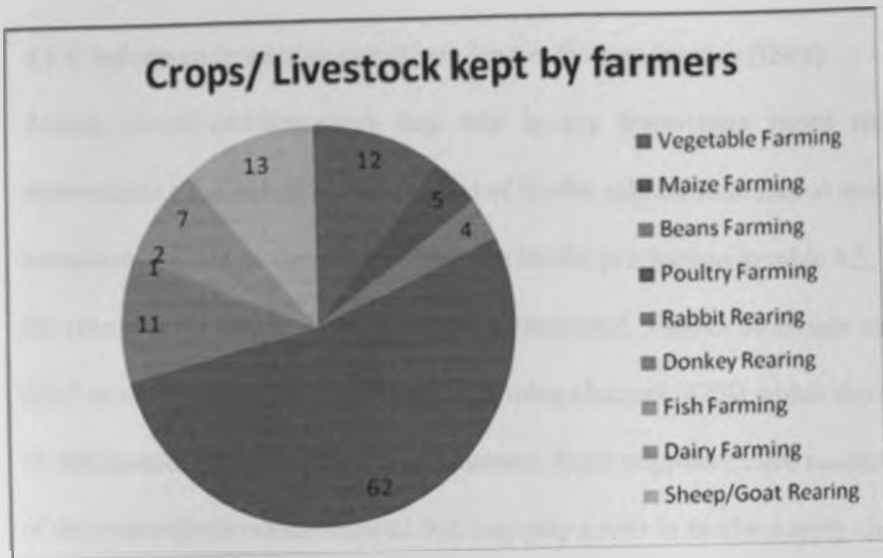


Figure 4.4: Chart of crops/ livestock kept by the farmers

From the figure 4.5 below, it can be seen that 73.5% of the respondents reported that they keep livestock alone while 26.5% keep both crops and livestock. Livestock keeping seem to be preferred by most broiler farmers in the peri-urban farming system due to possibility of maximizing available small spaces.

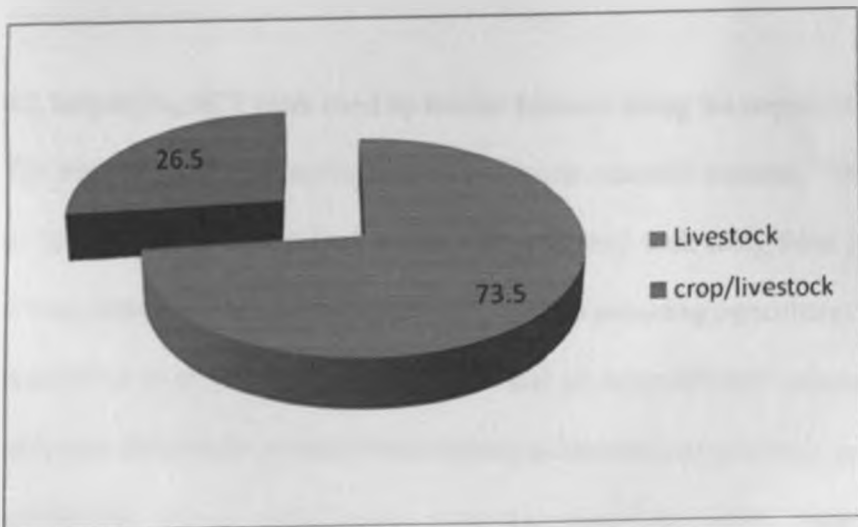


Figure 4.5: Crops/livestock farming by households

4.1.6 Information service providers for broiler production (ISPs)

Access to information plays key role in any knowledge based economy. The respondents were asked to state source of broiler related information and they ranked extension officers as the primary ISPs for broiler production in table 4.5, with 48% of the respondents listing them as the most important. Farmer to farmer extension was cited as an important source of broiler farming channel (42%) which shows high level of information sharing amongst the farmers. Input suppliers were mentioned by 10% of the respondents which showed that they play a role in broiler supply chain.

Table 4.5: Information service providers in broiler production

Service Provider	Percent	No. of farmers
Extension staff	48	32
Other farmers	42	28
Input suppliers	10	7
Total	100	67

4.2 Identifying ICT tools used by broiler farmers along the supply chain

The second specific objective was guided by the research question, “What ICT tools do broiler farmers use and what information do they seek using these tools?” ICT is driving economic development in various sectors including agriculture. According to Jayathilake et al (2004), use of ICTs can lead to more efficient communication and increased demand for products and services and hence spur economic growth even in agricultural sector. Information promotes competition and improves market performance and may also increase the level of trust on consumers in a product or firm leading to increased demand.

