

**Investigating Knowledge Transfer for Entrepreneurship in Kenya's
Agricultural Sector**

William W. Ngugi

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William W. Ngugi

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Approval:

The thesis of **William W. Ngugi** was reviewed and approved (for examination) by the following:

Name of Supervisor: Dr X. N. Iraki

Faculty Affiliation

Institution

Head of School / Institute / Faculty.....

School Name

Dean, School of Graduate Studies

ABSTRACT

Agriculture remains the backbone of Kenya's economy. About 80% of the population depends directly or indirectly on agriculture for both food and employment. Despite this, the small scale farmers have largely remained stagnant in productivity and tended to focus on subsistence farming. This study investigated the knowledge transfer predictors for entrepreneurship in Kenya's Agricultural Sector. The objectives were, to first determine the knowledge and skills gap in the agricultural sector in Kenya, to determine the relationship between these knowledge gaps and successful knowledge transfer (productivity) in the agricultural sector in Kenya and to find out the moderating effect of hindrances on the relationship between knowledge gaps and successful knowledge transfer in the agricultural sector in Kenya. The knowledge predictors identified have shown that with an effective knowledge transfer from various existing agricultural and research institutions as well as learning institutions, it is possible for the farmers to not only increase their production, but it is also possible to turn their farming activities into commercial enterprises, small, medium and large farming enterprises. The initial stage of the study used exploratory design followed by descriptive design. Data was collected through self-administered questionnaires. The questionnaires were structured to minimize variability. The sample set was clustered and convenience sampling applied resulting in a sample size of 60 respondents (30 small-scale farmers and 30 large scale farmers from Laikipia, Kiambu and Nakuru counties, purposively sampled). The data was analyzed using descriptive statistics and inferential statistics in particular regression analysis. The study established that a relationship exist between knowledge gaps and knowledge transfer. Five predictors of knowledge transfer were identified. The most significant predictors of knowledge transfer according to their impact factor were: skills transfer from the large scale farmers to small scale farmers, access to research centers (KARI) and extension service providers like Syngeta EA, Osho chemicals, Amiran, Bayer EA, Twiga Chemicals, Kenya Seeds Company and others, access to information on agriculture relayed via TV and radio, education of the farmers and the courses pursued at college level. The study concludes that effective knowledge transfer is tenable through such mediums like the government agricultural officers, mass media and agricultural learning institutions which will turn the farming activities of small-scale farmers to commercial enterprises. Since implementing the predictors of knowledge transfer would entail a financial cost, a key

recommendation to other academicians is to determine the return on investment in knowledge transfer, by putting into practice the theoretical aspects identified.

Key words: Strategy, Small-Scale farmers, Large-Scale farmers, Knowledge Transfer

Table of Contents

Declaration	iii
ABSTRACT.....	iv
List of Tables	viii
List of Figures	ix
Acknowledgement	x
CHAPTER ONE: INTRODUCTION	1
1.1 Background	1
1.2 Problem Statement.....	3
1.3 Research Objectives.....	5
1.4 Research Questions.....	5
1.5 Importance and Significance of The Study.....	5
1.6 Limitation of the study.....	7
1.7 Summary.....	7
CHAPTER TWO: LITERATURE REVIEW	8
2.1 Introduction.....	8
2.2 Literature Review on knowledge transfer.....	8
2.2.0 The WHAT, HOW, WHO and WHY in knowledge transfer in agriculture.....	8
2.2.1 Strategy in Knowledge Transfer	10
2.2.2 Knowledge Transfer in Agriculture Between Developed And Developing Countries..	12
2.2.4 Case Studies of Knowledge Transfer in Agriculture in Similar Countries	13
2.2.5 Agriculture in Kenya with a bias to the Vision 2030 and GDP	14
2.3 Empirical Review.....	17
2.4 Research Gap	18
2.5 Conceptual Framework.....	20
2.6 Research Hypothesis.....	21
2.7 Summary.....	21
CHAPTER THREE: RESEARCH METHODOLOGY	22
3.1 Introduction.....	22
3.2 Research Design.....	22
3.3 Target Population.....	23
3.4 Sample and Sampling Method	23
3.5 Data Collection	24
3.6 Validity	25

3.7	Reliability.....	25
3.8	Data Analysis.....	25
3.9	Summary.....	26
CHAPTER FOUR: RESULTS AND FINDINGS.....		27
4.1	Introduction.....	27
4.2	Response Rate.....	27
4.3	Sample Profile.....	27
4.3.1	Knowledge and skills gap.....	36
4.3.3	Have read or heard of Vision 2030.....	39
4.4	Testing the Research Hypotheses.....	43
4.4.1	Relationship between Knowledge Gaps and Knowledge Transfer.....	43
4.4.2	Relationship between Hindrances and Knowledge Transfer.....	45
4.4.3	The Moderating Effect of Hindrances on the Relationship Between Knowledge Gaps and Knowledge Transfer.....	47
4.4.4	Evaluating the Model.....	48
4.5	Summary.....	50
CHAPTER FIVE: DISCUSSION.....		51
5.1	Introduction.....	51
5.2	Discussion on Respondent Profile.....	51
5.3	Discussion on Knowledge Gaps and Knowledge Transfer.....	52
5.4	Discussion the Moderating Effect of Hindrance (Integrated model).....	55
5.5	Chapter Summary.....	57
CHAPTER SIX: CONCLUSION AND RECOMMENDATION.....		58
6.1:	Conclusion.....	58
6.2:	Recommendation.....	59
References.....		61
APPENDIX I: Tables.....		68
APPENDIX II: Timeline of Activities.....		71
APPENDIX III: Letter of Introduction.....		72
APPENDIX IV: Questionnaire.....		73
APPENDIX V: Photo Album.....		81

List of Tables

Table 4.3: What Did you Study in College.....	32
Table 4.4: What skills or Knowledge Can SSFs Borrow From LSFs	34
Table 4.5: Do you listen to radio / TV programs in agriculture	35
Table 4.6: Crosstabulation - Do you listen to radio / TV programs in agriculture	35
Table 4.7: Chi-Square Tests.....	36
Table 4.8: What risks have you experienced	36
Table 4.9: What is the most important unmet need in your farming activities.....	37
Table 4.10: ANOVA	43
Table 4.11: Coefficients of Model 4	44
Table 4.12: Model Summary	45
Table 4.13: ANOVA of Model 1, 2 & 3	45
Table 4.14: Model Summary of Hindrances	46
Table 4.15: Coefficients.....	46
Table 4.16: ANOVA results of the Moderation Effect.....	47
Table 4.17: Coefficients of the Moderation Effect	48
Table 4.18: Coefficients of the Moderation Effect	49

APPENDIX I - TABLES

Table 2.1: Gross Domestic Product by Activity (Per cent contributions to GDP)	68
Table 2.2: Domestic Exports by Broad Economic Category, 2004 -2008.....	68
Table 2.3: Wage Employment by Industry and Sector, 2004-2008.....	69
Table 2.4: Recorded Marketed Production at Current Prices, 2004-2008 (Ksh Million).....	69
Table 2.5: Sale to Marketing Boards from Large and Small Farms, 2004-2008.....	70

List of Figures

Figure 2.1: Knowledge Transfer Model (Miesing, Kriger & Slough (2006), pg. 116.....	17
Figure 2.2: Conceptual model.....	20
Figure 4.1: Respondents in the respective county	28
Figure 4.2: Gender of the respondents	29
Figure 4.3: Head of the Household	30
Figure 4.4: Age of the Respondents.....	30
Figure 4.5: Primary Activity of the Household head.....	31
Figure 4.6: The Household Head's farming experience.....	31
Figure 4.7: Level of education of the Household head.....	32
Figure 4.8: The farm owners.....	33
Figure 4.9: Number in working at least once a week	33
Figure 4.11: The hindrances in knowledge transfer.....	37
Figure 4.12: What Farmers can do to reduce food shortage or crop failure	38
Figure 4.13: Catalysts of Knowledge transfer	39
Figure 4.14: Have read or heard of Vision 2030	40
Figure 4.15: Effective knowledge transfer & Productivity.....	40
Figure 4.16: Gap in knowledge following knowledge transfer	41
Figure 4.17: Skills for farmers	41
Figure 4.18: Knowledge transfer through reading.....	42

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CHAPTER ONE: INTRODUCTION

1.1 Background

Johnson and Scholes (2006) defined strategy as the direction and scope over the long-term, which achieves advantage through the configuration of resources within a challenging environment, to meet the needs of markets and to fulfill stakeholder expectations. Strategy, they cited, was a careful plan or method, a clever stratagem or the art of devising or employing plans or stratagems toward a goal.

Agriculture in Kenya remains exigent (Njaramba, 2011). Blood and Studdert (2007) defined large scale farming as the modern trend to enlarge farms to be a business enterprise rather than as a unit size suited to single family management, with the application of modern agricultural technologies to improve production while concurrently protecting and enhancing the land resources on which production depends. Dumanski et al., (2006) defined conservation agriculture as integrating natural processes into modern agricultural practices while ensuring minimal mechanical disturbance of the soil.

Large scale farmers (LSFs) in Kenya are at the top of the pyramid with only a small percentage of the population involved in large scale farming or conservation agriculture, as suggested by the CAADP Africa Forum (2009). At the bottom of the Pyramid are small scale farmers (SSFs) and the vulnerable population. Porter (1996) acknowledged that strategic positioning is about performing different activities from rivals or performing similar activities in different ways while competitive strategy is about being different. This study intends to examine a strategy for the small scale farmers to learn and benefit from the experience and knowledge of the large scale farmers.

Important weaknesses of small-scale farmers are lack of knowledge about modern markets, modern technology and proper use of modern inputs (Pannell, 1999). The author acknowledges that modern markets encompass use of approaches like value-chain financing and modern technology is the use of equipment for farm use, like spraying, irrigation, harvesting, storage and

transportation. LSFs on the other hand, use superior technology and there is need to transfer knowledge between large scale and small scale agriculture and bridge this gap (Lucas, 2006).

Malhotra (2002) defined knowledge transfer as a means of finding effective ways to let people talk and listen to one another and the successful knowledge transfer involves neither computers nor documents but rather interactions between people. Butler, Grice and Reed (2006), acknowledged that farmers combine training with their tacit knowledge and through discussions with their family, and in some cases with professional contacts, acquire new knowledge initiates leading to various degrees of change within businesses. The authors proceeded to state that the familial, social and emotion attributes of business relations may determine the extent that knowledge is transferred into practice.

The FAO & World Bank (2000) defined an agricultural knowledge and information systems (AKIS) as a system that “links rural people and institutions to promote mutual learning and generate, share and utilize agriculture-related technology, knowledge and information”. The FAO & World Bank (2000) noted that the need to increase production, improve the poor linkages between agricultural actors, improve access to market information and agro processing and address the limited supply of agricultural information and knowledge for farmers highlighted the need to understand the AKISs of small-scale farmers.

The Economic Survey (2009) reported that agriculture remains the most important economic activity in Kenya, although less than 8% of the land is used for crop and feed production. Less than 20% of the land is suitable for cultivation, of which only 12% is classified as high potential (with adequate rainfall) agricultural land and about 8% is medium potential land. The rest of the land is arid or semiarid. About 80% of the work force engages in agriculture or food processing. Farming in Kenya is typically carried out by SSFs who usually cultivate no more than two hectares (about five acres) using limited technology. These small farms, operated by about three million farming families, account for 75% of total agricultural production. Although there are still important European-owned coffee, tea and sisal plantations, an increasing number of peasant farmers grow cash crops. The Encyclopedia of the Nations (2010) noted that agriculture is the backbone of Kenya’s economy. 80% of the population lives in rural areas and derive their

livelihoods from agriculture. They are in the bottom of the pyramid while at the top of the pyramid are LSFs. There is need to determine an appropriate model for knowledge transfer, in an attempt to make sure that the low-income SSFs grow to engage in large scale farming.

Learning and innovation by the small-scale farmers is essential for economic survival Nieuwenhuis (2002). Knowledge transfer is therefore important. The knowledge is transferred through; formal research and development, informal knowledge diffusion through journals, organizations, mobility and observation, learning by doing and by using problem-solving behavior and purchasing knowledge through machinery and tools. These are important for vertical growth of the country's agricultural GDP contribution. The next section examines the significance of agriculture in Kenya and this study will explore more on how learning and innovation are connected.

Ojiambo (1989) observed that the problem of inadequate information provision to the rural areas, where the bulk of our population lives is an issue which has been addressed but with little successes. According to the Economic Survey (2009) Agriculture contributes significantly to exports, employment and income. Despite the disproportionate concentration of poverty in rural areas, the provision of knowledge, adequate information and financial access to the poor and low-income people has tended to gravitate away from those engaged in conservation agriculture and the agriculture borrowers. There is thus a knowledge transfer gap.

Literature on knowledge transfer appears not only extensive, but also highly variegated. Bou-Llusar & Segarra-Cipre's (2006) concluded that the effect of strategic knowledge transfer varies depending upon the competitiveness of the sector. Kumar & Ganesh (2008) resolved to characterize the knowledge transfer to dimensions while Khamseh & Jolly (2008) determined the characteristics of knowledge; the factors related to absorptive capacity; the reciprocal behavior of the partners; and finally, the nature and form of alliance activity. Presented next is the problem statement of the research process.

1.2 Problem Statement

According to Kiplang'at (1999), there is lack of knowledge transfer between large scale and small scale farmers, defined as the sharing or disseminating of knowledge and providing inputs

for problem solving. The author continues to state the small scale farmers have largely remained stagnant in productivity and tended to focus on subsistence farming hence need to identify knowledge transfer predictors that can scale them up entrepreneurially. Kenya has since independence relied heavily on the agricultural sector as the mainstream for economic growth, employment creation and foreign exchange generation (Kiplang'at, 1999). According to the Current National Development Plan (2010) the agricultural sector employs about 82% of the labour force, accounts for 27% of the GDP and 64 % of export earnings. The sector is also a major source of the country's food security and a stimulant to the growth of off-farm employment, both of which are of primary concern to the Kenyan government. About 80% of Kenya population lives in the rural areas and depends on agriculture for their livelihood.

Dumanski, Peiretti, Benites, McGarry & Pieri (2006), examined the paradigm of conservation agriculture and large scale farming, EPZA (2005) examined the dairy farming sector in Kenya, Kenanoglu & Karahan (2002) examined policy implementation for agriculture and the Economic Survey (2009) of Kenya examined the contribution of agriculture in Kenya. In all these studies, there was limited focus on the strategy for knowledge transfer of commercialization of agricultural sector to the small scale farmers.

Poverty among the farming communities is still very eminent and heavy and there is not much training towards improving farming management as studies by FAO & World Bank (2000) reveal. This has led to frustrations and frequent protests and riots by small scale farmers. Early 2010, flower farmers in Naivasha rioted over poor pay and working conditions (Daily Nation, 2010). Despite their huge potential to contribute in poverty alleviation, majority of the small scale farmers (SSFs) sit at the bottom of the pyramid whilst the large scale farmers (LSFs) are at the top. There is need for knowledge transfer and interaction between LSFs like Del Monte in Kenya and SSFs like the Nanyuki vegetable farmers, for growth. The study sought to examine the knowledge gaps that exist among the farming community especially the SSFs and came up with insights for knowledge transfer to help the farmers undertake their activities as commercial enterprises.

1.3 Research Objectives

The general objective of the study was to formulate a model for knowledge transfer in Kenya's agricultural sector with the aim of commercializing the farming activities especially of small scale farmers. The specific objectives of the study were;

- i) To determine the knowledge and skills gap in the agricultural sector in Kenya
- ii) To determine the relationship between knowledge gaps and successful knowledge transfer (productivity) in the agricultural sector in Kenya
- iii) To find out the hindrances for knowledge gaps and successful knowledge transfer in the agricultural sector in Kenya.

1.4 Research Questions

From the research objectives above, the research questions formulated were;

- i) How vast is the knowledge and skills gap in Kenya's agricultural sector?
- ii) Is there a relationship between knowledge gaps and successful knowledge transfer (productivity) in the agricultural sector in Kenya?
- iii) What are the hindrances for knowledge gaps and successful knowledge transfer in the agricultural sector in Kenya?

1.5 Importance and Significance

From this study, small scale farmers, policy makers and indeed the entire population are set to benefit from the findings of my study. Kenya's economy is heavily dependent on agriculture. Generally 75% of Kenyans earn their living from farming either directly or indirectly. Kenya is among few African countries whose food production has kept pace with its population growth. Agriculture usually brings in over 6% of foreign exchange earnings and provides raw materials for Kenya's agro-industries, which account for about 70% of all its industrial production. The results and findings of the study are important to the Government, the stakeholders and parastatals. As a policy maker, the Government and the parastatals should be able to formulate policies and guidelines that will assist the small-scale farmers improve productivity and commercialize their farming activities. The objective of the study was to investigate and

formulate a model for knowledge transfer for entrepreneurship in Kenya's agricultural sector and thus the results and findings will be important to the Government.

