

**THE ROLE OF PRIVATE VERNACULAR RADIO PROGRAMMES IN  
DISSEMINATING AGRICULTURAL MESSAGES TO SMALL-SCALE  
FARMERS IN KERICHO WEST SUB-COUNTY, KENYA**

**Joseph Mwangi Mithamo**

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

**EGERTON UNIVERSITY**

**FEBRUARY, 2015**

## DECLARATION AND RECOMMENDATION

### Declaration

I hereby declare that this thesis is my original work and has not been submitted before for an award of a degree or diploma in this university or any other University.

Signature .....

Date.....

**Joseph Mwangi Mithamo**

**Reg. No.: EM12/1613/06**

### Recommendation

This thesis has been submitted for examination with our approval as University supervisors.

Signed .....

Date.....

**Prof. C. A. Onyango**

**Professor of Agricultural Education & Extension**

**Egerton University**

Signed.....

Date .....

**Prof. J. G. Mwangi**

**Professor of Agricultural Education & Extension**

**Egerton University**

## **COPYRIGHT**

© 2015

Joseph Mwangi Mithamo

All rights reserved. No part of this work may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without the prior written permission from the author or Egerton University.

## **DEDICATION**

This thesis is dedicated to my family, who had been very supportive and understanding throughout my study period and my mother who believes that it is through education that one's quality of life can be improved.

## **ACKNOWLEDGEMENT**

I am extremely grateful to my supervisors Prof. C. A. Onyango and Prof. J. G. Mwangi for providing professional guidance in the development of the proposal and the thesis. They never gave up on me even when I felt like giving up.

Special gratitude goes to my course mate Mr Titus Masila and Mr Eliud Musakhi who kept on encouraging me so that we move together and complete the research. It is worth mentioning the input of panel members during defence at the department's and faculty oral examination of the proposal and the thesis and thereby improving their quality.

Acknowledgement also goes to the Board of Graduate School at Egerton University for granting me research funds without which this thesis may not have seen the light of day. I also acknowledge those who played any part in my Master's degree study whose names may not be listed here. Thanks a lot to you all and may God bless you.

## ABSTRACT

Radio is an important extension tool that can be used in sharing agricultural information with smallholder farmers in rural areas inexpensively. The use of vernacular in radio broadcasts makes programmes more acceptable to rural farmers and may be used to supplement public extension. However, the role of private vernacular radio stations in disseminating agricultural messages, the approaches they use, the challenges they face and the opportunities they offer farmers in Kericho West Sub-County is not well understood or documented. The study sought to address this. A Cross-Sectional Survey research design was used to collect data from a sample of 152 rural households and three inventoried private vernacular radio stations. An interview schedule for smallholder farmers and private vernacular radio stations was used for data collection. Experts in the Department of Agricultural Education and Extension assisted in reviewing the content and face validity of the instrument. Piloting was done in Buret Sub-County to determine the reliability of the data collection instrument. A reliability coefficient of 0.77 $\alpha$  was obtained which was above the 0.70 threshold for acceptable reliability. The statistical package for social sciences (SPSS) version 17 was used to analyse data. The hypotheses were tested using ANOVA and Chi-square at 0.05 significance level. The study showed that small-scale farmers receiving messages from a higher number of agricultural extension service providers did not have a significantly higher level of access to the messages than those receiving messages from fewer extension service providers. The most required agricultural messages were not necessarily the most accessed. The study also showed that participation in disseminated messages influenced farmers' access to the messages and that people in charge of agricultural extension programmes faced various challenges. Conclusions: Small-Scale farmers accessed messages from agricultural extension service providers but the number of providers did not influence the level of access. The more the messages that small-scale farmers required, the more they had access to from the vernacular radio. Participation in disseminated messages increased access to the messages. The people in charge of the agricultural programmes faced challenge in their involvement in agricultural extension. Recommendations: Extension service providers should use vernacular radio programmes to disseminate agricultural messages. The focus should be on the relevance rather than the number of messages disseminated. Since participation increased access to the disseminated messages, people in charge of the agricultural programmes should seek ways of increasing farmers' participation and should find ways of overcoming the challenges that they face.