Broiler farmers use various communication methods to access services to support the system. The research sought to explore type of ICTs tools being used by broiler farmers to facilitate communication and access to information. These methods were analyzed through this study which generated the following results.

4.2.1 Computer literacy

Table 4.6: Farmers' rating of computer skills

Computer Skills	Percent	No. of farmers
None	32	22
Fair	36	25
Good	23	16
Very good	9	6
Total	100	69

Almost 32% of the respondents have no computer skills while 36 % rated their skills as fair, 23% as good and 9% as very good. Though literacy level of the farmers is quite good, the same has not been translated to computer literacy. The results show that some farmers have low skills on how to use computer, which is a major ICT tool in accessing information from the global information pathway. However, a good percentage (68%) has computer skills which can be improved on.

4.2.2 Communication tools used by respondents: Sourcing inputs for broiler production

The results of the study shows that mobile telephone as a communication tool was being highly utilized (87%) to source for the broiler inputs, either through calls or

SMS, showing high usage of the telephone for agricultural purposes. Other communication methods used by broiler farmers in Njiru District are: own transport (6%), public transport (5%), and walking (2%). Adoption of mobile telephone by most people has enhanced communication including broiler farmers.

The results confirm findings by Sahdev Singh(2006) which led to a common learning that ICT enabled initiatives for agricultural development has been that farmers' information needs being satisfied through use of ICT are for market related information including price trends, accessing input and support services. Others include solving individual and community agricultural problems, especially diagnosis of disease and pest problems and getting solutions to them.

Table 4.7: Communication tools used to source for inputs

Communication Tool	Percent	No. of farmers
Phone call/SMS	87	60
Walking	2	1
Own Transport	6	4
Public Transport	5	4
Total	100	69

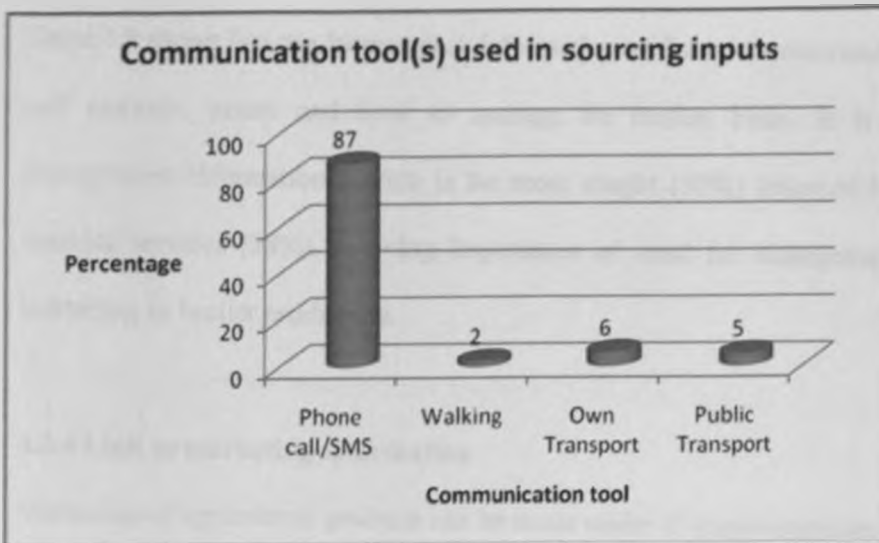


Figure 4.6: Graph of percent usage of communication tools to source for inputs

4.2.3 Information Sourced

Table 4.8: Information sought by farmers using the above tools

	Percent	No. of times info was sourced
Feeds	3	4
Diseases and Drugs	8	11
Inputs and Markets	38	54
Prices	1	1
Management information	50	71
Total	100	141

According to research by Unang (2005), broiler survival rate is dependent on capital and technical knowledge. Farmers who had access to technical knowledge experienced higher survival rates than those without. This was supported by the research results which indicated that management information was one of the services sought by the broiler farmers among others.

Table 4.8 shows that the farmers seek information on feeds, diseases and drugs, inputs and markets, prices and how to manage the broiler birds. It is evident that management information service is the most sought (50%) followed by inputs and markets services (38%), showing importance of need for management skills and marketing in broiler production.