Agriculture has proven to have a stronger impact on poverty reduction than do other sectors. This impact is of a direct and indirect nature. Agricultural growth impacts directly on poverty reduction by creating rural employment, raising rural incomes, increasing food production and food security. Indirectly and directly, agricultural growth contributes to a country's GDP, especially in countries with agricultural-based economies like Kenya. Increased GDP provides the resources for public investments in social sectors such as education and health and in social programmes such as social security, roads and other infrastructures. The results and findings will be important to the Government of Kenya – Ministry of Agriculture and Ministry of National Planning - as Kenya's Vision 2030 seeks to alleviate poverty.

The study will also provide insights into the small-scale and large scale farmers as regards the knowledge and skills gaps and their level of interactions. For effective knowledge transfer and remodeling especially of the small scale farms into agricultural enterprises, the results and findings of this study will be important. Effective knowledge transfer from various knowledge and skills centres to the farmers will lead to increased production by farmers', production levels will be higher than their consumption needs. Farmers will seek markets for their excess production and farming enterprises will kick-in. The study will be important to identify investment opportunities that exist in the agricultural sector, strategy for provision of low cost or affordable technologies and equipment for small-scale processing, opportunities for improvement in technology infrastructure such as packing, storage, and transportation, intensified irrigation and additional value added processing are marketable areas for investment and financial support to the sub-sector.

The study is important and relevant to the government as a source of information for planning purposes. To the general public that will want to venture into small-scale or large scale farming, the study will be imperative to them while to the scholars and academics, the results and findings are important to them for further research.

The study will also be important to other stakeholders like Kakuzi limited, Socfinnaf, Delmonte, Syngenta and those in flower farming in Naivasha, considered to be at the top of the pyramid and in large-scale farming. The results and findings from this study will be important to these stakeholders as it will provide insights on an intervention model for knowledge transfer throughout the agricultural pyramid.

1.6 Limitation of the study

The main limitation was that the respondents considered some of the information confidential and therefore the household heads did not want to fully disclose their information on the number of siblings and school going age. In order to get this information and assure the respondents of confidentiality, a rapport was created and approximations on scale numbers were used. There were also cultural issues in which the male was considered the head of the household, thereby being relied on for information and directions on farming activities especially among the small scale farmers. This was overcome by seeking permission from the male as the household head to talk to the female, the male felt recognized and easily asked the female to respond.

1.7 Summary

Chapter one presented the background, defined the key terms – strategy, large-scale farming, small scale farming and knowledge transfer and enterprise in agriculture. From the introduction and background, the research objectives and research questions were formulated, problem statement highlighted and significance of the study presented. In order to gain more understanding into the subject area, chapter two next examined relevant literature review.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Chapter two examined relevant literature review to the area of study as suggested by Bailey (1987) and Sarantakos (1993) who examined and analyzed the topic of social science, to provide insights. Chapter two examined the theoretical review, the empirical review and the conceptual framework was then formulated from the literature examined. The conceptual framework was formulated to gain more understanding in the subject area and pertained to the research area. Within these subject areas, a vast number of authors were cited and acknowledged. The literature review examined both the theoretical review and empirical review. It examined the strategy in knowledge transfer, knowledge transfer in agriculture between developed and developing countries, challenges in knowledge transfer in agriculture, case studies of knowledge transfer in agriculture in similar countries and agriculture in Kenya with a bias to the Vision 2030 and GDP.

2.2 Literature Review on knowledge transfer

2.2.0 The WHAT, HOW, WHO and WHY in knowledge transfer in agriculture

In order to fully answer the research questions formulated in chapter one, there was need to first examine, WHAT, knowledge is transferred in agriculture, HOW, the processes and channels of knowledge transfer (particularly in agriculture) work, WHO, are involved in knowledge transfer and WHY, the effects. Butler et. al (2006) acknowledges that there is a paucity of understanding regarding how knowledge gained through vocational training in agriculture is transferred to the farm business and effectively applied in practice. The literature on knowledge transfer within agriculture tends to be split into two divergent paths. The first examines the processes of cognition within the learning environment while the second focuses on the social environment in which an individual makes his or her decisions about education within a particular learning

process. The decisions that individuals make regarding their personal education is crucial to the levels of knowledge transfer in agricultural communities and the prosperity of their business.

Given the importance of training to the agricultural industry, it is necessary to understand how vocational training is transferred as a potential source of knowledge to others involved in their businesses or household; that is their personal business network. The extent of an individual's knowledge, described by Polanyi (1967), cited in (Butler et. al, 2006) as a combination of explicit and tacit knowing, and includes a shared dimension depicting knowledge within an organization rather than that kept by an individual. Considering shared explicit knowledge first, this is information in textbooks and manuals provided by an organization for people to learn from enabling Delimiting knowledge transfer individuals to acquire additional human capital. In terms of vocational training, improving the skills base of farmers and others involved in agricultural related businesses may be attained through formal learning situations that impart shared explicit knowledge. In agriculture, this tends to be dominated by technical and husbandry events rather than more managerial or entrepreneurial forms of training. Conversely, shared tacit knowledge remains relatively hidden and may only be accessible to an individual through sustained interaction.

The ability for farmers and other land-workers to participate in such training gives them the opportunity to develop their expertise and skills in technical and business related activities at a subsidized rate. Many of the training events are conducted on a 'learning-by-doing' or 'learning-by-interacting' which has a role in innovation particular if augmented to an individual's stock of tacit knowledge (Taylor & Plummer, 2003). There is evidence that farmers combine training with their tacit knowledge as the events that they participate in are frequently closely aligned to their business and farm management interests. Through discussions with their family, and in some cases with professional contacts this knowledge may initiate change either at a marginal level with adjustments to enterprises or through more radical restructuring of their business. However, familial, social and emotion attributes of business relations may determine the extent that knowledge is transferred in to practice.

In Kenya, The Government of Kenya, in recognition of the role of private sector in spear heading industrialization, has put in place a policy framework to foster the creation of a conducive environment for private sector participation in economic development. The agricultural sector has potential for spurring substantial growth in the economy. Exports from Kenya enjoy preferential access to world markets under a number of special access and duty reduction programmes. These include regional markets (EAC, COMESA), EU-African-Caribbean-Pacific/Lome Convention and the African Growth & Opportunity Act (AGOA). Kenya is also a member of most major international and regional intellectual property conventions – the World Intellectual Property Organization (WIPO), the African Regional Industrial Property Organization, the Paris Convention on the Protection of Industrial Property, and the Berne Convention on the Protection of Literary and Artistic Works. Located on the East African coast and having the port of Mombasa, Kenya is strategically located for investors wanting to access the East and Central African market. Kenya is also a regional hub for airlines allowing for easy access from and to any part of the world. This implies that we woo international investors. This is for the growth of our GDP. Agriculture usually brings in over 6% of foreign exchange earnings and provides raw materials for Kenya's agro-industries, which account for about 70% of all its industrial production.

2.2.1 Strategy in Knowledge Transfer

Strategy is concerned with engaging with, and sometimes trying to 'control', the future (Clegg et al., 2004) partly on the basis of projections, extrapolations and ideas of what future business conditions might be, and hence, how the organization should place itself. Though strategy research has moved a long way from its origins as a discipline centered mostly around planning (Clegg et al., 2004), this rational and control oriented view of strategy persists in many schools of research such as those labeled design, planning or positioning (Mintzberg, 1990). Zijp (1994) observed that lack of data was a significant constraint in planning and management of rural development. In particular the author stated that rural populations in Africa have difficulty in getting important information in a timely fashion and an appropriate format, like market produce prices or bulletins about pest infestation and most information disseminated was in written form, making it difficult for those with low or no literacy skills to benefit from this information.

Rees et al. (2000) cited that linkages between research, extension, civil society organizations and farmers were weak and that often the new improved technologies did not reach their intended beneficiaries. Of the farmers in Kenya, 80% are smallholders, who produce largely for subsistence and to some extent for sale. These farmers face many barriers to attaining full agricultural production including poor access to agricultural information, low output and productivity, weak institutional capacity and coordination, inadequate markets and market information (Republic of Kenya, 2006).

According to Kiplang'at (1999), rural development demands that rural people get access to information they need in forms that they can understand. Without these, development efforts will fail to achieve their potential impact. Kiplang'at (1999) continues to state that information technologies when adopted can increase the effective participation by the rural folk who are not only recipients of information but creators of knowledge based on their own experiences. Butler, Le Grice & Reed (2006) acknowledged that a synthesis of knowledge, social network structure and trust in relationships provides the basis for a tripartite model of knowledge transfer. The authors stated that farmers can combine training with their tacit knowledge and through discussions with their family, and in some cases with professional contacts, new knowledge is initiated. The familial, social and emotion attributes of business relations may determine the extent that knowledge is transferred into practice.

Ministry of Agriculture of Kenya, (2009), admonished the fact that in Africa, the potential of agriculture is underutilized while in Asia, agriculture has transformed national economies out of poverty. It proceeded to state that smallholders should be supported to become commercially viable producers and dependencies on handouts need to be reduced with the key strategies being, availing access to markets, inputs and credit to farmers, increasing the area under irrigation and strengthening institutions.

Conservation agriculture and zero tillage are now in practice worldwide and it is important to also examine the knowledge transfer in conservation large-scale farming. According to

Dumanski, Peiretti, Benites, McGarry & Pieri (2006), the practice of conservation agriculture on a large scale emerged out of Brazil and Argentina, although similar developments were occurring in many other areas of the world, notably North America in zero tillage, and Africa and Asia with technologies such as agro forestry. Zero tillage is now applied on more than 95 million hectares worldwide, primarily in North and South America (Derpsch, 2005) attributed to knowledge transfer. An important aspect would be to examine the knowledge transfer with a bias to agriculture between developed and developing countries. This is presented next.

2.2.2 Knowledge Transfer in Agriculture between Developed and Developing Countries

The UK educational policy asserted that the economic future depended on productivity as a nation and that required a labour force with the skills to match the best in the world (Department for Education and Skills, 2006). Within this picture, the agricultural sector was directed by policy to undergo a 'radical re-direction' (Ministry of Agriculture, Fisheries and Food, 2001) and adapt to changing markets, more sustainable systems of production and enterprise that would support the wider rural economy. Training and knowledge transfer was made a pillar of support.

The decisions that individuals make regarding training is crucial to the levels of knowledge transfer in agricultural communities and the prosperity of their business. Indeed, the ability of a business to survive and develop is influenced strongly by its capacity for innovation (Warren, 2003). A rational approach is for a farmer to weigh up the costs and benefits of training and decide whether it is in his or her personal interest (Learning and Skills Development Agency, 2002). Part of this reasoning is that training may be seen as a cost rather than an investment in future development (Matlay, 1999; Matlay & Hyland, 1999). Any decision to participate in vocational training with the intention of improving profitability, efficiency or the adoption of new technology is likely to be strongly correlated to a farmer's previous training and education experiences (Kilpatrick, 1998a, b, 2002).

2.2.3 Challenges in Knowledge Transfer in Agriculture

Diederer et al. (1999) define knowledge transfer in agriculture as the spread in time of an innovation among the members of a social system. In agriculture, many studies have been conducted on the diffusion processes of innovation (Smulders et.al, 1998). There is however a

paucity of understanding regarding how knowledge gained through vocational training in agriculture is transferred to the farm business and effectively applied in practice (Butler, Grice & Reed, 2006).

Shared tacit knowledge remains relatively hidden and according to Spender (1994) may only be accessible to an individual through sustained interaction. Yet to acquire additional knowledge through participation in education and training is only part of the process of knowledge transfer as this will only equip farmers for what is presently known (Taylor & Plummer, 2003).

2.2.4 Case Studies of Knowledge Transfer in Agriculture in Similar Countries

According to Zakaria and Nagata (2009), the Japanese agriculture has experienced several phases of reforms and modernization for more than a century ago and since the end of the World War II, Japan started to embark on a concerted effort to revitalize its agriculture sector in order to boost production to meet the escalating demand for food. The central and prefectural governments worked closely to enhance the training of farmers to uplift their technical and managerial skills and to ensure sustainability, and this was remarkably carried out through the activities and programs by the agricultural extension services.

The Japanese extension system for agriculture which started in 1948 was meant for helping farmers to acquire useful, appropriate, and practical knowledge in the domain of agriculture (Fujita, n.d.). This system was adapted from the Western extension system into the Japanese culture to suit their local needs and requirements. Traditionally, extension focuses on disseminating information from research laboratories to farmers (Roling, 1990), providing farmers with technical advice as a guide to improved farming methods (Zakaria et. al, 2009), training of new, youth and women farmers as well as community reorganization.

The Japanese agriculture has thus far been remarkably successful and sustainable especially in terms of its technical development. This “suggests that farm decision makers have either been using more and better information or becoming more knowledgeable” (Jones et al., 1987).

In Turkey, according to Kenanoglu and Karahan (2002), some committees were established to carry out activities on development and application of agriculture, with knowledge transfer in

mind. The authors proceed to state that now nearly all organic agricultural products from Turkey are vegetal crops, attributed to the knowledge transfer throughout the years.

According to Nieuwenhuis (2002), within Dutch agriculture, links between the educational system and the economic system have existed ever since the emergence of agricultural education during the years around the turn of the twentieth century.

2.2.5 Agriculture in Kenya, Vision 2030 and GDP

The Kenya Vision 2030 sector plan, (Republic of Kenya, 2008-2012), prescribes a step-by-step process measurable over five years, to improve the quality of life and living standards of the citizenry, in which agriculture is given prominence. Agriculture is acknowledged as the lifeline to the economy. The agricultural sector plays a critical role in wealth creation and employment and accounts for about 25% of the GDP (Republic of Kenya, 2008a). Agriculture provides raw materials to the manufacturing sector and stimulates indirect growth. The agricultural sector employs more than 80% of Kenya's workforce and contributes 57% of national income (Republic of Kenya, 2006). Despite its importance, growth in the sector has declined over the years from 24.4% in the year 1996 to a record 22.4% in 2000 (Republic of Kenya, 2006).

According to the Economic Survey (2009), the GDP for Kenya increased from 5.1 % in 2004 to 7.1 % in 2008. Table 2.1 (*Appendix I – Tables*) presents the percentage share contribution to GDP of the various sectors of the economy. The contribution of agriculture and forestry to GDP is the highest at 23.4% in 2008, followed by manufacturing at 10.6% in 2008 and transport and communication at 10.2% also in 2008. However, the contribution of agriculture and forestry to GDP declined from 23.4% in 2006 to 21.6% in 2007. The high costs of agricultural inputs like fertilizers and seeds worsened the situation thereby leading to the low production of both food and industrial crops. However, as indicated in Table 2.1 the contribution of agriculture and forestry to GDP increased from 21.6% in 2007 to 23.4 in 2008 (Economic Survey, 2009).

With regards to the contribution of agriculture to exports in Kenya, the summary of composition of Kenya's domestic exports by Broad Economic Category (BEC) is presented in Table 2.2 (*Appendix I – Tables*) Export earnings from food and beverages accounted for 40.4% of the total

domestic export earnings in 2008, almost the share recorded in 2007, according to the Economic Survey (2009) and the Kenya Bureau of Statistics (2009).

The export earnings from food and beverages increased from Kshs. 97,801 million in 2006 to Kshs. 130,273 million in 2008 recording an increase of 23.4% from Kshs. 105,549 million in 2007 to Kshs. 130,273 million in 2008. This increase was attributed to the increase in earnings from primary food and beverages for household and consumption.

With regards to the contribution of agriculture to employment in Kenya, as indicated in Table 2.3 (*Appendix I – Tables*) the wages employment from the private sector rose from 1,107,300 million jobs in 2004 to 1,305,500 million jobs in 2008. The leading sectors in providing private sector employment were: community, social and personal services; agriculture and forestry; and manufacturing with contributions of 23.5%, 22.2% and 18.2% respectively.

The public sector wage employment registered negative growth from 657.4 thousands in 2004 to 628.1 thousands in 2007. However, it registered marginal growth of 1.6% in 2008 (Table 2.3). Community, social and personal services registered the highest employment recording 464.7 thousand in 2008, followed by agriculture and forestry with 51,000 jobs.

With regards to the contribution of agriculture to marketed production and income from agriculture in Kenya, Table 2.4 (*Appendix I -Tables*) presents the value of marketed production in the agricultural sector for the period 2004 to 2008. The total value of marketed production at current prices increased marginally from Kshs. 178,634.9 million in 2007 to Kshs. 178,856.6 million in 2008. Tea, maize, fruits and sugarcane contributed to the marginal increase in the value of marketed output. The aggregate value of livestock and products marketed increased by 3.2 per cent from Kshs. 29,691.4 million in 2007 to Kshs. 30,629.1 million in 2008. The value of marketed cereals declined by 8.3 percent from Kshs. 14,617.6 million in 2007 to Kshs. 13,398.4 million in 2008.

The value of marketed maize increased by 4.5 % from Kshs. 7,969.2 million in 2007 to Kshs. 8,326 million in 2008, as a result of high prices offered in the market. The value of marketed horticultural produce declined by 13.8 % from Kshs. 67,253.7 million in 2007 to Kshs. 57,965.8 million in 2008 mainly due to lower unit prices for horticulture in the export market. The decline in horticultural export earnings in the year under review is attributed to a 27.8% slump in the value of vegetables. The high tea prices resulted in the value of marketed tea increasing by 26.2

% to Kshs. 55,383.1 million in 2008. The value of marketed dairy produce decreased by 1.1% to Kshs. 8,368.7 million in 2008 as a result of reduced milk production.