## TABLE OF CONTENTS

<b>DECLARATION AND RECOMMENDATION .....</b>	<b>ii</b>
<b>COPYRIGHT .....</b>	<b>iii</b>
<b>DEDICATION.....</b>	<b>iv</b>
<b>ACKNOWLEDGEMENT.....</b>	<b>v</b>
<b>ABSTRACT .....</b>	<b>vi</b>
<b>TABLE OF CONTENTS .....</b>	<b>vii</b>
<b>DECLARATION AND RECOMMENDATION.....</b>	<b>vii</b>
<b>LIST OF TABLES .....</b>	<b>x</b>
<b>LIST OF FIGURES .....</b>	<b>xi</b>
<b>ACRONYMS AND ABBREVIATIONS.....</b>	<b>xii</b>
<b>CHAPTER ONE</b>	
<b>INTRODUCTION.....</b>	<b>1</b>
1.1 Background of the Study.....	1
1.2 Statement of the Problem .....	4
1.3 Purpose of the Study .....	4
1.4 Objective of the Study.....	4
1.5 Hypotheses and Research Questions of the Study .....	5
1.6 Significance of the Study .....	5
1.7 Assumptions of the Study .....	5
1.8 Limitations of the Study.....	6
1.9 Scope of the Study.....	6
1.10 Definitions of Terms .....	7
<b>CHAPTER TWO</b>	
<b>LITERATURE REVIEW .....</b>	<b>8</b>
2.1 Introduction .....	8
2.2 History of Farm Broadcasting .....	8
2.3 Radio Approaches in Agricultural Extension.....	10
2.4 Radio in Agricultural Extension.....	11
2.5 Role of Private Vernacular Radio Station in Agricultural Extension .....	13
2.6 Challenges Faced by Private Vernacular Radio Stations .....	14
2.7 Small-Scale Farmer’s Agricultural Information Needs .....	15

2.8 Gender and Agricultural Radio Extension Programmes .....	16
2.9 Relevance of Agricultural Information to Small-Scale Farmers.....	17
2.10 Contacts between other Farmers and Extension Providers .....	17
2.11 Theoretical Framework .....	18
2.12 Conceptual Framework .....	19
 <b>CHAPTER THREE</b>	
<b>RESEARCH METHODOLOGY .....</b>	<b>21</b>
3.1 Introduction .....	21
3.2 Research Design.....	21
3.3 Study Location .....	21
3.4 Target Population .....	22
3.5 Sampling Procedure and Sample Size.....	22
3.6 Instrumentation.....	23
3.6.1 Validity.....	24
3.6.2 Reliability .....	24
3.7 Data Collection Procedure .....	24
3.8 Data Analysis .....	25
 <b>CHAPTER FOUR</b>	
<b>RESULTS AND DISCUSSION .....</b>	<b>27</b>
4.1 Introduction .....	27
4.2 Farmers Personal Characteristics .....	27
4.2.1 Genders and Age of Respondents in Kericho West Sub-County.....	27
4.2.2 Education Level of Respondents.....	28
4.2.3 Farming Enterprise .....	29
4.3 Livestock Production Enterprises.....	30
4.3.1 Crop Production Enterprises .....	30
4.4 Sources of Agricultural Messages.....	31
4.4.1 Access to Agricultural Messages from Providers .....	34
4.5 Access to Required Crop Production Messages.....	35
4.5.1 Access to Required Livestock Production Messages .....	37
4.5.2 Agricultural Messages Required by Small-Scale Farmers.....	38
4.6 Private Vernacular Radio as a Source of Agricultural Messages.....	39



4.7 Participation in Messages Disseminated by Private Vernacular Radio Stations .....	40
4.8 Dissemination of Agricultural Messages by Private Kalenjin Vernacular Radio ....	42
4.9 Challenges Faced by Private Kalenjin Vernacular Radio Stations .....	43
4.10 Test of Hypotheses .....	45
<b>CHAPTER FIVE</b>	
<b>SUMMARY, CONCLUSIONS AND RECOMMENDATIONS .....</b>	<b>50</b>
5.1 Introduction .....	50
5.2 Summary of the Study .....	50
5.3 Conclusions .....	54
5.4 Recommendations .....	54
5.5 Recommendations for Further Research .....	55
<b>REFERENCES.....</b>	<b>56</b>
<b>APPENDICES</b>	
Appendix A: Small-Scale Farmers’ interview schedule .....	63
Appendix B: Interview Schedule for Officer In-charge of the Radio Programmes.....	67
Appendix D: Letter of Research Authorisation.....	69
Appendix E: Research Permit .....	70