4.2.4 Link to marketing information

Marketing of agricultural produce can be made easier if stakeholders are in groups to increase bargaining power and thereby reduce transaction cost. The research sought to find out if broiler farmers have access to marketing organization and if so what benefit they get from such group. The results of the responses are tabulated in table 4.9.

Table 4.9: Linkage to market information system

Link to mktng.		
Info. service	No. of linked farmers	Percentage linked
Yes	1	1.7
No	58	98.3
Total	59	100.0

On whether the farmers were linked to any agricultural marketing information network, 58 of the 59 farmers who responded, that is 98%, said no which indicated that most broiler farmers are not linked to any marketing service (specifically Kenya Agricultural Commodity Exchange- KACE), a marketing organization which was established in 1997 to aid farmers in accessing market outlets for their produce.

However, the information is available in the mobile phone and internet but farmers are not aware, neither do they know of its value. It is a paid up service and does not give much information. The results indicate that broiler farmers in Nairobi have no access to marketing agency and basically struggle to get own market outlet.

4.2.5 Associations between the responses and the respondents characteristics

Relationship between respondent's gender and computer skills (Knowledge of ICTs)

The Pearson's chi-square test for the relationship between gender and the respondent's computer skills was not significant (p-value 0.843) which shows that the relationship between the two is not significant.

4.2.6 Relationship between respondent's age and computer skills (Knowledge of ICTs)

Table 4.10: Cross-tabulation of farmers' age and rating of computer skills

How do You Rate Your Computer Skills?					
Age of Farmer	None	Fair	Good	Very Good	Total
20-30 Years	0	1	2	1	4
31-40 Years	13	9	4	2	28
41-50 Years	4	10	7	2	23
51-60 Years	3	4	2	1	10
Above 61 Years	2	1	1	0	4
Total	22	25	16	6	69

The table above shows that a large proportion of the respondents lies between 31-50 years age bracket (51 out of 69), and more than half of them (47 out of 69) rate their computer skills between non-existent and fair. These results show that there's a great need for training to equip these farmers with more knowledge and skills in the use of ICTs. The Pearson's chi-square test for this relationship gave a p-value of 0.591, showing that although the two variables are related, the relationship is not statistically significant.

Table 4.11: Cross-tabulation of farmers' education and rating of computer skills

Education Background	How do You Rate Your Computer Skills?				Total
	None	Fair	Good	Very Good	
Primary	7	1	1	0	9
Secondary	12	18	11	3	44
Tertiary Institution	3	5	4	1	13
University	0	1	0	1	2
Total	22	25	16	5	68

Table 4.11 above shows that a majority of the farmers managed to attain secondary level of education (44 out of 69), and a majority of these farmers (25%) indicated that their knowledge of ICTs (computer skills) was good. The Pearson's chi-square test for this relationship gave a p-value of 0.066, very close to the threshold of significance (0.05), showing that of all the relationships tested, this was the most important. It was also noteworthy that all the respondents rating their computer skills as Very Good had higher than primary level of education.

4.3 Suggested policies to enhance use of ICTs along the broiler supply chain

This third specific objective was guided by research question, “What are the policy implications in broiler marketing system?” The respondents were asked to suggest public and private sector role in facilitating use of ICTs in enhancing broiler supply chain. They stated their opinions which were grouped into various categories as follows: Training farmers on the use of ICTs; Subsidizing the communication rates; Opening up service centers; Improving ICT infrastructure; Increased marketing of products online; Develop more user friendly ICTs.

Table 4.12: Suggested ways of promoting use of ICTs for broiler production

Suggestions	No. of farmers	Percent
Training farmers on the use of ICTs	20	32.3
Subsidizing the communication rates	18	29
Opening up service centers	4	6.5
Improving ICT infrastructure	11	17.7
Increased marketing of products online	5	8.1
Develop more user friendly ICT tools	4	6.5
Total	62	100

When respondents were asked to suggest ways of promoting use of ICTs for broiler production, major responses from 62 out of 69 broiler farmers were: training farmers on use of ICTs (32.3%), subsidizing the communication rates (29.0%), improving ICT infrastructure (18%). The results show that farmers lack skills on how to use the tools which limit ability to effectively use them.

Table 4.13: Suggested public sector intervention to promote use of ICTs in broiler production

Suggestions	No. of farmers	Percent
Training farmers on the use of ICTs	26	44
Subsidizing the communication rates	11	18
Opening up service centers	11	18
Improving ICT infrastructure	10	17
Increased marketing of products online	2	3
Total	60	100

On whether the government could facilitate use of ICTs, the respondents suggestions in table(4.11)were: training farmers on the use of ICTs(44%);subsidizing the communication rates(11%);opening up service centers(11%);improving ICT infrastructure(10%);increased marketing of products online(2%). The results show that the respondents require skills on ICTs and maybe opening up service centers in the local areas would facilitate their training.