With regards to the sales to the marketing boards in Kenya by the small farms and large farms, as presented in Table 2.5 (*Appendix I – Tables*) the share of sales to marketing boards by small farms declined from 75.9% in 2007 to 73.1% in 2008 in line with lower production from the smallholder farms (Economic Survey 2009).

The share of large farms sale to marketing boards increased by 11.8% from Kshs. 43,053 million in 2007 to Kshs. 48,148 million in 2008. In spite of the decline in the share of small farms sale to marketing boards by 3.6% from Kshs. 135,591 million in 2007 to Kshs. 130,709 million in 2008, the aggregate value of sales by the small farmers remained more than double, the value sold by the large farms.

Therefore as suggested by Kiplang'at (1999), accelerated growth in agriculture will increase employment opportunities, enhance foreign exchange earnings and act as a catalyst to improve the standard of living of the people. However, the author suggests that for increased agricultural production in any developing country, there needs to be improved rural roads, technological support to farmers in terms of better seeds, research and extension services, mechanization services, plant protection and animal health, irrigation and drainage and credit.

According to Kiplang'at (1999), the key to increased agricultural production ultimately lies with the Nation's ability to disseminate relevant information to the farming community to facilitate the effective adoption of new production techniques and knowledge transfer from large-scale farmers. With regards to knowledge transfer, Miesing, Kriger & Slough (2006), hypothesized that transferring best practices between subsidiary and parent, and between organizational units, requires three activities: creating, sharing, and using knowledge. The authors synthesized the relevant extant literature on organizations to further develop the model in Figure 2.1.

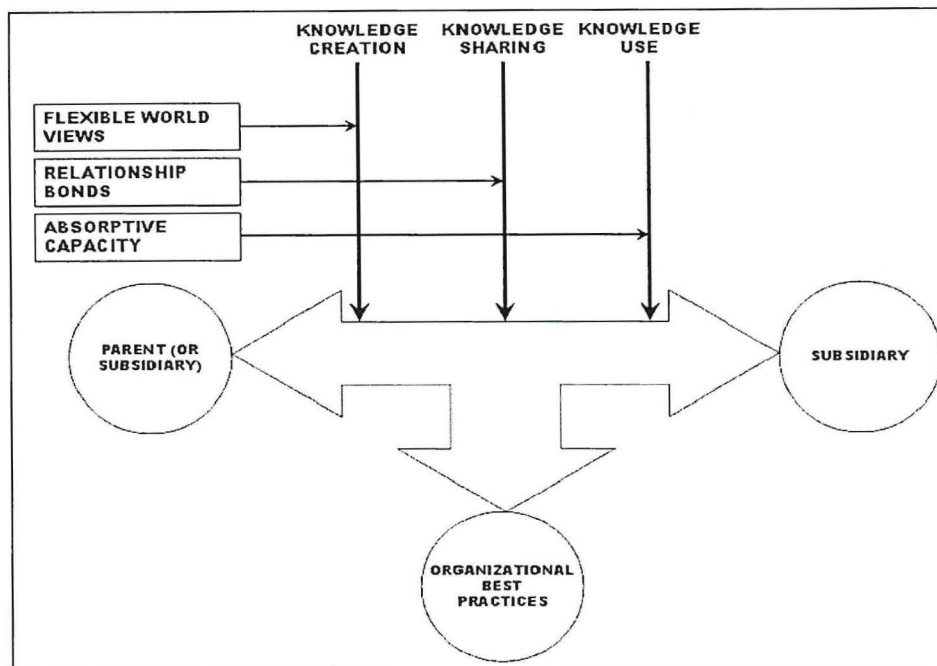


Figure 2.1: Knowledge Transfer Model (Miesing, Kriger & Slough (2006), pg. 116

2.3 Empirical Review

2.3.1 Transfer of Knowledge in the Agricultural Sector by Universities, Research Institutes and Traditions

Atchoarena & Holmes (2004) noted that universities can potentially become showcases of local traditions and knowledge, reflecting the regional, cultural, and ethical traditions of their society, as well as global movements and forces. In reinforcing their roles as contributors to a culture of learning and rural development, the authors emphasized that Higher Agricultural Education institutions need to engage more directly and more effectively in partnerships and dialogue with other local educational institutions and their surrounding communities, in order to achieve knowledge transfer.

Innovative universities have conceived themselves to have three complementary missions, namely research, teaching and service to the community (Maguire 2002). In Kenya, agricultural universities have adjusted their programs to accommodate new topics, new partnerships and continuous dialogue with policy-makers in dissemination of knowledge to small scale –farmers.

Mbithi (2004), of the University of Nairobi, placed rural and agricultural development within the context of overall national development after examining the production, adaptation and transfer of technical knowledge in the field of agriculture in Kenya. In Kenya, Jomo Kenyatta University of Agriculture and Technology (JKUAT) partnered with the University of Nairobi on a programme on knowledge transformation and intellectual property transfer aimed at providing an enabling environment for the management and commercialization of intellectual property and supporting the activities related to commercialization and popularization of R&D, according to a report by UNECA (2009).

Universities and research institutes have therefore done much in knowledge transfer and this study determines the knowledge gaps existing among the farmers and how the same can be bridged for higher productivity and commercialization of especially the small-scale farms. Lucas (2006) argues that the issue of culture, individualism / collectivism, uncertainty avoidance, and masculinity / femininity, will significantly impact the possibility of knowledge transfer. The study will formulate a likely appropriate model for knowledge transfer that can possibly allow smooth knowledge and skills transfer among the farmers, boost the productivity of small-scale farmers beyond their consumption requirement and lead to the commercialization of their farming activities.

2.4 Research Gap

Dumanski, Peiretti, Benites, McGarry & Pieri (2006), examined the paradigm of conservation agriculture and large scale farming, EPZA (2005) examined the dairy farming sector in Kenya, Kenanoglu & Karahan (2002) examined policy implementation for agriculture and the Economic Survey (2009) of Kenya examined the contribution of agriculture in Kenya. From the theoretical review, the authors examined the strategic model for knowledge transfer and generally acknowledged that since strategy was concerned with extrapolations and ideas of what the future business conditions might be, it may be important for small-scale farmers to devise a way to alleviate their challenges. The authors acknowledged that a synthesis of knowledge, social network structure and trust in relationships provides the basis for a tripartite model for knowledge transfer. However, the authors did not expound on the likely appropriate strategy to empower small-scale farmers in Kenya, as sought by the study.

The authors also highlighted the challenges in knowledge transfer in the agricultural sector and all cited a paucity of understanding regarding how knowledge gained through vocational training in agriculture is transferred to the farm business and effectively applied in practice. The study, therefore sought to determine the knowledge and skills gaps, come up with solutions to the hindrances for knowledge and skills transfer, come up with likely appropriate model for smooth knowledge transfer for increased productivity and commercialization of Kenya's agricultural sector, especially among the small scale farmers.

In the empirical review examined, the authors examined the mediums of knowledge transfer. They examined these mediums as contributors to a culture of learning and rural development. However, there was a gap in understanding how these mediums of knowledge and skills transfer will infiltrate the small-and large-scale farmers in Kenya.

2.5 Conceptual Framework

The literature review examined the what, how, who and why in knowledge transfer in agriculture, the strategy in knowledge transfer, knowledge transfer in agriculture between developed and developing countries, case studies of knowledge transfer in agriculture in similar countries, agriculture in Kenya with a bias to the vision 2030 and GDP. Based on this the reviewed literature, the study proposed the conceptual framework, which is a 1 to 1 relationship within the variables, is shown in Figure 2.2. The independent variable is knowledge gaps, hindrances to knowledge transfer is the moderating variable, while successful knowledge transfer is the dependent variable.

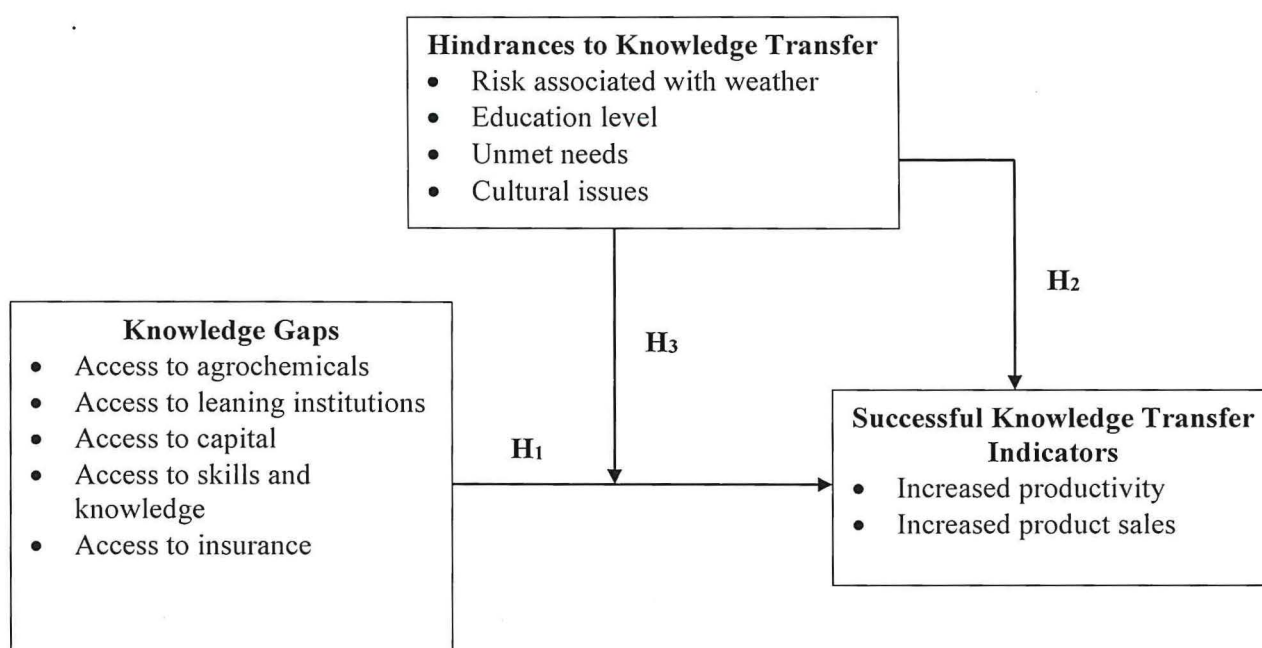


Figure 2.2: Conceptual model

It was proposed that knowledge gaps have a direct causal effect on successful knowledge transfer, but that this effect is moderated by hindrances such as risk resulting from unpredictability of weather. The study proposed four sources of knowledge gaps as including: access to agrochemicals, access to learning institutions, access to capital, access to skills and knowledge, cultural issues and demographics. Successful knowledge transfer was defined by increased productivity and increased product sales of the small scale farmers

2.6 Research Hypothesis

From the literature review examined, the conceptual framework was formulated and the following hypothesis formulated:

- H₁: There is a significant relationship between knowledge gaps and successful knowledge transfer
- H₂: Hindrance has a significant effect on successful knowledge transfer
- H₃: The relationship between knowledge gaps and successful knowledge transfer is moderated by hindrance

2.7 Summary

Chapter two examined relevant literature review with a view to gain more understanding on the subject area. It examined the theoretical and empirical review and from this, the conceptual framework was formulated and hypotheses extracted. From the research gaps highlighted, there was need to design the approach to collect primary data that will exhaustively answer the research questions.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter details the research methodology used in the study. The chapter presents the research design, the data collection instruments, target population of the study, the sampling method, study setting, data analysis, pre-testing, validity test the and research ethics.

To answer the research questions formulated and to affirm or reject the hypotheses, it was important to define and design a detailed plan for obtaining information, which could smooth the progress for the resolution of the problem. Central to this was the development of an effective research design.

3.2 Research Design

Based on the nature of the study, the research objectives and the target population, exploratory and descriptive research design was used. Exploratory approach allowed the researcher to interview the farmers and gain more insight of the prevailing of knowledge gaps. While the descriptive design permitted accurate estimation of the population parameters and subsequent hypotheses testing leading to generalization. This approach allowed for the use of quantitative approach in data analysis, and enabled explanation of how knowledge can be transferred to and among the farmers, particularly the small scale farmers.

The survey method was used and a questionnaire administered face-to-face to the respondents and farmers. The survey method was advantageous as it allowed for the comprehensive accumulation and aggregation of statistical data that was easy to analyze and interpret.

In order to measure the knowledge gap and hindrances to knowledge transfer, a structured questionnaire was administered face-to-face which sought to solicit their level of knowledge. The questionnaire allowed them to list the predictors of knowledge transfer. This was then analyzed and reported descriptively.

3.3 Target Population

The target respondents of the study were the large scale farmers', small-scale farmers, stakeholders in the agricultural sector and the Government. The study focused on farmers in Nanyuki, Naivasha, Thika and Ruiru due to the volume of agribusiness and agriculture practiced there by both large and small scale farmers. According to the Ministry of Agriculture (2012), the population of the farmers, both large and small scale in the areas covered by the study was approximately 500 to 1000 farmers.

3.4 Sample and Sampling Method

In a study by Orodho and Kombo (2002), sampling was described as the procedure used to gather things, places or people to study, the study used the non-probability sampling technique. The sampling technique employed in this study was a combination of cluster sampling followed by convenience sampling method.

The farmers were clustered into three geographic areas (county) and from each county respondent were picked by using convenience sampling method. Convenience sampling was preferred because the farmers could not be found in one central point; instead the questionnaires had to be administered to them in the fields where they were working. In this method, researchers have the freedom to choose whomever they find, hence the name "convenience." Although a convenience sample has no controls to ensure precision, it is still useful for testing ideas or gaining ideas about a subject of interest (Cooper and Schindler, 2008). A total of 60 respondents formed the sample, following this rationale, as presented in the table 3.1 next.

The rationale for the counties and numbers were purposive. The economic Survey (2009) posit that the large scale farmers are mostly from Laikipia, Kiambu and Nakuru Counties and hence by purposively selecting these counties, we can examine the knowledge transfer between these large scale farmers and the small scale farmers in these counties. Purposive Sampling was cited by Cooper and Schindler (2008) as advantageous and most appropriate because of the judgmental decision that it would be universe hence the rationale for the choice.

Table 3.1: Sample Size

Cluster		Number of respondents			
County	District	Large Scale Farmers	Small Scale Farmers	Total Farmers	Percentage (%) of sample
Laikipia	Nanyuki town	10	10	20	33.3 %
Kiambu	Thika / Ruiru area	10	10	20	33.3 %
Nakuru	Naivasha	10	10	20	33.3 %
TOTAL		30	30	60	100 %

3.5 Data Collection

The study used a questionnaire as the main instrument to collect primary data from the respondents. Quantitative data was collected that was related to the variables in the conceptual framework. Questionnaires were considered appropriate given the research objectives, their cost effectiveness (Mellenbergh, 2008), respondents are given time to fill-in the questionnaires, do not require as much effort as for the verbal and telephone interviews and are easier to classify the data given in the closed ended questions making it easier to compile data. The questionnaire consisted of a demographic section that allowed profiling the respondents and categorizing them for cross analysis. To recruit the respondents, the list of large and SSFs that represent the agricultural sector in Kenya was selected randomly from the official telephone directory, 2012. The selected respondents were then called and appointments made. In order to collect accurate information, the respondents were explained to who large scale farmers and small scale farmers were. Pictures were used and in addition, they were explained to as those who use modern large scale equipment for farm work like tractors, versus those who use simple hoes for digging and cannot use tractors.

For data integrity, they were first greeted; a rapport created and then briefed on the purpose of the research, the duration of the interview and then the questionnaire was administered. The interview was conducted in a quiet, comfortable place that the respondent perceived suitable, without disrupting his or her normal chores. Quality checks were also being put in place to ensure accuracy of the data. The data was counterchecked and incomplete or incomprehensible questionnaires reconfirmed with the respondents.

3.6 Validity

Validity was cited as the degree by which the sample of the test items represents the content the test is designed to measure (Rousson, Gasser and Seifer, 2002). The study undertook two validity tests. Face validity and internal construct validity. The face validity test was undertaken by administering the questionnaire to 10 farmers prior to field work. Their feedback was used to improve the questionnaire.

To establish the internal construct validity of the study, the construct validity test was used as reported under the data analysis section. Internal construct validity is concerned with the extent to which a particular measure relates to other measures in a way that is consistent with theoretically derived hypotheses concerning the concept. Construct validity defines how well a test or experiment measures up to its claims (Mugenda, 2008).

3.7 Reliability

The data collected using the questionnaire was tested for reliability. Reliability is a measure of degree to which research instrument yields consistent results or data after repeated trials. The instrument in Appendix III was subjected to Cronbach's alpha test and the 81 item instrument resulted $\alpha = 0.861$, meaning the questionnaire was very reliable.