## LIST OF TABLES

Table 1: Population and Households per Division in Kericho West Sub-County .....	22
Table 2: Small-Scale Farmers Households per Sub-Location in Belgut Division, Kericho West Sub-County .....	23
Table 3: Summary of Data Analyses .....	26
Table 4: Gender and Age of Respondents .....	27
Table 5: Respondents Highest Level of Education.....	28
Table 6: Gender and Farming Enterprise of the Respondent.....	29
Table 7: Livestock kept by Small-Scale Farmers in Kericho West Sub-County.....	30
Table 8: Crop Grown by Small-Scale Farmers .....	31
Table 9: Rank Order of Sources of Agricultural Messages by Gender .....	33
Table 10: Access to Information from Agricultural Messages Providers.....	34
Table 11: Specified Crop Production Messages Required and Accessed by Respondents .....	36
Table 12: Livestock Production Messages Required and Accessed by Farmers.....	37
Table 13: Messages Required by Small-Scale Farmers.....	38
Table 14: Private Vernacular Radio as a Source of Agricultural Messages .....	39
Table 15: Respondents' Participation in Messages Disseminated by Radio Stations .....	40
Table 16: Other farmers' Participation in Messages Disseminated by Radio Stations ...	41
Table 17: Number of Providers and the Level of Access to Agricultural Messages .....	45
Table 18: One Way ANOVA Statistical Test for Number of Providers and the Level of Access to Agricultural Messages.....	46
Table 19: Level of Required Information and Level of Access.....	47
Table 20: Chi-Square Tests for Required Information and Level of Access.....	48
Table 21: Level of Participation and Level of Access .....	49
Table 22: Chi-Square Tests for Level of Participation and Level of Access .....	49

## LIST OF FIGURES

Figure 1: Conceptual framework of the role of private vernacular radio stations in dissemination of agricultural messages .....	20
Figure 2: Respondents' ranking of sources of agricultural messages.....	32

## ACRONYMS AND ABBREVIATIONS

ACP	Africa, Caribbean and Pacific Countries
AIC	Agricultural Information Centre
AIE	Agricultural Information Exchange
AKIS	Agricultural Knowledge and Information System
AM	Amplitude Modulation
CBO	Community Based Organisations
CCK	Communication Commission of Kenya
DDP	District Development Plan
FAO	Food and Agricultural Organisation of the United Nations
FM	Frequency Modulation
GDP	Gross Domestic Product
KBC	Kenya Broadcasting Corporation
MOARD	Ministry of Agriculture and Rural Development
NALEP	National Agriculture and Livestock Extension Programme
NAOFB	National Association of Farm Broadcasting
NGO	Non-Governmental Organisations
PCA	Participatory Communication Approach
PVRS	Private Vernacular Radio Station
RLGA	Radio Listening Group Approach
RMS	Royal Media Services
RPO	Rural Producer Organisations
SAGA	Strategies and Analysis for Growth and Access
SAP	Structural Adjustment Policies
SMS	Short Message Service
SPSS	Statistical Package for Social Sciences
UN	United Nations
UNDP	United Nations Development Programmes
USAID	United States Agency for International Development
VOK	Voice of Kenya

## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 Background of the Study**

Agricultural information packaging and dissemination is crucial in agricultural development. However, appropriate information is usually lacking in most developing countries. Fortunately, dissemination of appropriate information can be achieved through use of information communication technology (ICT). The ICT environment in developing countries is generally not favourable due to poor human, infrastructural and financial resources devoted to agricultural information and communication (Food and Agriculture Organization (FAO), 2006). Out of the new ICT, radio is still seen as a potentially effective method of information dissemination for it is a common feature of household and is accessible to many people compared to any other ICT (Butunyi, 2011; FAO, 2006). Most studies on modern information technology have shown that radio is still a powerful communication tool (Chapman, Blench, Kranjac-Berisavljevic & Zakariah, 2003; Nazari & Hassan, 2010). Majority of the farmers prefer radio as an effective ICT tool for disseminating agricultural information due to its portability and low cost. They consider the least effective ICT in the dissemination of agricultural information as the internet particularly because it is costly and inaccessible to rural communities (Sitawa, Ogutu & Ngunjiri, 2003; Musa, Githeko, & El-Saddig, 2011).