Table 4.14: Suggested private sector intervention to promote use of ICTs in broiler production

Suggestions	No. of farmers	Percent
Training farmers on the use of ICTs	1	1.7
Subsidizing the communication rates	26	43.3
Opening up service centers	16	26.7
Improving ICT infrastructure	9	15.0

Suggestions	No. of farmers	Percent
Increased marketing of products online	1	1.7
Develop more user friendly ICT tools	7	11.7
Total	60	100.0

The respondents were also required to provide information on rating the major players and their order of importance in the broiler supply chain. This led to the identification of middlemen as the most important players (78%) while the restaurants ranked second (15%).

Table 4.15: Key players in the broiler supply chain

Key player	No. of farmers responding	Percent
Restaurants	10	15
Individuals	3	4
Middlemen	53	78
Other farmers	1	2
Family Members	1	2
Total	68	100

The farmers were asked to rank the constraints which affect use of ICTs for broiler marketing from one to three with poor communication and high cost of services emerging as the major constraints in using ICT tools for broiler marketing. The respondents also indicated that there is very little information available through the ICTs being used by broiler farmers which limit utilization of the same tools.

Table 4.16: Key constraints in the use of ICT tools for broiler marketing

Constraint	No. of farmers responding	Percent
Poor communication	34	54.8
High cost of services	8	12.9
Availability of market	6	9.7
Poor marketing strategies	5	8.1
Low skill levels	5	8.1
Unscrupulous brokers	3	4.8
Total	62	100

The final bit of information sought from the respondents related to the mentioning of challenges faced in broiler production and marketing. In order of priority, challenges faced by farmers in broiler supply chain mainly relate to marketing issues such as accessibility, pricing and delayed payments (Figure 4.7)

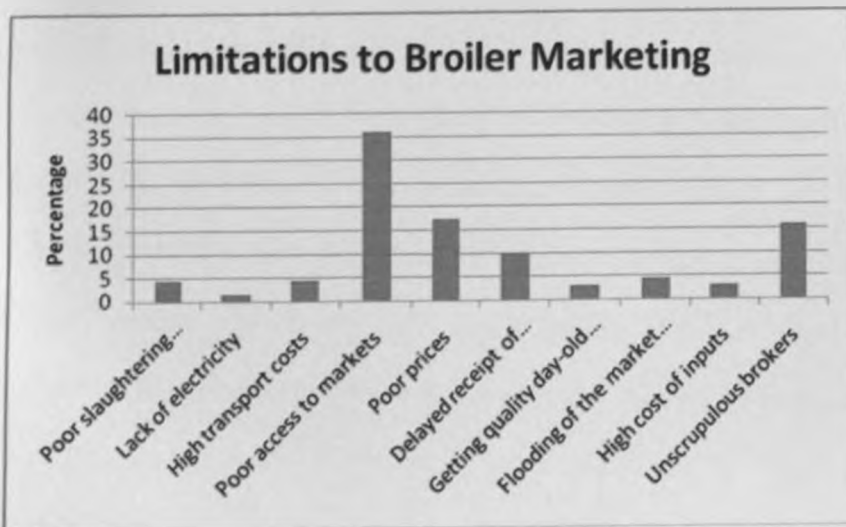


Figure 4.7: Limitations to broiler marketing

When asked to list and rank the limitations to the broiler marketing industry, out of the total who responded, about 36% mentioned poor access to markets as the number one main challenge. Poor pricing of broiler farming products was ranked as the second major challenge out of the list of possible challenges by 17% of the respondents. Unscrupulous brokers ranked as the third main challenge to broiler marketing.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

In trying to identify the major players and their order of importance in the broiler supply chain, this led to the identification of middlemen as the most important players (78%) while the restaurants ranked second (15%). The results of the study shows that mobile telephone as a communication tool was being highly utilized (87%) to source for the broiler inputs, either through calls or SMS, showing high usage of the telephone for agricultural purposes. Other communication methods used by broiler farmers in Njiru District are: own transport (6%).public transport (5%), and walking (2%).Adoption of mobile telephone by most people has enhanced communication in various sectors including broiler farming.