3.8 Data Analysis

The data collected was analyzed using Ms Excel and Scientific Package for Social Sciences (SPSS). Data analysis was undertaken using two statistical tests: descriptive statistics and regression analysis. The independent variable (knowledge gaps) was regressed against the dependent variable (successful knowledge transfer). Then the hindrances to knowledge transfer were introduced in the relationship to examine its moderating effect. The linear regression model adopted took the mathematical form below;

$$SKT = \alpha_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \dots \beta_i X_i + \epsilon_0$$

From the equation, SKT = successful knowledge transfer, α_0 = constant, $\beta_1, \beta_2, \beta_3, \dots, \beta_i$ = coefficient of the independent variables $X_1, X_2, X_3, \dots, X_i$, respectively and ϵ_0 = error term.

Here;

X_1 = Access to agrochemicals

X_2 = Access to leaning institutions

X_3 = Access to capital

X_4 = Access to skills and knowledge

X_5 = Access to insurance

These variables were operationalized and analyzed by the type of variable. The nominal variables, access to learning institutions, access to skills and knowledge, the ordinal variables access to capital, insurance, were applied various statistical statistics. Inferential statistics and differential statistics were employed for their means, mode and medians. These were then reported in graphical format and presented in the findings section.

Before the data was analyzed, data checks and data cleaning were exhaustively carried out. Any unusual data check reports were re-confirmed and where need arouse, the respondent was called to countercheck the data. The treatment for missing data used in the study was, exclude cases pair wise method. The analyzed data was then used to prepare the final report and the results and findings presented in graphs and chart output.

For rigour in the analysis, and based on the nature of the study, there was need to run a regression model and analyse the analysis of variance (ANOVA) in order to determine which factor fosters transfer of knowledge and hindrance.

3.9 Summary

Defining and designing a proper approach for data collection and analysis was important, as the results, conclusions and recommendations were dependent on this. The research design presented the approach in data collection and the draft questionnaire is presented in Appendix III.

CHAPTER FOUR: RESULTS AND FINDINGS

4.1 Introduction

In this chapter data is analyzed, presented and the interpretation made of the findings. The data presented includes the response rate, the demographic information and the findings of the research. Descriptive statistics is used to explain the variables and correlate bivariate relationships; factor analysis is used to reduce the many variables associated with knowledge gaps into a few factors that can be easily explained. Regression analysis is used to determine the associated strength between the dependent and independent variables and while at the same time indicating the predictive power of the emerging model. Linear regression, correlation and cross tabulation were applied in order to relate variables and provide more in-depth insights for the correct conclusion.

4.2 Response Rate

Table 4.1 shows that a total of 60 questionnaires were administered to the farmers, out of which 45 were returned and found usable resulting in a sample size of $n = 45$ and a 75% response rate which was considered very good for data analysis. According to Mugenda and Mugenda (2003) a 50% response rate is adequate, 60% good and above 70% rated very good. This implied that basing on this assertion; the response rate in this case of 100% was very good.

4.3 Sample Profile

This section presents the respondent profile and descriptive statistics of the study variables. The demographic information collected was on; the gender, age, the head of household, his/her primary economic activities, farming activities, and level of education, the farm owners, number of household members involved in agricultural activities, those attending school, assisting in the farm and opting to relocate to the city.

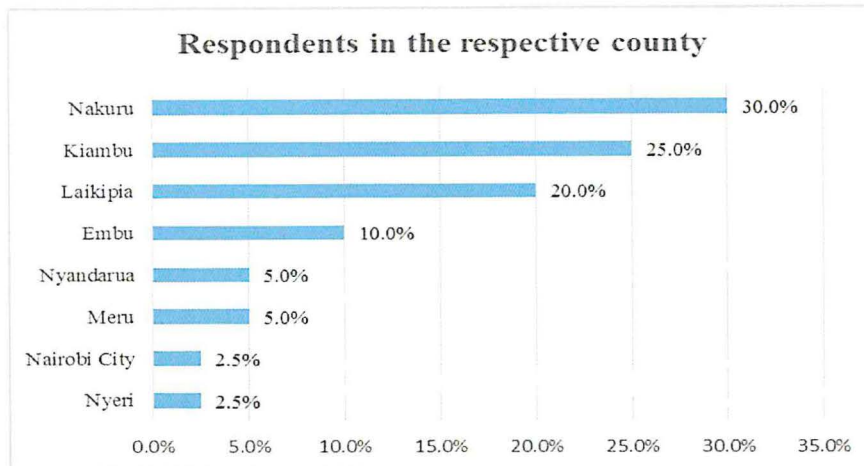


Figure 4.1: Respondents in the respective county

The study area sampled three counties countrywide. Figure 4.1 shows a majority, 30%, were from Nakuru County since Nakuru heavily relies on agriculture and has horticulture and large scale farming. Nakuru was also part of the former white highlands and still have a good number of large farms under whites. A good reason to select the counties of Nakuru, Laikipia and Embu was that they as well have a good combination of both large scale and small scale farmers. These reasons made these areas appropriate for the study. A key finding was that there is agricultural activity in each county, namely large scale farming and small-scale farming as well as agricultural oriented organizations like NGOs and offices for multinational agricultural companies. The findings were therefore comparable to the Ministry of Agriculture, 2012.

According to Haggblade (2011), Africa's agribusinesses stand poised for exceptionally rapid growth over the coming 40 years. The author noted that accelerating urbanization means that city populations will surpass rural inhabitants and the resulting urban population gains, coupled with growing income and changing tastes, will propel rapid growth in the marketed share of Africa's agricultural production. The author notes that majority of the population in the city are fairly young as compared to those remaining to farm in the large scale farms.

From Table 4.2, majority, 80% of the respondents were male. The main finding was that the nature of work and task involved was tough and thus most that opted to do farming were male. There was a similar finding in the gender of the household head. 70 % of the respondents

affirmed that the male is the household head while 12 % affirmed it was the female. Less than a third, 15 %, stated that they were equal partners as household head. These findings were consistent with the works of Haggblade et al., (1989) who noted that gender roles have changed over time as commercialization accelerates.

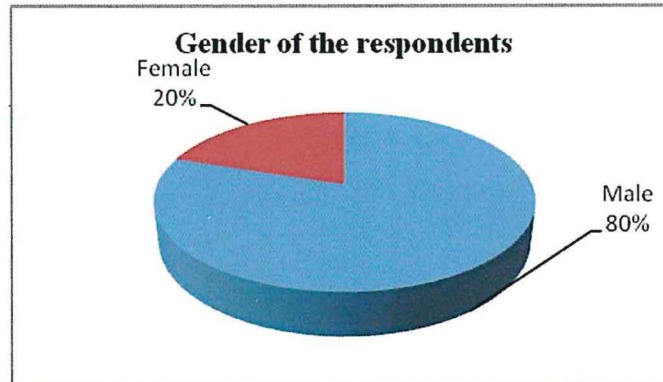


Figure 4.2: Gender of the respondents

From the demographic profile, majority of the males were the head of household, aged 31 to 40 years and primary activity was agriculture. Culture and the socio cultural influence play a great role in farming. According to Onyekwere et al., (1989) and Nweke et al., (2002), from the African tradition, men own farms and lead in the agricultural activities. Traditionally, men are the household heads and family spokespersons. This is also a finding in the study.

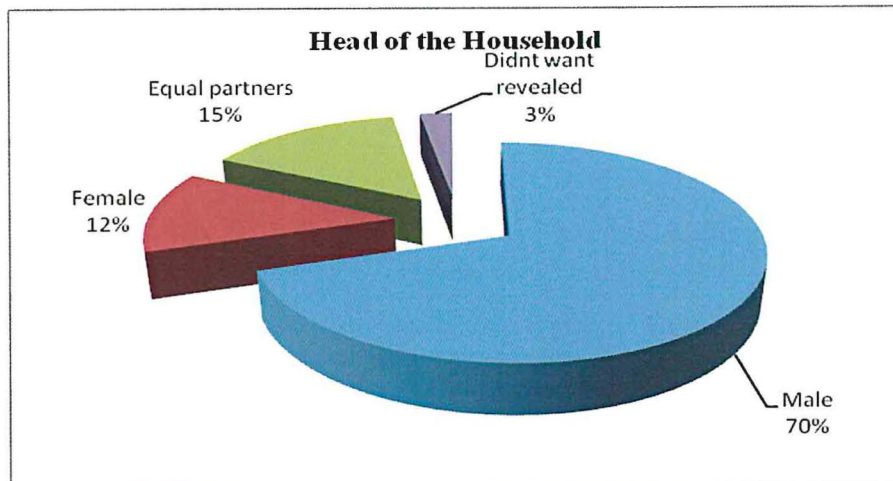


Figure 4.3: Head of the Household

Table 4.2 also shows that a majority of the respondents that were engaging in agriculture as an economic activity were aged between 31 to 40 years. Figure 4.4 shows that close to half of them, 45% were in the age group of 31 to 40 years. This could be attributed to the fact that at the ages of between 31 to 40 years, the respondents were settled with what they want to do in life.

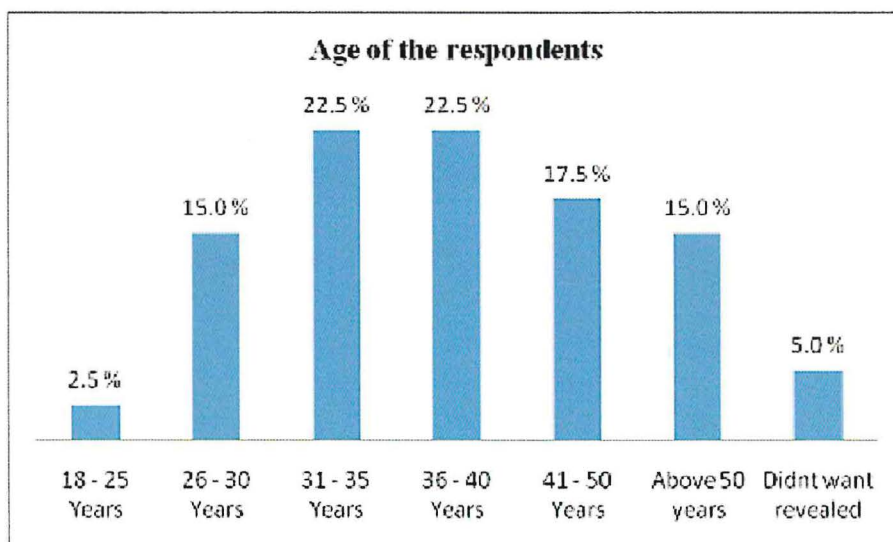


Figure 4.4: Age of the Respondents

Another explanation could be that agriculture as an activity has started attracting younger population after university graduation. In some cases, these respondents are employed and it is clear that the employers prefer younger energetic workforce.

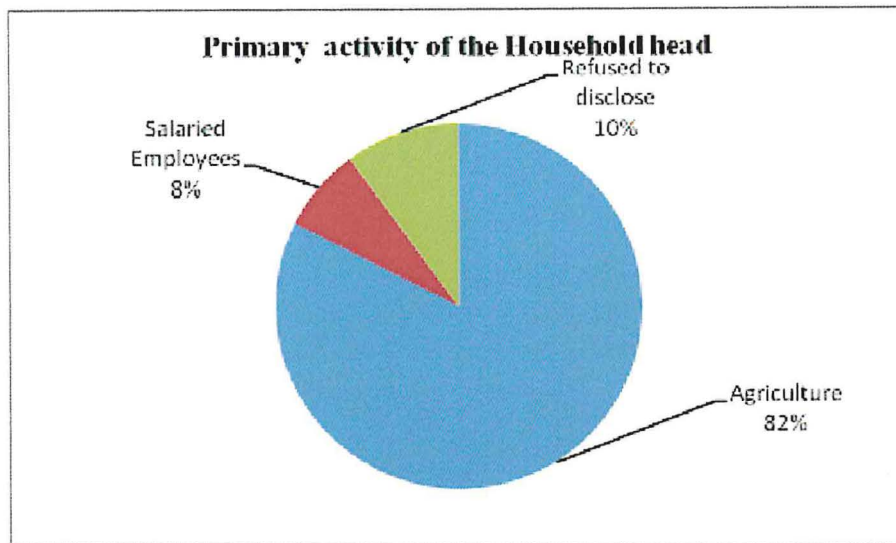


Figure 4.5: Primary Activity of the Household head

From the general objective of the study, the study targeted farmers and indeed, most, 82% were in agriculture as their primary activity (Figure 4.5) with over eleven years of farming experience, and most, 35% having being educated to tertiary / college level as shown in Figure 4.5.

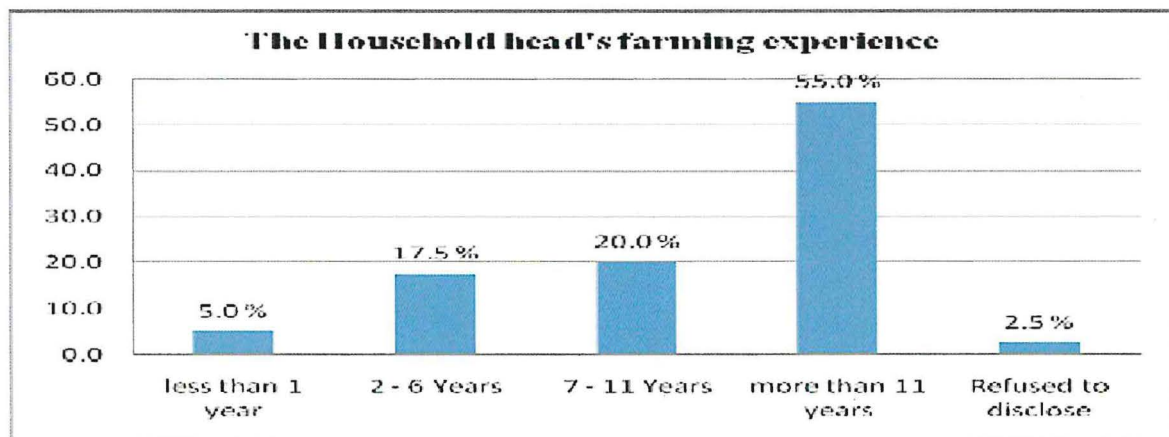


Figure 4.6: The Household Head's farming experience

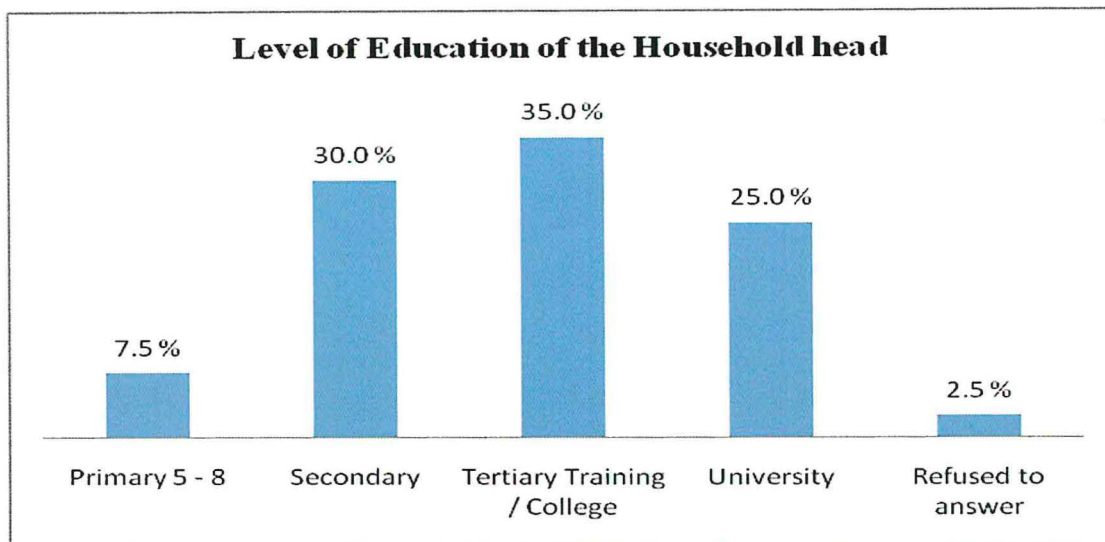


Figure 4.7: Level of education of the Household head

Most of the farmers as shown in Table 4.3 had studied agriculture while at college, implying they had the basic skills of the trade.

Table 4.3: What Did you Study in College

Study area	Frequency	Percent	Cumulative Percent
Agriculture	20	50.0	52.5
Information technology	2	5.0	62.5
Accounting	1	2.5	2.5
Electrical	1	2.5	55.0
Teaching	1	2.5	57.5
Numerous units (Accounting/Animal husbandry/Agriculture)	1	2.5	65.0
No response	14	35.0	100.0
Total	40	100.0	

Only 47.5 % of the respondents owned the farms where they engaged in farming activities. It was observed that most of the large scale farms are company owned (Figure 4.8), with the

farmers residing and reporting to work daily, a finding similar to Lanjouw (2007). According to the author, the poverty impact of shifting nonfarm employment reveals more variability.