The internet environment in developed countries like the United States of America is different. The number of farmers with Internet access on a variety of digital gadgets has dramatically increased; a total of 62 per cent of U.S. farms had Internet access, and 65 per cent of farms had access to a computer in 2011, changing the way farms do business. Farmers are increasingly using the internet to speed up their work flow, improve their farming techniques, market their crops and connect with customers and retailers (US Department of Agriculture, 2011). The public and the private sector have been on the search for an effective solution to address the challenge of agriculture information needs of farmers and the use of ICT is one of these solutions. According to World Bank, (2012) the development and the use of ICT originated in the public sector but quickly was dominated by the private sector whose involvement has enhanced the access, affordability and adaptability of ICT in agricultural development.

In developed countries, many agricultural services that were in the past managed by the government are being managed and delivered by the private sector (World Bank, 2012) and in developing countries, there is demand for a greater role by the private sector to participate in agricultural extension (Alex, 2002; Katz, 2002; Rivera, 2001). The premise is that the private sector is more efficient in extension services delivery (Muyanga & Jayne, 2006). According to Rivera & Qamar, (2003) extension services are among the agricultural services that are headed for partial privatisation. Therefore, the private sector is expected to play an increasingly important role in rural knowledge systems, even though, total privatization is not feasible, even for commercial agriculture (Ministry of Agriculture and Rural Development (MOARD), 2001a).

There are different approaches radio stations can use to disseminate agricultural messages which include participatory communication approach, where farmers are involved in the determination; of programme content, presentation, time of transmission, the feedback mechanism and one way communication approach where farmers are not involved except in listening and perhaps, practicing what they learn. Experience with rural radio has shown the potential for agricultural extension to benefit from radio by using participatory communication approaches (PCA). This can be enhanced if radio is to be used with other technologies like call in telephone. According to Communication Commission of Kenya (CCK), 14.4 per cent of Kenya's population has mobile phones (Ndioo, 2006). Hence, this participatory radio communication approach can work and be exploited for the benefit of small-scale farmers.

Vernacular radio programmers are important in sharing information locally and opening up wider information networks for farmers (Chapman *et al.*, 2003). This increases access to agricultural messages by small-scale rural farmers. As indicated by Benham and Behrens (2005), people in rural areas, often find word of mouth information to be better than the written word. This helps in overcoming the problem of illiteracy prominent in rural areas. Radio is widely regarded as a key technology, but there are challenges in sharing agricultural information effectively. The growth in entertainment-based FM (Frequency Modulation) radio stations makes it more difficult for rural people to find the programmes that offer the information they need (Kadenge, 2001). During agricultural programme, one is talking to farmers, salesmen, agri-business men, loan officers and other interested members; this is a challenge in that the programme should be tailored to

suit all of them (Rivera & Qamar 2003). Most radio stations lack accurate statistics regarding the nature and composition of their audiences, in terms of demographic figures and listener preferences (Niang, 2002).

Radio is the most popular and the most accessible media (Kadenge, 2001). The strength of vernacular radio as an extension tool lies in its ability to reach illiterate farmers and provide them information relating to all aspects of agricultural production in a language they understand, and the accent of its community (Chapman *et al.*, 2003; Girard, 2001; Parvizian, Hosseinnejad & Lashgara, 2011). This appeals to listeners and makes the messages or the programme acceptable. Almost any type of information and advice can be prepared for radio transmission. However, the timing, sustainability and continuity of the programmes must be considered (Chapman *et al.*, 2003). The content should be repeated at regular intervals to have more effect.