However, the results show that farmers lack skills on how to use the ICT tools which limit ability to effectively use them. On whether the farmers were linked to any agricultural marketing information network, 59 of the 69 interviewed (98%) said no which indicated that most broiler farmers are not aware of (KACE, marketing organization which was established in 1997 to aid farmers in accessing market outlet for their produce. The information available through the mobile phones is not known by farmers which would help them to assess broiler meat prices in the market.

In order of priority, challenges faced by farmers in broiler supply chain mainly relate to marketing issues such as accessibility, pricing and delayed payments (Figures 4.8

to 4.10). These affect knowledge of how to commercialize broiler farming and affect the flock sizes kept by farmers.

5.2 Recommendations

Broiler farmers require skills on how to access information from the mobile phones and other ICT tools available such as computers considering their low literacy levels. There is need to establish information centers accessible to farmers equipped with appropriate ICT tools where they can form networks to enhance information access and sharing. The centers would also act as meeting point for the service providers and other stakeholders including researchers.

The cost of communication need to be reduced to affordable rates in order to facilitate usability. KACE rates at seven shillings per SMS through 'get-it' are too high and need to be reviewed to facilitate access and utilization of the service by farmers and other stakeholders

The existing marketing information system in the Ministry of livestock Development (LINKS) need to be expanded to include other livestock such as poultry and especially broilers which are highly perishable.

There is need to establish a broiler sub sector database capturing all commercial producers and market outlet to enhance networking among the players in the broiler supply chain.

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APPENDICES

Appendix I: Questionnaire

Analysis of the Role of ICT in Broiler Marketing:

NJIRU DISTRICT-NAIROBI PROVINCE

This questionnaire is intended to collect data on the role of ICTs in broiler marketing in peri-urban environment. The information provided will be treated as confidential and will be used for academic purposes only. I therefore request for your assistance and kindly respond to all the questions as honestly as possible.

Questionnaire No.....name of enumerator.....

Date:.....

PART A: Farmer's socio-economic characteristics

1. Name of the farmer.....Gender.....Marital status.....
2. Name of the respondent (if different from above).....
3. Division.....
4. Location.....sub-location.....
5. Age of the farmer: a) >20years b) 20-30years c) 31-40years d)41-50years e)51-60years f) above 61years
6. Education background: a) none b) primary c) secondary d) tertiary institution d) university
7. Other occupation of the farmer.....
8. Time spent on farming per week.....
9. crops/livestock kept:-----

Part B: broiler farming system:

10. Please fill the spaces

- a) When did you start keeping broilers?
- b) How many birds do you keep per batch?.....
- C) How many batches do you keep per year?.....
- d) Can you keep more birds? Yes/no
- e) If yes, how many? Please give reasons for your answer

11. Please state the inputs you use for the broiler enterprise, source and cost per unit

Input	Major Source	Quantity	Unit cost	Total cost
Day old chicks				
Feeds				
Labour				
Drugs				
other(specify)				

12. How do you source inputs for broiler production? (a)phone calls/sms (b)walk
(c)own transport (d)public transport (e)other.....

13. Based on 12 above, how much does it cost you to source for the inputs? Estimate
in Kenya shillings.....

14. At what age do you sell the broiler birds in weeks?.....

15. Who are the information service providers for broiler production (tick the appropriate a) Extension staff b) other farmers c)input suppliers d)others (specify).....

16. i) do you keep records for the broiler enterprise? a) yes b)no

ii) If yes, which broiler records do you keep?: a) feeding b)health c)marketing d)others(specify).....

Part C: Marketing Information

17. Where do you sell the broilers? a) Restaurants b)individuals c)fastfoods d)others(specify).....

18. In what form do you sell broilers: a) slaughtered and frozen b) slaughtered and fresh c) live birds d)other(specify).....

19. a) Please state the means you use to access market for the broilers and approximate cost in Kenya shillings

Market access means	Cost/day	Total cost
Phone:call/sms		
Email		
physical visit		
other(specify)		

b) What other means of information access and communication tools do you use? i) computer ii) radio iii) television iv) other.....

c). what other communication tools do you use? i) computer ii) radio iii) television iv)

other.....

20. What other broiler related services do you seek using the above communication tools?

Communication tool	Services sought
Phone(sms/calls)	
computer	
Email	
Radio	
television	
Other	

21. How do you rate yourself on the following?

your computer skills	1. None 2./fair 3.good 4.very good 5. No answer
access to internet	1. Accessible 2. Not accessible 3. No answer

22) Who are the key players in broiler marketing? State their importance

i).....

ii).....

iii).....