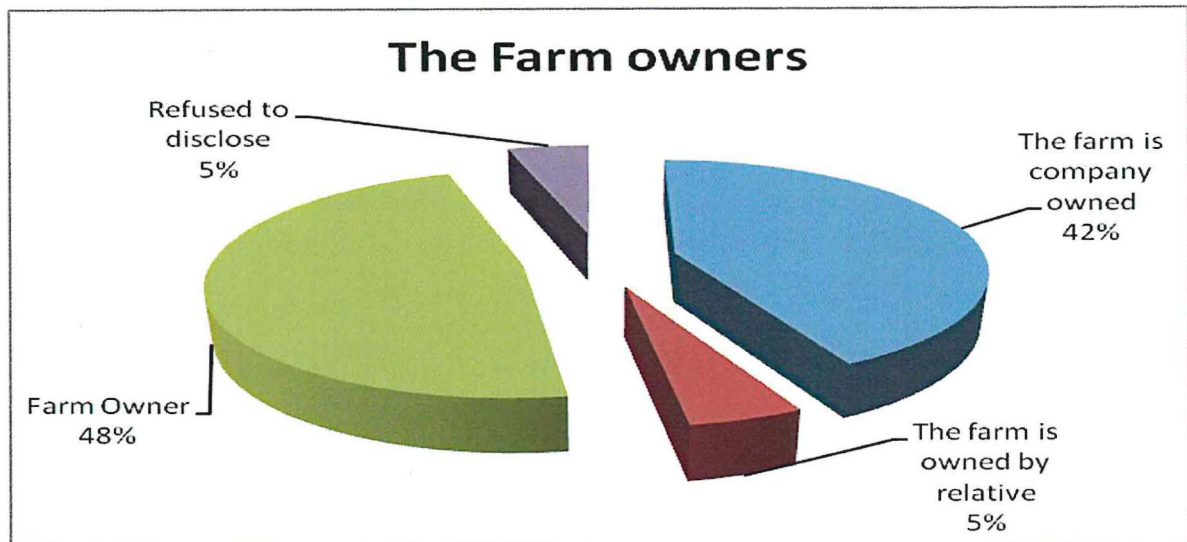


Figure 4.8: The farm owners

Figure 4.9 shows that 74.8 % of the workforce were aged between 21 – 50 years and reside in the compound and work in the firm once a week. Similarly of those aged of 21 – 50 years, a majority lived away but assisted in the farm activities as evidenced by Figure 4.10.

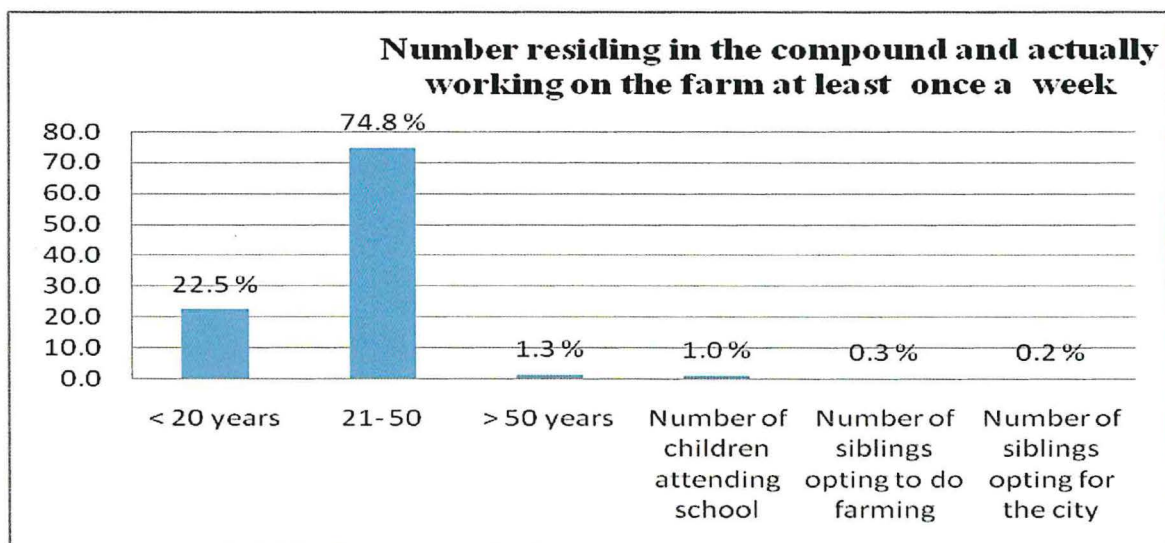


Figure 4.9: Number in working at least once a week

This could be attributed to the fact that below the ages of 21 would be school going while above 50 would be advanced in age and retreated to the farms. This also reveals the connection between those living in town and cities and those living in farms. Those living away could be in colleges and universities, or even working, but they go home most of the weekend and give some kind of assistance in farming.

Table 4.4 shows that knowledge transfer from Small Scale Farmers (SSFs) to Large scale farmers' (LSF) is more likely to take place in terms of skills required for the appropriate agrochemical to use on crops (37.7%). This is followed by need to understand the market related information. This is interpreted to mean that skills in agrochemicals can boost output while market knowledge will make it possible for the SSFs to sell more.

Table 4.4: What skills or Knowledge Can SSFs Borrow From LSFs

Skill	Frequency	Percent	Cumulative Percent
Required agrochemicals for various crops	15	37.5	37.5
Market information	8	20.0	72.5
Research and development in new crops	5	12.5	85.0
Agricultural management skills	4	10.0	95.0
Application of agrochemicals	3	7.5	45.0
Weather knowledge	3	7.5	52.5
None really	2	5.0	100.0
Total	40	100.0	

A majority (52.5%) of respondents get agricultural information by listening to radio and TV. While the other 32.5% source information from other sources as shown in Table 4.5. Information is critical for success in agri-business and entrepreneurial farmers seek information from all sources including the internet, professional networks and others.

Table 4.5: Do you listen to radio / TV programs in agriculture

Channel	Frequency	Percent	Cumulative Percent
Yes	21	52.5	52.5
No	13	32.5	85.0
No response	6	15.0	100.0
Total	40	100.0	

When asked the channel listened to the most, a majority as shown in Table 4.6 indicated Citizen Radio. A cross tabulation of the source of information and channel of information confirms the same. They preferred this station because it communicates in local dialect that makes it possible for them to understand. Government stations (KBC) are not so popular or preferred therefore as presented next

Table 4.6: Do you listen to radio / TV programs in agriculture * Radio / TV programs in agriculture listened to

Cross tabulation

		Radio / TV programs in agriculture listened to			Total
		Radio: KBC Swahili service	Radio: Citizen	Can't recall fully / Not applicable	
Do you listen to radio / TV programs in agriculture	Yes	1	19	1	21
	No	0	0	13	13
	No Response	0	0	6	6
Total		1	19	20	40

The study sought to examine the significance of this relationship as used the Chi-Square test for independence of association and the output is displayed in Table 4.7 below. The resulting

Pearson Chi-Square indicates Chi-Square value (χ^2) = 36.190, $p = 0.000$. This means there is statistical significant association between listening to radio / TV programs in agriculture and the Radio / TV programs in agriculture listened to. Hence farmers who listen to radio/TV may end up getting more information than those who don't.

Table 4.7: Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	36.190 ^a	4	.000
Likelihood Ratio	47.411	4	.000
Linear-by-Linear Association	7.245	1	.007
N of Valid Cases	40		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is .15.

4.3.1 Objective 1: Knowledge and skills gap

A majority of the farmers (57.5%) identified droughty as a major hindrance to knowledge transfer as shown in Table 4.8 below. The other hindrances were floods, pests and diseases. The hindrance were described by the farmers as occurrences which inhibit them from enjoying the fruits of knowledge transfer especially when they experiment with new seeds or they try new technologies.

Table 4.8: What risks have you experienced

Risk	Frequency	Percent	Cumulative Percent
Droughts, dry spells	23	57.5	57.5
Flooding	2	5.0	62.5
Pests	9	22.5	85.0
Diseases	3	7.5	92.5

Figure 4.11 showed that the major challenge in adopting knowledge, from knowledge transfer is the change in weather patterns as stated by close to two-thirds, 70%. About 10% stated that the prices of recommended inputs and equipment and their current knowledge in agriculture is a hindrance. The policy makers need to put deliberate effort to ease access to farm inputs, equipments and knowledge on agrochemicals.

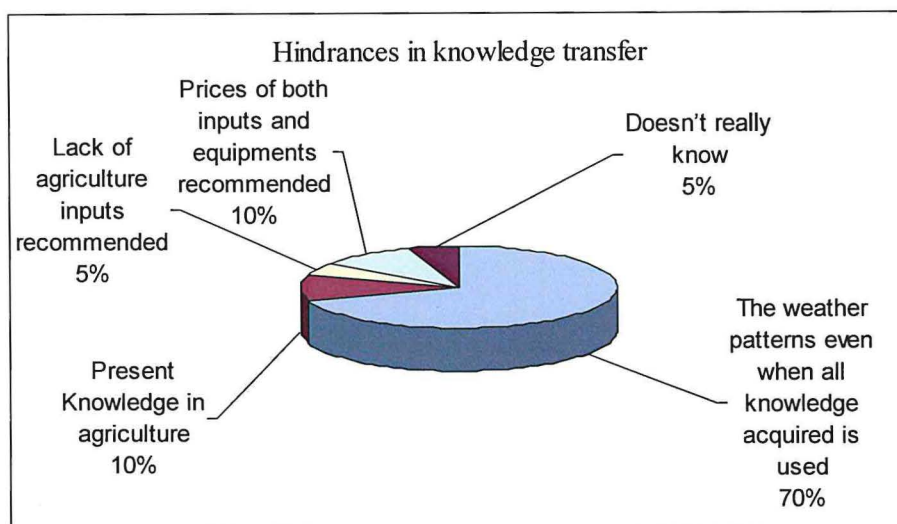


Figure 4.11: The hindrances in knowledge transfer

Table 4.9 defines many needs that farmers have that hinder knowledge transfer. The major unmet need was the unaffordable prices of inputs and implements (35%) followed by market accessibility (27.5%). These variables serve to reduce the farmer's potentiality to gain from knowledge transfer.

Table 4.9: What is the most important unmet need in your farming activities

	Frequency	Percent	Cumulative Percent
Lack of Knowledge	7	17.5	17.5
Lack of inputs (chemicals, seeds, etc)	3	7.5	25.0
Lack of equipment	1	2.5	27.5
Prices of inputs and equipment	14	35.0	62.5
Market inaccessibility	11	27.5	90.0
No response	4	10.0	100.0
Total	40	100.0	

Figure 4.12 shows what the respondents suggested that farmers can do to reduce food shortage. Many (15%) suggested that access to irrigation facilities was the best option to food shortage. The farmers can be more productive on their farms if they sought the assistance of the

agricultural extension workers for farming knowledge, also if they attend field days usually organized by multinationals and other stake holders. Harvesting of rain water for simple irrigation, usage of simple green houses now available even for SSFs will increase the productivity in agriculture.

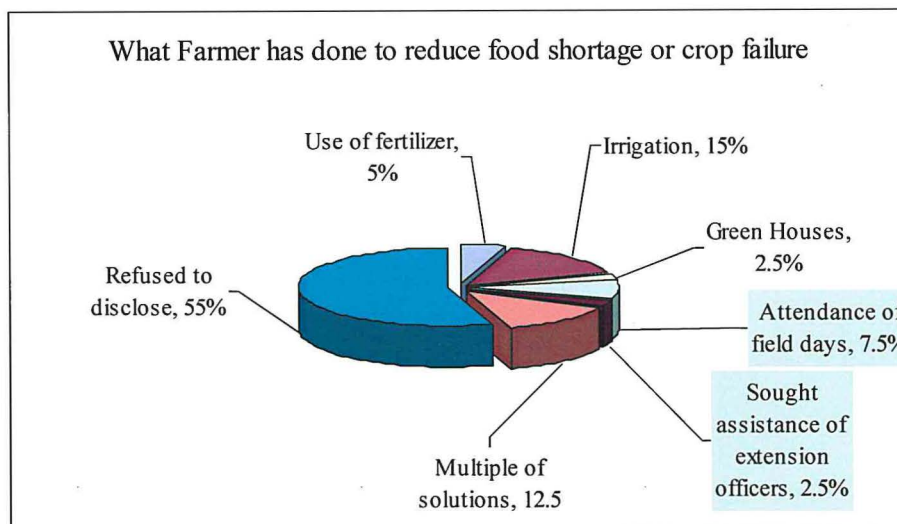


Figure 4.12: What Farmers can do to reduce food shortage or crop failure

4.3.2 Objective 2: Relationship between knowledge gaps and successful knowledge transfer

Knowledge transfer is prescribed to entail idea creation, sharing, evaluation, dissemination and adoption. Close to half of the respondents, 44%, affirm that the catalysts for knowledge transfer are the government, schools and colleges, media, individual effort and money. The most effective mediums for knowledge transfer are agricultural radio programmes followed with agricultural extension officers visiting the farmers for demonstrations. Multinationals and other organizations trading in agrochemicals also need to relax their controls on their products' information. The knowledge transfer implies the vehicles that drive information or sources through which the respondents acquire new skills. From the findings and indeed from Onyekwere et al., (1989) and Nweke et al., (2002), the government plays a key role in agriculture and knowledge transfer. This is presented in Figure 4.13 below.

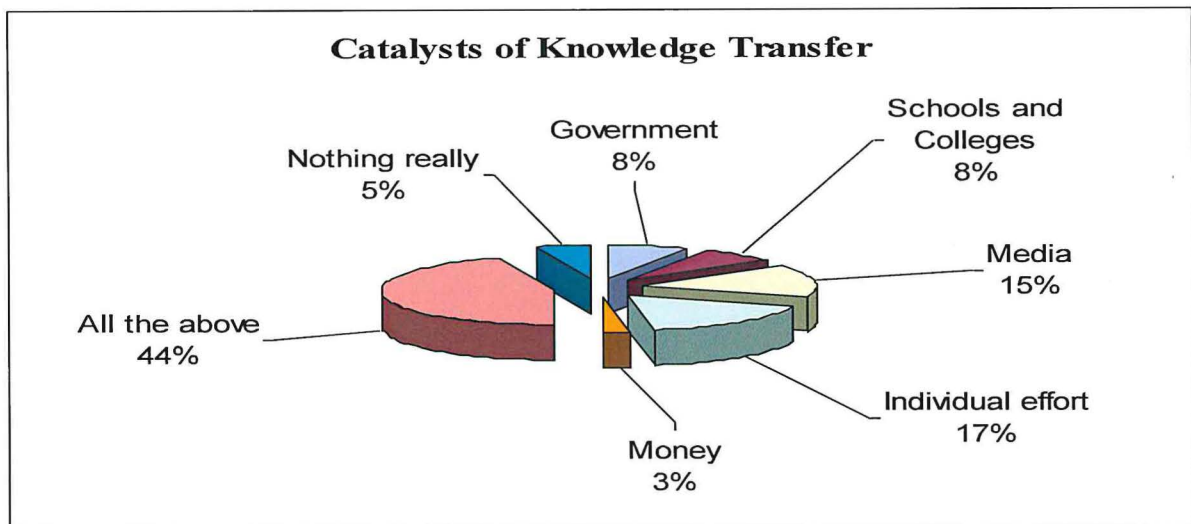


Figure 4.13: Catalysts of Knowledge transfer

The farmers also need to put individual efforts to acquire farming knowledge – they need to attend field days, they need to read books, they need to educate their children who in turn will help in knowledge transfer. Farmers can also benefit a lot from agricultural radio programmes now being organized by multinationals (like Syngenta East Africa and others). So farmers’ individual efforts remain very important, the government can only do so much. The media and the government can accelerate knowledge transfer in agriculture

4.3.3 Have read or heard of Vision 2030

The variables of interest were the productivity of the farmers based on Kenya’s Vision 2030 plan that outlines the growth of small-scale farmers, the reduction of the productivity gap between the small-scale farmers and the large – scale farmers, the reduction of the knowledge and skills gap and the presence of a strategy and model for knowledge and skills transfer.

From the findings, 47% (Figure 4.14) of the respondents have read or heard of the Kenya Vision 2030 plan and 67.5% (Figure 4.15) affirmed that indeed, effective knowledge transfer in the agricultural sector would increase the productivity of the farming community.

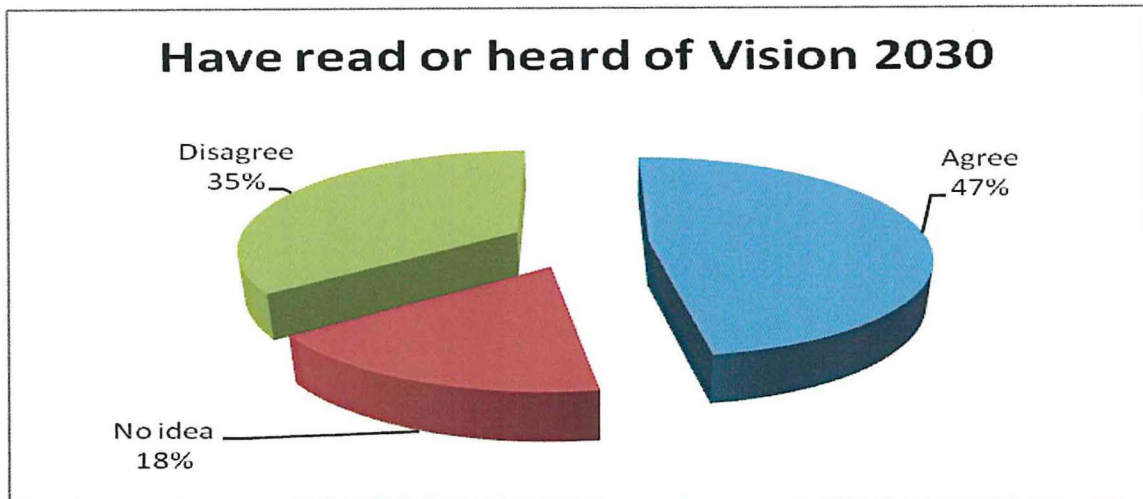


Figure 4.14: Have read or heard of Vision 2030

Figure 4.15 shows that knowledge transfer is a key pillar in the agricultural sector. Majority of the respondents strongly agreed effective knowledge transfer is the main means of boosting productivity in agriculture, especially among the SSFs. The respondents reported that unless an effective models for transferring the farming knowledge and skills to those who need it are designed then the knowledge will continue existing in books and benefiting only a few Large scale farmers' and the elite farmers.