Despite rapid technological changes in telecommunications in the last few decades, radio broadcasting remains the cheapest mode of information dissemination that can reach the remotest parts of the country (Nazari *et al.*, 2010; United Nations Development Programmes (UNDP, 2004). Before the 1990s, Kenya's airwaves were ruled by the state broadcast, but radio has grown by 280 per cent in the last five years, since 2001 (Kwama, 2006) and by mid-2011, 319 radio stations had been licensed (Butunyi, 2011). Small-scale farmers should therefore benefit from this tremendous growth in the sector. Rural farmers are in great need of information, knowledge and skills to improve decision-making and increase productivity (Leeuwis, 2004; Nazari *et al.*, 2010) and radio broadcasting in vernacular can meet this challenge inexpensively and supplement the government extension programmes.

The amount of resources allocated to agricultural extension world over is decreasing especially in developing countries (Muyanga *et al.*, 2006). In some cases, governments are forced to cut extension budget as a result of structural adjustment policies (SAP) or due to economic crisis and the feeling of government in industrialised countries is that farmers should and, can pay for extension services themselves (Leeuwis, 2004). This makes it increasingly hard for small-scale farmers to access agricultural extension information especially in rural areas. In view of this, the private sector is expected to play

a supplementary role in the provision of the services. Therefore, there is need to assess their role in disseminating agriculture messages to small-scale farmers.

### **1.2 Statement of the Problem**

The amount of resources allocated to agricultural extension by the Government is decreasing as seen in the reduction of the number of extension staff, extension operations and maintenance due to under-funding, which makes it increasingly hard for small-scale farmers especially in the rural areas to access the agricultural extension information they require. For farmers to improve their farm productivity and farm managerial skills significantly, they must use research based technologies. These technologies mainly reach them through extension service providers who are currently inadequate to meet the many requests from farmers. Vernacular radio programmes have been used in the study area to disseminate agricultural messages. The role these programmes play in disseminating agricultural messages is currently not well understood or documented, hence the need for this study.

### **1.3 Purpose of the Study**

The purpose of the study was to establish the role of private vernacular radio programmes in disseminating agricultural messages to farmers in the area of study.

### **1.4 Objective of the Study**

The study was guided by the following objectives.

- i. Determine the role of private vernacular radio programmes in facilitating small-scale farmers' access agricultural messages from agricultural extension service providers in Kericho West Sub-County.
- ii. Determine the relationship between agricultural messages required by small-scale farmers and farmers' level of access to the messages disseminated by private vernacular radio programmes in Kericho West Sub-County.
- iii. Establish the relationship between small-scale farmers' participation in agricultural messages disseminated by private vernacular radio stations and access to the messages disseminated, in Kericho West Sub-County.
- iv. Establish challenges faced by private vernacular radio in dissemination of agricultural messages to small-scale farmers in Kericho West Sub-County.



### **1.5 Hypotheses and Research Questions of the Study**

The objectives in section 1.4 were used to formulate three null hypotheses for objectives i, ii and iii and one research question for objective iv.

The hypotheses of the study were:

Ho<sub>1</sub>: There is no statistically significant difference between the number of extension service providers who disseminate agricultural extension messages through private vernacular radio stations and small-scale farmers' level of access to the agricultural messages disseminated.

Ho<sub>2</sub>: There is no statistically significant association between the number of agricultural messages required by small-scale farmers and level of access to the messages disseminated through private vernacular radio programmes in Kericho west Sub-County.

Ho<sub>3</sub>: There is no statistically significant association between small-scale farmers' participation in agricultural messages disseminated by private vernacular radio and level of accessing the messages.

The research question for the study was

- i. What are the challenges faced by private vernacular radio stations in their involvement in dissemination of agricultural messages?

### **1.6 Significance of the Study**

The study findings may show the significance of private Kalenjin vernacular radio in the agricultural knowledge and information system. It may help to sensitize media owners, policy makers, extension providers and small-scale farmers on the need to engage and considering private sector radio services as an important component in dissemination of agricultural messages to small-scale farmers.

### **1.7 Assumptions of the Study**

- i. Small-scales' households had access to radio
- ii. Small-scale farmers use private Kalenjin vernacular radio as source of agricultural extension information.
- iii. Owners of private Kalenjin vernacular radio station would cooperate in clarifying issue on source and type of agricultural messages disseminated.