23)i. Are you linked to any agricultural marketing service provider? Yes/no

ii)if yes, what services they offer in broiler marketing (list them)

a).....

b).....

c).....

iii).how do you rate their services: a) easily accessible b) not accessible c) not aware

24. What are the challenges you face in broiler marketing? List them in order of importance.

1.....2.....3.....4.....5...
.....

Part D: interventions (policy and practice)

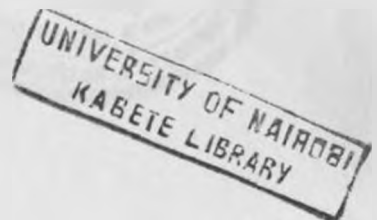
25. What are the constraints in use of ICTs in broiler marketing? Suggest three most important.

a).....b).....c).....

26) Suggest ways of promoting use of ICTs for broiler production

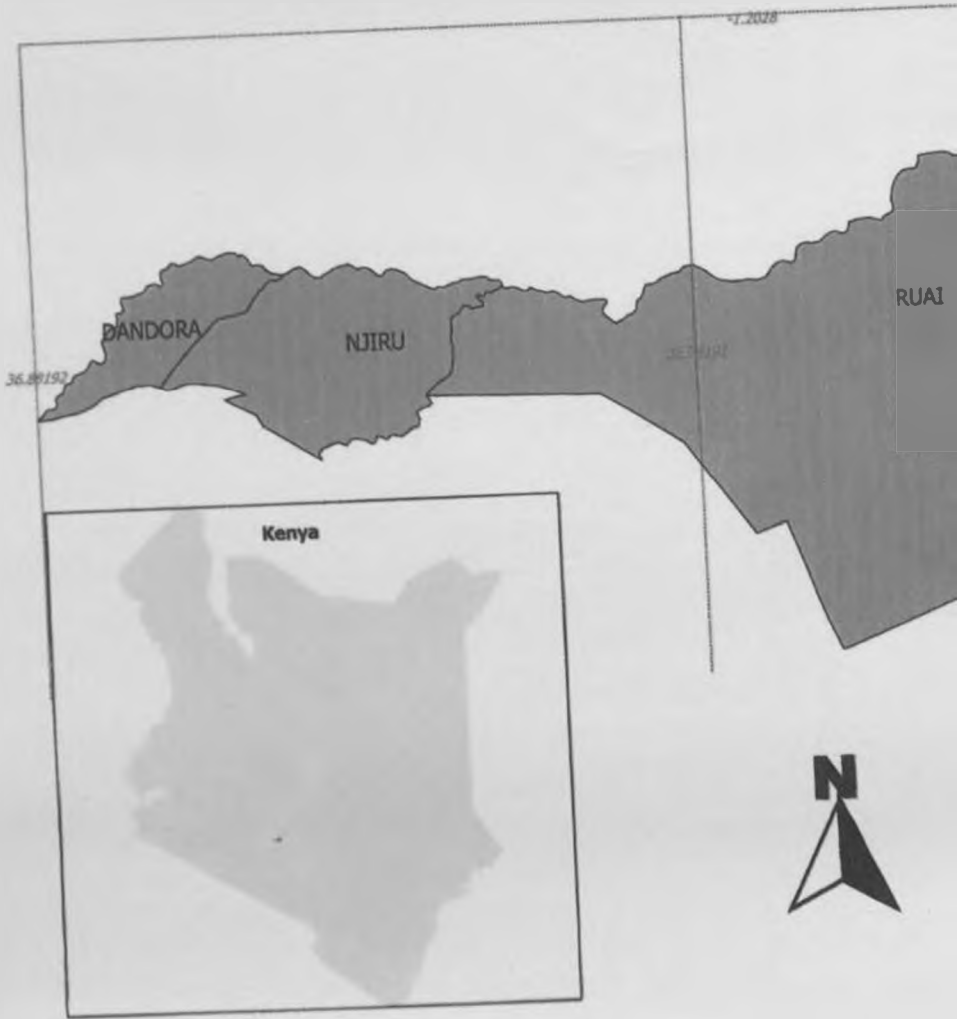
27) Suggest public sector intervention in promoting use of ICTs for broiler production

28. Suggest private sector (service providers) intervention in promoting use if ICTs for broiler production



Njiru District

Appendix II: Map of Njiru District





Legend

Coordinate grid

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Locations

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