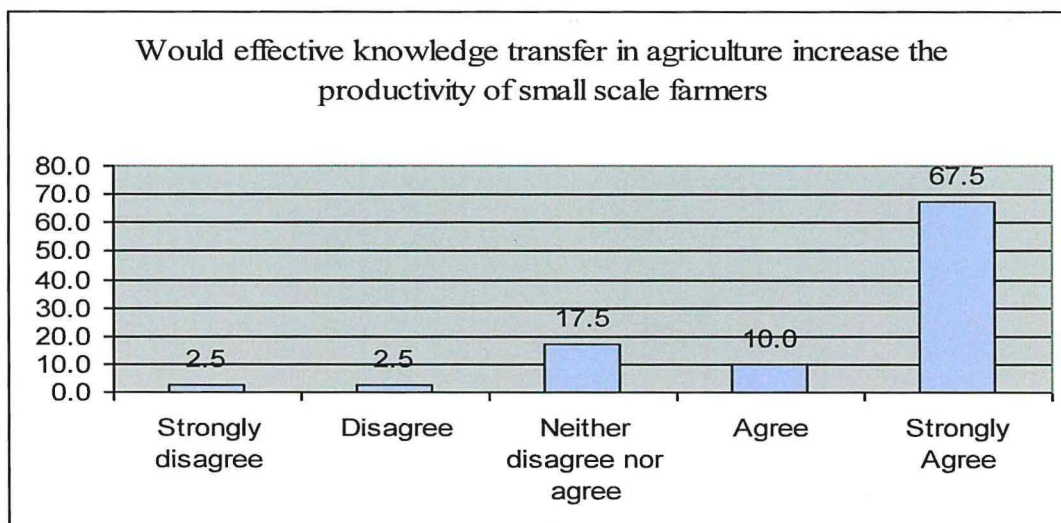


Figure 4.15: Effective knowledge transfer & Productivity

The agricultural knowledge and skills gap implies that each new medium of knowledge transfer decreases the gap between the information rich and information poor. Differences in access to the mediums (like radio, television, extension workers, farmers forum), and control over their use, among other factors has contributed to this knowledge and skills gap.

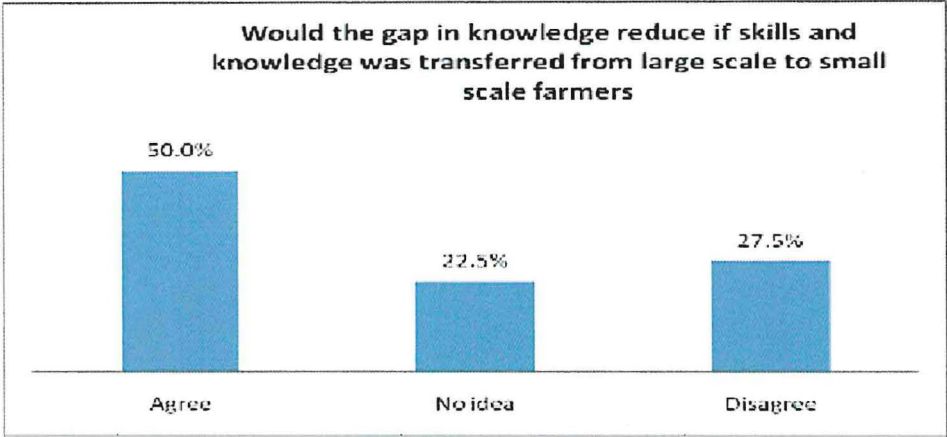


Figure 4.16: Gap in knowledge following knowledge transfer

Figure 4.16 shows that if skills or knowledge is transferred to and among the farmers, both large and small scale farmers, the gap in the pyramid will reduce. 50% of the respondents agree that knowledge transfer will definitely reduce the knowledge and skills gap among the farmers.

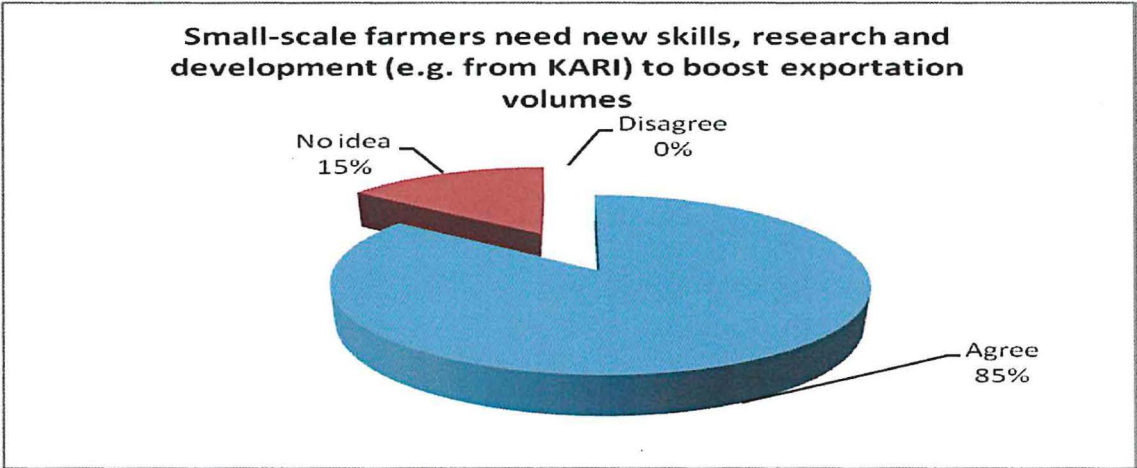


Figure 4.17: Skills for farmers

Figure 4.17 shows that a majority (85%) of the farmers assert that indeed, large and Small-Scale farmers (SSFs) need new skills, new research knowledge and development, like from KARI to boost exportation volumes, hence if the hindrances in knowledge and skills transfer to and among the farmers are overcome, exportation volumes for Kenya will increase. Knowledge here includes market information, quality information as well as pricing information. Information on crops that are more weather resistant, planting methods, and crop diseases control etc need to be disseminated to the farming community at the right time.

Figure 4.18 shows that only 45% have bought or read books in agriculture. An intervention model needs to encompass material for knowledge dissemination in order to improve the productivity of small-scale farmers in Kenya. Knowledge transfer seeks to organize, create, capture or distribute knowledge and ensure its availability for future users.

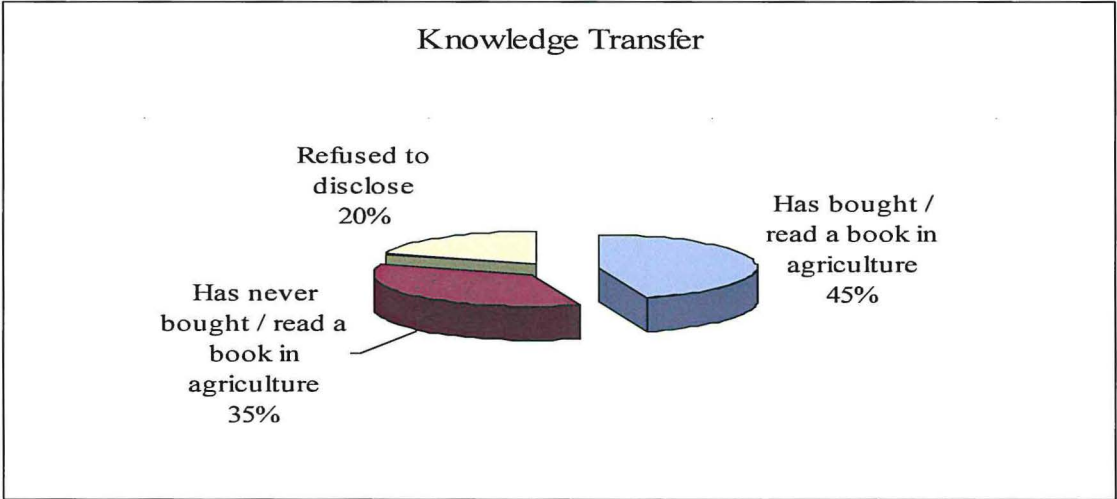


Figure 4.18: Knowledge transfer through reading

4.4 Testing the Research Hypotheses

In reference to the conceptual model in Figure 2.2 and the proposed hypotheses, this section presents the results of the hypotheses test. The study assumed a linear relationship between the predictors and dependent variables. Linear regression was used to examine the relationships and predictive ability of the independent variables. The mathematical form of the regression model was, $SKT = \alpha_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \dots + \beta_iX_i + \epsilon_0$ as earlier described.

4.4.1 Relationship between Knowledge Gaps and Knowledge Transfer

While the previous descriptive analysis described the variables in terms of their frequencies, a determination of the magnitude of their impact was sought. The first research hypothesis was:

H₁: There is a significant relationship between knowledge gaps and successful knowledge transfer

A linear regression was used to enter the predictor variables in steps. The stepwise regression method resulted in four models as shown in Table 4.10 below. The one way analysis of variance (ANOVA) test results were used to assess the significance of the regression.

Table 4.10: ANOVA¹

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	818.695	2	409.348	3.562	.038 ^b
	Residual	4252.068	37	114.921		
	Total	5070.763	39			
2	Regression	2595.174	3	865.058	12.580	.000 ^c
	Residual	2475.589	36	68.766		
	Total	5070.763	39			
3	Regression	4059.656	4	1014.914	35.132	.000 ^d
	Residual	1011.107	35	28.889		
	Total	5070.763	39			
4	Regression	4621.267	9	513.474	34.270	.000 ^e
	Residual	449.496	30	14.983		
	Total	5070.763	39			

a. Dependent Variable: Successful Knowledge Transfer

The ANOVA Table 4.10 shows that model 1, 2, 3 and 4 were all significant ($p \leq 0.05$) in explaining the relationship between knowledge gaps and successful knowledge transfer.

Table 4.12 presents the model summary reflective of the four models generated. The coefficient of determination R square (r^2) column shows model 4 provides the best fit ($r^2 = 0.911$). The study therefore proceeds to interpret the coefficients related to model 4 in Table 4.12 below.

Table 4.11: Coefficients of Model 4

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
4 (Constant)	19.002	5.347		3.554	.001	8.082	29.921
What is your highest level of education	-2.555	1.194	-.213	-2.140	.041	-4.994	-.117
What did you study in college	-.041	.023	-.172	-1.781	.050	-.089	.006
Where do you sell your crops	.023	.059	.030	.384	.703	-.097	.142
What skills or knowledge can SSFs borrow from LSFs	.675	.318	1.260	2.120	.042	.025	1.325
Have you ever bought / read a book in agriculture	.025	.020	.086	1.225	.230	-.017	.066
Do you listen to radio / TV programs in agriculture	.088	.023	.273	3.840	.001	.041	.135
Have you heard about KARI, coffee research foundation or any other research institute and what they do?	.152	.042	.349	3.618	.001	.066	.238
Have you heard about Syngenta EA, Du Pont, Osho chemicals, Amiran, Bayer EA, SeedCo., Twiga Chemicals, Murphy chemicals, Kenya Seeds Company, Monsato, Pioneer Seed?	-.582	.453	-1.065	-1.284	.209	-1.507	.344
What in your opinion facilitates knowledge transfer in Kenya	.087	.277	.160	.315	.755	-.478	.652

a. Dependent Variable: Successful Knowledge Transfer

Table 4.11 shows that under model 4, there are five variables with significant p values ($p \leq 0.05$). These are: What is your highest level of education ($p=0.041$), what did you study in college ($p=0.050$), what skills or knowledge can SSFs borrow from LSFs ($p=0.042$), do you listen to

radio / TV programs in agriculture ($p=0.001$), have you heard about KARI, coffee research foundation or any other research institute and what they do ($p=0.001$).

Table 4.12: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.402 ^a	.161	.116	10.72011	.161	3.562	2	37	.038	
2	.715 ^b	.512	.471	8.29255	.350	25.834	1	36	.000	
3	.895 ^c	.801	.778	5.37483	.289	50.694	1	35	.000	
4	.955 ^d	.911	.885	3.87081	.111	7.497	5	30	.000	1.797

e. Dependent Variable: Successful Knowledge Transfer

4.4.2 Relationship between Hindrances and Knowledge Transfer

The second research hypothesis was:

H_2 : Hindrance has a significant effect on successful knowledge transfer

The ANOVA Table 4.13 shows that model 1, model 2 and model 3 are all significant ($p \leq 0.05$) in explaining the relationship between hindrance and successful knowledge transfer.

Table 4.13: ANOVA of Model 1, 2 & 3

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1733.016	1	1733.016	19.730	.000 ^b
	Residual	3337.747	38	87.835		
	Total	5070.763	39			
2	Regression	1836.331	2	918.165	10.503	.000 ^c
	Residual	3234.433	37	87.417		
	Total	5070.763	39			
3	Regression	1836.519	3	612.173	6.814	.001 ^d
	Residual	3234.244	36	89.840		
	Total	5070.763	39			

a. Dependent Variable: Successful Knowledge Transfer

The model summary in Table 4.14 provides a description of the three models generated. The significance column shows that only model 1 and model 2 are significant. Model 2 has a higher $r^2 = 0.362$ as compared with model 1 ($r^2 = 0.342$). Because model 2 has a better fit, the study proceeds to interpret the coefficients related to model 2 in Table 4.14 below.

Table 4.14: Model Summary of Hindrances

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.585 ^a	.342	.324	9.37206	.342	19.730	1	38	.000	
2	.602 ^b	.362	.328	9.34971	.020	1.182	1	37	.028	
3	.602 ^c	.362	.309	9.47840	.000	0.002	1	36	.964	1.8245292

a. Dependent Variable: Successful Knowledge Transfer

Table 4.15 shows that under model 2, one predictor (What would you say are the major challenges in your farming operations) was significant with p value = 0.000. The study therefore fails to reject H_2 at 95% C.I and concludes that hindrance has a statistically significant effect on successful knowledge transfer.

Table 4.15: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	9.524	1.550		6.146	.000	6.387	12.661
	What would you say are the major challenges in your farming operations	0.310	0.070	.585	4.442	.000	0.169	.451
2	(Constant)	10.067	1.625		6.196	.000	6.775	13.360
	What would you say are the major challenges in your farming operations	.380	.095	.717	4.001	.000	.188	.572
	What is the most important unmet need in your farming activities	-.077	.070	-.195	-1.087	.284	-.219	0.066
3	(Constant)	10.054	1.672		6.013	.000	6.663	13.445
	What would you say are the major challenges in your farming operations	.376	.136	.709	2.755	.009	.099	.652
	What is the most important unmet need in your farming activities	-.076	.071	-.195	-1.071	.291	-.221	.068
	What risks have you experienced	.004	.098	0.010	0.046	.964	-0.194	.203

a. Dependent Variable: Successful Knowledge Transfer

4.4.3 The Moderating Effect of Hindrances on the Relationship Between Knowledge Gaps and Knowledge Transfer

After establishing the existence of a significant relationships between knowledge gaps and successful knowledge transfer (H_1), and also that hindrances significantly influence successful knowledge transfer (H_2), the study sought to examine the mediating effect of hindrance by testing the third research hypothesis:

H_3 : *The relationship between knowledge gaps and successful knowledge transfer is moderated by hindrance*

Using stepwise regression process, the five variables that were significant in the relationship between knowledge gaps and successful knowledge transfer (H_3) were entered leading to generation of Model 1 in Tables 4.16, Table 4.17 and Table 4.18. The variables that define hindrance were then entered step by step leading to the generation of the other models 2, 3 and 4. The ANOVA Table 4.16 shows that model 1, model 2, model 3 and model 4 are all significant ($p \leq 0.05$) in explaining the relationship between hindrance and successful knowledge transfer.

Table 4.16: ANOVA Results of the Moderation Effect

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4565.869	5	913.174	61.494	.000 ^b
	Residual	504.894	34	14.850		
	Total	5070.763	39			
2	Regression	4568.319	6	761.387	50.007	.000 ^c
	Residual	502.444	33	15.226		
	Total	5070.763	39			
3	Regression	4586.246	7	655.178	43.271	.000 ^d
	Residual	484.517	32	15.141		
	Total	5070.763	39			
4	Regression	4586.381	8	573.298	36.690	.000 ^e
	Residual	484.382	31	15.625		
	Total	5070.763	39			

a. Dependent Variable: Successful Knowledge Transfer

The model summary in Table 4.18 provides a description of the four models. The significance column shows that only model 1 is significant with a $p = 0.000$. Models 2, 3 and 4 all were representing variables that defined hindrances were not significant. The study therefore fails to accept H_3 which means that hindrances do not moderate the relationship between knowledge gaps and successful knowledge transfer. Model 1 is therefore adopted in this study as providing the best description of the relationship between the variables and is interpreted as follows.