- iv. The private Kalenjin vernacular radio stations operating in Kericho West Sub-County disseminate agricultural messages.
- v. Extension providers use PVRS to disseminate agricultural information.

### **1.8 Limitations of the Study**

- i. The researcher was not proficient in the Kalenjin vernacular language spoken by the small-scale farmers in the Sub-County. It was overcome by use of trained interpreters proficient in the language.
- ii. The farming systems and types of crops grown and livestock kept in the Sub-County were different from one farmer to another. The limitation was overcome by consideration them during data collection and analysis.

### **1.9 Scope of the Study**

The study covered Kericho West Sub-County, in Kericho County, in Kenya where KASS F.M, Radio Injili and Changei FM private Kalenjin vernacular radio stations involvement in dissemination of agricultural messages were studied.

### **1.10 Definitions of Terms**

**Agricultural household:** A household where at least one member of the household is involved in agricultural activities (FAO, 2005).

**Agricultural extension:** This is the application of scientific and new knowledge to agricultural practices through farmer education (Röling, 1988).

**Approaches of agricultural extension programmes:** A style of managing agricultural extension programmes (MOARD, 2001a).

**Challenges:** New or difficult task that tests success (Wehmeier, McIntonsh, Turnbull, & Ashby, 2005). In this study the challenges in the involvement of PVRS in agricultural extension are cost constraints, source, packaging and presentation, the time of transmission against other competing programmes

**Information:** processed, stored or transmitted data/ communication of knowledge (online encyclopaedia <http://www.encyclopedia2.com>). Operationalized as the agriculture related messages disseminated by the radio stations

**Message:** a short communication transmitted by word, signals or other means from one person to another (Legal dictionary online <http://www.thefreedictionary.com>), in the study, it is operationalized as production technology and marketing, agriculture messages disseminated by the radio stations.

**Opportunity:** Openings offered to small-scale farmers in accessing agricultural messages prepared and presented by agricultural extension providers through private vernacular radio involvement in dissemination of agricultural messages.

**Private vernacular radio stations:** radio that is owned and operated by individuals or companies, whose aim is to make money through broadcasting in vernacular language of the target clientele (Ilboudo, 2005). For this study it is defined as private vernacular radio broadcasting in Kalenjin language whose main purpose is to make profit.

**Small-Scale farmer:** farmers with land size of at most 5 hectares used for crops and livestock production (MOARD, 2001a).

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter looks at other peoples work on use of radio in agricultural extension. It highlights some of the historical use of radio in agriculture, the challenges and players that influence small-scale farmers' decisions. Further, other researchers work on opportunities of using radio in dissemination of agricultural messages, small-scale farmers' information needs, sustainability of the messages and how it helps to produce sustained outcome is reviewed. Gender and radio agricultural programmes are also briefly looked at. The theories and model informing the study and the conceptual framework concludes the chapter.

#### **2.2 History of Farm Broadcasting**

The first established radio operators in the United States of America U.S.A. were amateurs experimenting with the new invention called "hams." There were over a thousand of them by 1912 (Hilliard, 2009). According to National Association of Farm Broadcasting (NAOFB), (2011) USA, broadcasting information to farmers started just after the invention of the AM (Amplitude Modulation) radio. In January 1921 radio began broadcasting weather reports. Two months later, an Illinois grain dealer, put on the air a five minute grain market reports to grain dealers and farmers. A few months later, in Pittsburgh, Pennsylvania the National Stockman & Farmer had on air report on market. By 1922, 36 stations had been licensed by the Commerce Department, and 35 of the 36 had been approved to broadcast USDA markets. In the 1920s, numerous stations were licensed and built to broadcast to the farm and rural areas of the country. According to Hilliard, (2009) Some of the universities, especially the "land grant" colleges that had been chartered for the purpose of serving rural America and which had extensive Departments of Agriculture, offered extension courses through radio for people who were too far away from a school or university to take courses in person.