Table 4.17: Coefficients of the Moderation Effect

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	21.609	4.898		4.412	.000	11.655	31.563
	What is your highest level of education	-3.195	1.085	-.266	-2.945	.006	-5.399	-.990
	What did you study in college	-.058	.021	-.241	-2.812	.008	-.100	-.016
	What skills or knowledge can SSFs borrow from LSFs	.215	.052	.401	4.124	.000	.109	.321
	Do you listen to radio / TV programs in agriculture	.099	.021	.306	4.694	.000	.056	.141
	Have you heard about KARI, coffee research foundation or any other research institute and what they do?	.147	.041	.338	3.567	.001	.063	.231

a. Dependent Variable: Successful Knowledge Transfer

4.4.4 Evaluating the Model

Following the outcome above, model 1(one) in Table 4.18 is evaluated. Model 1 has a coefficient of determination (R^2) = 0.900. This means 90.0% of the variance in the dependent variable (successful knowledge transfer) is explained by five independent variables (level of education of the farmers, what the farmer studied in college, the type of skills that small farmers can borrow from the large farmers, access to agricultural information from radio and TV and access to research institutes like KARI). The model provides a very strong fit, implying the five variables are identified as the largest areas of knowledge gaps amongst small scale entrepreneurial farmers in Kenya.

Table 4.18 Model Summary of the Moderation Effect

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.949 ^a	.900	.886	3.85355	.900	61.494	5	34	.000	
2	.949 ^b	.901	.883	3.90200	.000	.161	1	33	.691	
3	.951 ^c	.904	.884	3.89117	.004	1.184	1	32	.285	
4	.951 ^d	.904	.880	3.95288	.000	.009	1	31	.927	1.964

e. Dependent Variable: Successful Knowledge Transfer

The relationship between the variables presented in coefficients Table 4.17 and the model summary Table 4.18, led to the derivation of a linear regression model of the form: $SKT = \alpha_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \dots + \beta_iX_i + \epsilon_0$, as earlier proposed. The resulting model was;

$$SKT = 21.609 - 3.195E - 0.058C + 0.125S + 0.99I + 0.147R$$

$$n = 60$$

$$r^2 = 0.900$$

Where:

- SKT = Successful knowledge transfer
- E = Education level of the farmers
- C = College training
- S = Skills transfer from LSFs to small scale farmers
- I = Information on agriculture accessed by radio and TV
- R = Research Centers accessibility

The standardized coefficients column Table 4.18 shows that, skills transfer from LSFs to SSFs had the highest $\beta = 0.401$. Skills transfer from LSFs to SSFs therefore had the greatest impact factor on successful knowledge transfer. This meant that successful skill transfer depended on skills transfer from LSFs to SSFs 40.1% of the times. The regression model shows a positive relationship between skills transfer from LSFs to SSFs and successful skill transfer. This meant that the more the SSFs acquired skills from the LSFs, the more successful the knowledge transfer.

4.5 Summary

The data collected was profiled, analyzed and presented. Chapter four provided descriptive statistics of the sampled data, examined relationship amongst variables, tested research hypotheses and determined the predictive effect of the independent variable (knowledge transfer) on the dependent variable (successful knowledge transfer).

CHAPTER FIVE: DISCUSSION

5.1 Introduction

In this chapter, a discussion of the major results is presented. Initially the respondent profile with significant implications to the study is discussed, followed by a discussion relating to the three research objectives. Using interviews, exploratory data was gathered and this data is infused in the discussion in this chapter. This study sought to determine the skills and knowledge farmers require in order to run their farms as business enterprises, identify knowledge and skills gap among the small and large-scale farmers, determine the hindrances in knowledge transfer, and establish an appropriate model for knowledge and skills transfer that will allow SSFs acquire the pre-requisite knowledge and skills for operating an agricultural enterprise.

5.2 Respondent Profile

The demographic profile shows that most of the farmers were of the male gender, indicative of the labor intensive nature of farming that makes it more attractive to the male gender. It was noted that a majority of the heads of family households happen to be men and that most of the farmers who own land were men. While this is consistent with the African customs where men own almost all the productive resources in an African set up, this meant the female gender played an insignificant role in farming decision making and that cultural factors in such circumstances acted as a deterrence to knowledge and skills transfer. This observation was consistent to the works of Onyekwere et al., (1989) and also Nweke et al., (2002) who acknowledged men have assumed an increasingly important role in agriculture processing and distribution system, in Africa.

The study established that a majority of those involved in farming were in the age bracket of 31-40 years, indicating youthfulness of the agricultural entrepreneurs. Few of the younger generation and even fewer of the older generation were involved in farming. This trend is in line with the observation that agriculture is labor intensive and requires energetic individuals.

Majority, 74.8 % of those involved in farming reside in the compound and work in the farm at least once a week, with a similar age group of 21 – 50 years living away (non-resident) but assisting in the farm activities. This meant the respondents were to a large extent fully employed in agriculture. Hence confirming the trend earlier presented in Table 2.3, which shows an increase in number of wage rate for those employed in Agriculture overtime as capture in the Economic Survey (2009).

Over 60% of the households had nonresident members (family members living in schools, colleges and university most of the time) aged below 20 years, while the nonresident members met the criteria of being young and energetic, their absence most of the time meant, they were not accessible for knowledge transfer. This age set further indicates agricultural knowledge transfer would be more effective if targeted at farmer's aged 31-40 years. Most of the farmers had more than 11 years of farming experience and were well educated with many having attained college level education. Literacy as evidenced in literature is a fundamental platform of facilitating knowledge transfer.

5.3 Knowledge Gaps and Knowledge Transfer

The first objective that motivated this study was to determine the knowledge and skills gap among farmers in Kenya while the second research objective sought to determine the relationship between the knowledge gaps and knowledge transfer. Literature reviewed revealed numerous sources of knowledge and skill gaps among farmers. The sources identified as potential determinants of knowledge and skill transfer were structured in questionnaires and the resulting data analyzed. By testing hypothesis one (H1) the study validated objective one and two. The study failed to reject H1 and concluded that there were knowledge gaps in farming and that a statistically significant relationship exists between knowledge gaps and successful knowledge transfer.

Five variables were identified as having significant effect p value ≤ 0.05 including. These were: What is your highest level of education ($p=0.041$), what did you study in college ($p=0.050$), what skills or knowledge can SSFs borrow from LSFs ($p=0.042$), do you listen to radio / TV programs

in agriculture ($p=0.001$), have you heard about KARI, coffee research foundation or any other research institute and what they do ($p=0.001$). The five are discussed below.

The level of education of the entrepreneurial farmer significantly affected their ability to transfer or acquire knowledge. As mentioned in discussion on the farmers demography above, most of the farmers interviewed had up to college level of education and literate was touted as a critical ingredient of successful knowledge transfer. It is easier to train educated farmers on new techniques of commercial farming, efficient production methods, use of agrochemicals to boost profits from farming proceeds amongst others. Lack of formal education impedes knowledge transfer and ends up stifling the farming enterprise. Education is critical as expounded in the UK educational policy, which asserted that the economic future depended on productivity as a nation and that required a labour force with the skills to match the best in the world (Department for Education and Skills, 2006).

The study established a positive relationship between what the farmers had studied in college and knowledge transfer. The descriptive frequencies had indicated that a majority of those interviewed had studied agriculture in college. This relationship indicates a possible existence of a significant correlation between the skills acquired at college level and knowledge transfer. College graduate with agricultural orientation are more likely to seek employment in agriculture and have a higher potential of appreciating knowledge transferred to them in agriculture.

A positive significant relationship was observed between 'what skills or knowledge can SSFs borrow from LSFs' and knowledge transfer. Most of the LSFs are either well established organizations with formal structures and technically trained employees with vast skills in agriculture. It was observed that interaction between the small scale farmers and the LSFs, facilitated knowledge transfer to a large extent. From the findings of the study, the productivity of the SSFs can be boosted through knowledge and skills transfer. The respondents, who operate SSFs, asserted that their key requirements are access to agrochemicals and knowledge on application of the same. This could be attributed to the fact that the agrochemicals are expensive and rate of crop failure is high due to pests and diseases and requires specific training on application of agrochemicals. Interaction of the SSFs and well established LSFs is therefore

more likely to increase knowledge transfer resulting in a more entrepreneurial farmer, especially the SSF.

Modern farmers who operate successful business use modern techniques. The study confirmed that the most sought after knowledge transfer from LSFs to SSFs was how to use agrochemicals for various crops. Proper use of agrochemicals results in increased productivity of the farming activity. SSFs also sought market information. Successful farmers are those able to sell their output to not only the local market but even foreign markets. This is confirmed in a report documented in the Economic Survey (2009) that exhibits an increasing trend of exporting farm produce. The study established that SSFs also seek a symbiotic relationship with LSFs in order to acquire knowledge about contemporary research indicating new crops or new seedlings in the market. An appreciation of such knowledge is likely to positively influence farm performance making the farming activity entrepreneurial in scope.

A strong positive relationship between 'do you listen to radio and TV programs in agriculture and knowledge transfer was observed to exist in this study. This meant that farmers sought information on contemporary developments in agriculture, because such information would boost their farm performance to a greater extent. The exploratory interviews had given a strong indication that the most sought after information was on the use of agrochemicals to boost farm performance. They also seek information on the availability of markets for their produce and most prevalent prices in the market. Farmers got this information by listening to radio and TV. A Chi-Square test for independence of association established the existence of a statistical significant association between listening to radio / TV programs in agriculture and the Radio / TV programs in agriculture listened to. This observation means that farmers who listen to radio/TV may end up getting more information than those who don't. Knowledge access and transfer is more likely when such information is relayed via Radio/TV than other modes of communication.

Not many of the small-scale farmers have read books on agriculture or received post tertiary education. Their counterparts in the large-scale farms have advanced training and the knowledge and skills gap could be a limiting factor on agricultural productivity and commercialization

especially of small scale farms. The mediums for knowledge transfer were determined as schools, the media, the government, extension officers and individual effort. Bearing this in mind, a likely appropriate model for knowledge transfer needs to encompass ‘advisers’ of agricultural knowledge or extension officers.

A significant relationship was established between ‘have you heard about KARI, coffee research foundation or any other research institute and what they do and knowledge transfer. According to Kiplang’at (1999), the key to increased agricultural production ultimately lies with the Nation’s ability to disseminate relevant information to the farming community to facilitate the effective adoption of new production techniques and knowledge transfer from large-scale farmers. In Kenya KARI is tasked with such responsibility and while the study established that most (90%) of the farmers had heard about KARI, the interviews indicated that they complained of not being able to access KARI. This was a strong indicator of a knowledge gap, that while KARI could be holding crucial knowledge on new skills on crop production, such information never reached farmers to help revitalize their farming into an entrepreneurial activity.

The study noted that the most sought after knowledge from KARI by LSFs and SSFs was information on: Information on crops that are more weather resistant, planting methods, crop diseases control, market information, quality information and pricing information. The study observed that such information from KARI would boost production and increase the volume for local and international sales making farmers gain from the entrepreneurial ventures of agribusiness. Hence if the transfer of knowledge and skills from KARI to farmers is enhanced, the volume of trade, particularly export earnings from agriculture could be increased leading to economic growth as shown in Table 2.4.

5.4 Moderating Effect of Hindrance (Integrated model)

Third research objective was to determine the moderating effect of hindrances on the relationship between knowledge gaps and successful knowledge transfer in the agricultural sector in Kenya. This was restated as hypotheses three (H₃) and tested. To test for the moderating effect, the study developed three steps. First an examination of the existence of a significant relationship between knowledge gaps and successful knowledge transfer (H₁), followed by an examination of the

existence of a significant relationship between hindrance and successful knowledge transfer (H₂) and last an examination of the existence of a significant relationship between knowledge gaps and successful knowledge transfer after integrating hindrance as a moderating variable.

There was a significant relationship between knowledge gaps and successful knowledge transfer and H₁ was validated. There was a significant relationship between hindrance and successful knowledge transfer and H₂ was validated. There was no statistically significant relationship between hindrance and successful knowledge transfer and H₃ was not accepted. The study however noted that while hindrance played no significant role in moderating the relationship between knowledge and knowledge transfer, hindrance significantly related with knowledge transfer.

The concept of hindrance was coined in the study to refer to parameters that had a strong influence on knowledge transfer but which the farmers/researcher had no control over. The variables that defined hindrance included: risk associated with weather, cultural association and farmers' unmet need.

Weather was identified as the most critical challenge in adopting knowledge, from knowledge transfer, with up to 70% of the respondents casting blame on the unpredictability of weather for their crop failure. A further 57.5% of the farmers mentioned that drought related to prolonged dry spells negatively influenced their effort of adopting new knowledge. This variable was identified in Economic Survey (2009) as a major challenge to growth in the agricultural sector.

Cultural association was conceptualized as encompassing inherent cultural practices that define the behavior of a people. In this study culture was examined from the perspective of: land ownership, gender roles, primary economic activity of the respondent, household heads, number of household members involved in farming and key agricultural activity. The study confirmed that because of African cultural practices, land ownership was to a great extent under control of the male gender. That because of the nature of farming the female gender played a less significant role in farming activities. The primary economic activity of those surveyed was agriculture, meaning there was need to transfer knowledge for their farming activities to prosper and become entrepreneurial.

The study observed that the farmers had numerous unmet needs. The major unmet needs were the unaffordable prices of inputs and implements, market accessibility, poverty and land size. Poverty lead to lack of equipment, insufficient resources to purchase fertilizers and inputs, and illiteracy among the small-scale farmers were determined as key hindrances to knowledge and skills transfer. While the large-scale farmers invest heavily on agricultural inputs and equipments, a different trend is witnessed among the small-scale farmers. The sizes of the farms of the small-scale farmers were on average between 2 to 10 acres whilst the LSFs possess on average between 100 to 200 acres of land. The existence of these unmet needs reduced the farmer's potentiality to gain from knowledge transfer.

5.5 Chapter Summary

This chapter broadly discussed that made significant contribution to the study. The chapters explained how the three research objectives were met and the extent of attainment. From the discussion, the study deduced that knowledge gaps exist and they influence knowledge transfer and entrepreneurship in Kenya's agricultural sector, especially among the small scale farmers.

CHAPTER SIX: CONCLUSION AND RECOMMENDATION

6.1 Conclusion

This study concludes that there is a significant relationship between the independent (knowledge gaps) and dependent variable (knowledge transfer). Knowledge gaps affect knowledge transfer to a great extent. The most significant predictors of knowledge transfer according to their impact factor were the following five: skills transfer from the large scale farmers to small scale farmers (0.401), access to research centers (KARI) and extension service providers like Syngeta EA, Osho chemicals, Amiran, Bayer EA, Twiga Chemicals, Kenya Seeds Company and others (0.338), access to information on agriculture relayed via TV and radio (0.306), education of the farmers (0.266) and the courses pursued at college level (0.241).

From the findings, it was deduced that the likely appropriate model for knowledge transfer will involve the use of both formal and informal learning institutions as mediums for knowledge transfer. The likely appropriate model will entail having the actors interact and share best practice

Agriculture was prescribed in Kenya's MDGs as the avenue to improve the economy of the country and from the findings of the study, more than half of the respondents had heard and read of the Vision 2030 plan and indeed strongly agreed that with knowledge transfer, the farmers' productivity would increase thereby inching closer to meeting the MDG goals on agricultural productivity and narrowing the gap between the large-scale farmers and small-scale farmers. The findings were also similar to the affirmation of the hypothesis that was formulated to state that with the implementation of a robust model for knowledge and skills transfer, there will be increased knowledge transfer among the small and large-scale farmers leading to higher productivity and commercialization of farming especially of the small scale farms.

6.2 Recommendation

Investment in knowledge transfer may not necessarily guarantee a return on the investment and productivity. A key recommendation to other scholars and academicians is to undertake studies that determine the return on investment in knowledge transfer for the farmers, especially the small scale farmers, but also for other actors.

A key recommendation to the Government is to support the farmers by supporting the purchase of inputs and equipment as well as revive the services of agricultural extension workers to continuously advise the farmers on the various farming challenges. The new devolved government and the Counties provide a new opportunity for the ministry of agriculture to establish agricultural extension service departments at County levels. This will ensure that SSFs in all the Counties can easily access the services of agricultural extension officers. Eventually this will ensure smooth and localized knowledge and skills transfer to the farmers, increased farm production and commercialization of farms especially the small scale farms.

The farmers continue to struggle to purchase farm inputs and equipments and thus, there is urgent need for the government to formulate favorable policies that will lead to enhanced agricultural productivity. Fertilizer for example can be manufactured locally and the government can also invest more in the metrological department for accurate weather forecasts.

A key recommendation to the stakeholders like multinationals and KARI is to continue researching and promoting new skills in farming. Agriculture remains the backbone of our economy and therefore it is important to research and appropriately communicate the research outcome to the farmers in a way they can understand so as to increase farm productivity.

One recommendation to the media is to increase agricultural educative programs and documentaries that will facilitate knowledge transfer. And to the schools, institutions, colleges and universities is to continue in their efforts of research and development, partnership with other institutions for impact and continually train and educate the small-scale farmers in order to enhance their agricultural knowledge and skills levels.

As an area for further research, one of the applicable issues that arise is measuring the return on investment (ROI) in knowledge transfer. There is need for other scholars to further study this area to determine and quantify the large and small-scale farmers' returns on investing in knowledge transfer. When you attend the field days, when you read agricultural books, when you seek the assistance of the extension officers, when you listen to radio programmes and interact with the large scale or other small scale farmers, what returns would the farmer expect from this, by how much should the farmer expect his production to increase?.

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APPENDICES

APPENDIX I: Tables

Table 2.1: Gross Domestic Product by Activity (Per cent contributions to GDP)

INDUSTRY	2004	2005	2006	2007	2008
Agriculture and forestry	24.4	23.8	23.4	21.6	23.4
Fishing	0.5	0.4	0.4	0.4	0.4
Manufacturing	10.0	10.5	10.3	10.4	10.6
Electricity and water supply	1.9	2.0	1.8	1.5	1.5
Construction	3.8	4.0	3.9	3.8	3.8
Wholesale and retail trade, repairs	9.2	9.2	9.3	9.7	10.0
Hotels and restaurants	1.3	1.4	1.5	1.6	1.1
Transport and communication	9.9	10.3	10.6	10.6	10.2
Financial intermediation	3.5	3.5	4.0	4.7	4.7
Real estate, renting and business services	5.7	5.6	5.4	5.3	5.1
Public administration and defense	4.2	4.5	5.4	5.8	5.0
Education	7.9	7.4	7.0	6.8	6.3
Health and social work	2.6	2.6	2.5	2.5	2.4
Other community, social and personal services	3.9	3.8	3.6	3.5	3.4
Private households with employed persons	0.4	0.4	0.4	0.4	0.4
Less: Financial services indirectly measured	-0.7	-0.8	-0.9	-1.1	-0.9
All industries at basic prices	88.9	89.1	89.0	88.2	88.2
Taxes less subsidies on products	11.1	10.9	11.0	11.8	11.8
GDP at market prices	100.0	100.0	100.0	100.0	100.0

(Economic Survey, 2009)

Table 2.2: Domestic Exports by Broad Economic Category, 2004 -2008

DESCRIPTION	2004	2005	2006	2007	2008
1. Food and Beverage	75,071	91,127	97,801	105,549	130,273
2. Industrial supplies (non-food)	39,479	51,219	53,715	66,678	92,500
3. Fuel and lubricants	1,182	6,894	6,882	8,931	4,589
4. Machinery & other capital equipment	1,904	2,252	3,529	4,426	5,566
5. Transport equipment	1,716	2,206	2,762	3,475	3,672
6. Consumer goods not elsewhere specified	33,648	56,072	63,436	72,623	86,036
7. Goods not elsewhere specified	6,061	148	56	3	24
TOTAL	159,061	209,918	228,181	261,685	322,660
PERCENTAGE SHARES					
1. Food and Beverage	47.2	43.4	42.9	40.3	40.4
2. Industrial Supplies (Non-Food)	24.8	24.4	23.5	25.5	28.7
3. Fuel and Lubricants	0.7	3.3	3.0	3.4	1.4
4. Machinery and other Capital Equipment	1.2	1.1	1.5	1.7	1.7
5. Transport Equipment	1.1	1.1	1.2	1.3	1.1
6. Consumer Goods not elsewhere	21.2	26.7	27.8	27.8	26.7

Specified					
7. Goods not elsewhere specified	3.8	0.1	0.0	0.0	0.0
TOTAL	100.00	100.00	100.00	100.00	100.00

(Economic Survey, 2009)

Table 2.3: Wage Employment by Industry and Sector, 2004-2008

	2004	2005	2006	2007	2008	% Change
PRIVATE SECTOR						
Agriculture and Forestry	264.8	272.4	280.3	289.0	289.7	0.2
Mining and Quarrying	4.9	5.1	5.3	5.6	5.9	5.4
Manufacturing	212.0	221.7	228.5	237.9	237.0	-0.4
Electricity and Water	1.9	1.9	1.9	2.2	2.3	4.5
Building and Construction	54.4	55.7	57.9	61.2	64.9	6.0
Wholesale and Retail Trade, Restaurants and Hotels	161.7	169.2	179.6	189.8	196.4	3.5
Transport and Communication	60.7	75.1	90.9	117.8	120.3	2.1
Finance, Insurance, Real Estate and Business Services	70.2	72.4	75.5	79.0	81.9	3.7
Community, Social and Personal Services	276.7	283.9	287.8	299.2	307.1	2.6
TOTAL PRIVATE SECTOR	1,107.3	1,157.4	1,207.7	1,281.7	1,305.5	1.9
PUBLIC SECTOR						
Agriculture and Forestry	55.8	54.8	54.3	50.9	51.0	0.2
Mining and Quarrying	0.7	0.7	0.7	0.7	0.7	0.0
Manufacturing	31.6	31.1	30.8	26.9	27.1	0.7
Electricity and Water	18.9	18.3	17.7	16.8	17.0	1.2
Building and Construction	23.0	22.5	22.0	20.1	19.9	-1.0
Wholesale and Retail Trade, Restaurants and Hotels	6.3	6.2	6.3	6.0	6.0	0.0
Transport and Communication	37.9	38.9	40.2	36.1	37.4	3.6
Finance, Insurance, Real Estate and Business Services	15.0	16.5	16.8	14.3	14.2	-0.7
Community, Social and Personal Services	468.2	465.2	461.1	456.3	464.7	1.8
TOTAL PRIVATE SECTOR	657.4	654.2		628.1	638.0	1.6

(Economic Survey, 2009)

Table 2.4: Recorded Marketed Production at Current Prices, 2004-2008 (Ksh Million)

	2004	2005	2006	2007	2008
CEREALS					
Maize	6,880.5	6,342.4	7,170.2	7,969.2	8,326.6
Wheat	1,864.0	2,232.3	2,073.4	3,074.1	2,613.8

Others	2,055.3	3,329.5	3,843.2	3,574.3	2,458.1
Total	10,799.8	11,904.2	13,086.8	14,617.6	13,398.4
HORTICULTURE					
Cut flowers	18,720.0	22,896.8	23,560.6	43,101.5	39,765.9
Vegetables	12,068.0	13,891.4	17,822.9	22,354.3	16,128.7
Fruits	1,803.0	2,049.9	1,737.3	1,797.9	2,071.2
Total	32,591.0	38,838.1	43,120.8	67,253.7	57,965.8
TEMPORARY INDUSTRIAL CROPS					
Sugar –cane	8,389.8	9,169.6	9,998.9	11,704.3	12,291.1
Pyrethrum	305.7	158.1	74.1	98.6	91.9
Others	644.6	859.0	602.5	808.5	786.5
Total	9,340.1	10,186.7	10,675.5	12,611.4	13,169.5
PERMANENT CROPS					
Coffee	7,284.5	8,999.1	10,023.6	9,089.9	6,859.3
Tea	41,212.2	38,829.9	45,162.0	43,887.0	55,383.1
Sisal	1,275.4	1,289.2	1,228.2	1,492.9	1,451.4
Total	49,772.0	47,948.2	56,413.8	54,469.8	63,693.8
TOTAL CROPS	102,502.9	108,877.2	123,296.9	148,952.5	148,227.5
LIVESTOCK AND PRODUCTS					
Cattle and Calves	11,284.8	13,063.5	13,403.2	13,451.6	13,494.1
Dairy Produce	4,385.0	5,313.2	6,494.4	8,462.2	8,368.7
Chicken and eggs	1,705.7	1,901.5	2,186.7	2,575.5	2,788.8
Others	3,391.2	3,980.7	4,291.5	5,202.1	5,977.6
Total	20,766.7	24,258.9	26,375.8	29,691.4	30,629.1
FISH					
Freshwater fish	7,182,213	7,207,619	8,070,557	7,983,627	8,382,808
Marine fish	327,592	305,871	334,624	422,046	443,148
Crustaceans fish	221,106	99,278	123,105	145,437	152,709
Other marine products	29,895	39,098	38,485	43,382	45,551
TOTAL	7,760,806	7,651,866	8,566,771	8,594,492	9,024,216
GRAND TOTAL	131,030.4	140,788.0	158,239.5	187,238.4	187,780.1

(Economic Survey, 2009)

Table 2.5: Sale to Marketing Boards from Large and Small Farms, 2004-2008

	LARGE FARMS		SMALL FARMS		TOTAL		
	KSH mn.	Annual Percentage Change	KSH mn.	Annual Percentage Change	KSH mn.	Annual Percentage Change	
2004	33,086	21.59	90,184	16.20	123,270	17.60	73.16
2005	34,828	5.27	98,308	9.00	133,136	8.00	73.84
2006	38,860	11.58	110,813	12.72	149,673	12.42	74.04
2007	43,053	10.79	135,591	22.36	178,644	19.36	75.90
2008	48,148	11.83	130,709	-3.60	178,857	0.12	73.08

(Economic Survey, 2009)

APPENDIX II: Timeline of Activities

WORK PLAN

Progress Stage	Stage Description	Proposed dates
1	Scoping of the Research study	10 th Feb. 2011
2	Choice of Research Topic	25 th Feb to 15 th Mar 2011
3	Research Problem clarification, Research objectives, Purpose and Significance	20 th to 30 th Mar 2011
4	Foundation Literature survey	1 st 15 th April 2011
5	Proposal of Research Methodology	April 2011
6	Advanced Literature Review (Chapter By Chapter)	April 2011 to April 2012
7	Detailed Proposal of Research Methodology	May 2011 Dec 2011
8	Data Collection	June to Aug 2011
9	Data analysis and Interpretation	Sept 2011 to Jan 2012
10	Thesis Report writing	June 2011 to April 2012
11	Thesis Report Assessment By Supervisors	Sept 2011, Dec 2011, May 2012, April 2013
12	Thesis Correction Upon Assessment By Supervisors	Dec 2011, Sept 2012, May 2013

Any remarks:

God is good!!

APPENDIX III: Letter of Introduction

16th March, 2011

Strathmore Business School
Nairobi.

Dear Respondent,

RE: REQUEST TO FILL THE QUESTIONNAIRE

I am an MBA student at Strathmore University, and I wish to undertake the study whose topic is

“Investigating Knowledge and Knowledge Transfer for Entrepreneurship in Kenya’s Agricultural Sector”

I therefore kindly request that you take 10 minutes to respond to the questionnaire. This is an academic research and the information you provide will be used for academic purposes only and treated with confidence. Strict ethical principles will be observed to ensure confidentiality.

There will be no reference to your name or shop in the analysis; however I have provided my contacts and email address for any clarification. The response you provide will help in accomplishing the research objectives and will enable me complete my studies. The results will help in formulating policies that will support you.

In case of any questions, please do not hesitate to contact the undersigned on

Thank you very much for your invaluable contribution and we appreciate the time you have spared to answer the questions.

Sincerely,

William W. Ngugi

Tel. 0720632 464

APPENDIX IV: Questionnaire

Q1. Identification Particulars

Please provide the following identification information

1. Date of interview	
2. Name of enumerator	
3. District or county	
4. Name of respondent	
5. Gender of respondent	
6. Age of respondent	
7. Division	
8. Location	
9. Sub-Location	

Q2. Household Particulars

Provide the following detail about the household head

Gender 1 = Male, 2 = Female	Age (years)	Primary activity	Farming experience (years)	Highest Education level

Q3. Is the household head the **farm owner**?

() 1. Yes () No

If not, who is the **farm owner**? _____

Q4. Number of Household members (including HH head) living permanently on the compound

<u>Age Categories</u>	Males	Female	Total	Number actually working on the farm at least once a week
< 20 years				
21– 50				
> 50 years				
Number of children attending school				
Number of siblings opting to do farming				
Number of siblings opting for the city				

Q5. Number of Non-Resident Household members, living away but who occasionally benefit or assist the farm activities

<u>Age Categories</u>	Males	Female	Total
< 20 years			
21– 50			
> 50 years			

Q6. Are any of the non-residents (in 5 above) involved in any agricultural activities

Agricultural activities	Yes	No
selling animal feeds / products		
selling agro-chemicals		
selling agricultural machinery		
agricultural education		
others		

Q7. Can you identify the main reasons why some choose to go to the city?

- I. Seek for a job
- II. For education
- III. Business
- IV. Married
- V. Do not know
- VI. Others, please name

Q8. What is your highest level of education? Just tell me to stop when I reach the appropriate category.

- I. No formal education
- II. Primary school
- III. Secondary school
- IV. Tertiary / college
- V. University and above
- VI. Dropped out
- VII. Do not read

Q9. What did you study in college (accounting, agriculture, electrical, mason, animal husbandry?)

Q10. What is your job occupation? _____

Q11. If in agriculture related, what is your main role? _____

Q12. What category do you fall?

- I. Small Scale Farmer
- II. Large Scale Farmer
- III. Other – Government official / Stakeholder
- IV. Others _____

Q13. What is the approximate size of cultivated land?

Q14. How long have you worked on the farm _____ (In years)
_____ (In months)
_____ (any other response)

Housing and Food Security (to check income)

Q15. Type of wall for the house: mud only plastered wooden bricks stone

Q16. Type of roof for the house: grass iron-sheet tiles

Q17. What % of your income is from agriculture _____?

Q18. Where do you sell your crops?

Local markets' Marigiti in Nairobi Exports market Others

Q19. Do you keep animals / pets (cows, goats, chicken, pigs, horses, donkeys, dogs, cats)?

Yes No

Q20. Do you experience any food shortage?

I. If yes, what have you done to reduce the problem (use of fertilizer, irrigation, green houses, attend field days, sought assistance of extension officers)

Q21. What would you say are the major challenges in your farming operations, in terms of priority?

- Weather
- Knowledge in agriculture
- Lack of agriculture inputs (seeds, chemicals etc)
- Lack of agriculture equipments
- Prices for both inputs and equipments
- Labor
- Market access
- Others, name them _____

Q22. What is the most important unmet need in your farming activities?

- Lack of knowledge
- Lack of inputs (chemicals, seeds, etc)
- Lack of equipments
- Prices for inputs and equipments
- Market inaccessibility
- Others, name them _____

RISKS AND RISK MANAGEMENT

Q23. If you have experienced any risks related to weather, pests or diseases please indicate which ones.

Risks	What do you do to reduce the risk?
Droughts, dry spells	
Flooding	
Pests	
Diseases	
Weeds	
Other, specify	

Q24. Do you have any crop insurance (e.g. Weather index insurance)?

- Yes
- No

Q25. What else would you like to have insured? _____

Knowledge Transfer

Q26. On a scale of 1 to 5 where 1- is *Strongly Disagree* and 5 – is *Strongly Agree*, how would you rate the following attributes ...

Attributes	1 – Strongly Disagree	2	3	4	5 - Strongly Agree
Effective knowledge transfer in agriculture would increase productivity of small and LSFs in Kenya,	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
You have heard of / read vision 2030	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If skills or knowledge are transferred from LSFs to small scale farmers, the gap in the knowledge will reduce.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
LSFs have the knowledge they need for their farming activities – chemicals they need for their crops and the application, weather, equipments, markets	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
SSFs have the knowledge they need for their farming activities – chemicals they need for their crops and the application, weather, equipments, markets	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q27. Thinking specifically on Agriculture. How would you AGREE with the following statements?

RANDOMIZE	Strongly Disagree	Disagree	Neither Disagree Nor Agree	Agree	Strongly Agree	Don't Know
Small-Scale farmers need new Skills, Research & Development (e.g. from KARI)	o	o	o	o	o	o
Small-Scale farmers have the potential to transfer their skills and knowledge to the large-scale farmers	o	o	o	o	o	o

Q28 What skills or knowledge can SSFs borrow from LSFs?

- Required agrochemicals for various crops
- Application of agrochemicals
- Weather knowledge
- Market information
- Research and development in new crops
- Agricultural management skills
- Others _____

Q29. Have you ever bought / read a book in agriculture? If yes, which one? _____

Q30. Do you listen to radio /TV programs in agriculture? _____

If yes, which ones? _____

Q31. Have you heard of KARI, Coffee Research Foundation or any other research institution and what they do? What do you know about them?

Q32. Have you heard of the following companies (Place a tick against the one you know)

Syngenta East Africa Limited, Monsanto, Du Pont, Osho Chemicals, Amiran, Bayer East Africa Limited, SeedCo, Pioneer Seed Company, Twiga Chemicals, Murphy Chemicals, Kenya Seeds Company?

Q33. What, in your opinion, facilitates knowledge transfer in Kenya?

Government schools and colleges, media individual effort

Money Universities, Others' _____

Q34. Why do you think some farmers remain poor?

Q35. Any other comment _____

APPENDIX V: Photo Album



Photo 1: small-scale's farmer greenhouse



Photo 2: Small-scale farmer attending to greenhouse



Photo 3: Crop (tomatoes) in greenhouse



Photo 4: Small Scale Farms