The desire to initiate farm broadcasting was first licensed in 1923. This move was facilitated and encouraged by the St. Joseph Stockyards and the St. Joseph Grain Exchange. The idea for a national association for farm broadcasters grew out of a 1943 meeting of the Institute for Education by Radio in Columbus. World War II interrupted

the process, but in May 1944, the organization was officially formed and named the National Association of Radio Farm Directors (NARFD).

The aim was to market and promote farm broadcasting to the agricultural advertising community. They served a dual role in communicating not only to farmers, but also relating the agricultural perspective on food and environmental issues to the consumer. They communicated the news of agricultural science, technology, food safety, and environmental conservation and security (National Association of Farm Broadcast, 2011).

Ilboudo (1998) noted that in Africa, before independence, there were radio programmes aimed at giving the populations advice on hygiene and health or practical economy, especially farmers; thus, radio in Africa was used rapidly by the new States. Example includes; 1956 in Cameroon, 1957 in Mali, Nigeria as from 1954, in Ghana 1956, Niger 1962, Benin 1967-68, Burkina Faso 1969, and Togo 1970 and in Ivory Coast, the programme called "The national cup for progress" was created in 1966. The programmes were broadcasted in local languages of the target audience.

The subject matter varied from one region and from one country to another examples include; In Benin 1960-61, Radio Dahomey was broadcasting a special programme in Fon language against felling palm trees, in 1967 a pilot project started with assistance from FAO which used six languages for its programmes dealing with planting palm trees, development of maize fields and the introduction of rice and cotton. In Niger, the Radio Club Association was created in 1962 and the launching of its first programmes in 1965. Subjects related to selecting seeds, preparing soil, fertilizers, bovine bits were predominant among other subjects such as commercialization of food products, irrigated agriculture, water hygiene and animal traction agriculture (Ilboudo, 1998).

In Kenya, The British East African Company initiated the first radio broadcast services in Kenya back in 1927 and the first English Radio Broadcasting went on air in 1928. This was only the second radio broadcasting service on the African continent after South Africa which had begun in 1920 (Mbeke & Mshindi, 2008; Gathigi, 2009). It served only whites and Asians. Mbeke and Mshindi, (2008) noted that the first radio broadcasts for Africans went on air during the Second World War to inform and support the war effort. It was not until 1953 that the African Broadcasting Service was established which was

highly controlled. The government set up the Kenya National Broadcasting Service (KBS) in 1959 following positive recommendation by the Pound Commission in 1959. In 1962, the programme "education through radio" broadcasted advice on agriculture. The independence government nationalized KBS in 1964 and named it Voice of Kenya (VOK).

Broadcasting in Kenya was on AM frequencies until 1995 when FM frequencies were opened. Kenya Broadcasting Corporation (KBC) subsidiary, Metro FM, was the first to hit the airwaves and was followed by privately owned Capital FM in 1995 and Nation FM in 1996 (Gathigi, 2009). The first private vernacular radio station, Kameme, was set up in 2000 since then the number has increased considerably (Communications Commission of Kenya, 2011). By 2011, there was a large variety of commercial, state-run and community based local language stations on air. According to the Communications Commission of Kenya (CCK) (2011), there were 30 stations broadcasting in languages other than English and Kiswahili. Eleven of them run by Royal Media Services (RMS); KBC run five vernacular stations and seven vernacular regional services and more local language stations were waiting licensing in 2011. All stations run agricultural programmes targeting farmers.

### **2.3 Radio Approaches in Agricultural Extension**

Approaches to agricultural extension worldwide continue to evolve. However, the best approach should be context and situational specific to agro-climatic region and social-economic condition of the farmer (Glendenning, Babu, & Kwando, 2010). An extension approach is a style of managing extension (MOARD, 2001b). An effective extension approach should meet farmers' information needs irrespective of their socio-economic factors, personal characteristics or agro-ecological region they are in.

In the field of agricultural extension, a number of relatively new agricultural extension approaches have emerged, which includes, participatory extension approaches, participatory learning approaches, participatory rural appraisals, rapid rural appraisals, participatory technology development, farmer field schools, innovative farmer workshop and look-and-learn tours (FAO, 2005). Other new and emerging extension approaches; farmer-first, farmer-back-to-farmer, farmer-to-farmer extension and facilitation extension agents respond to farmers' requests and programmes and visit farmers only when required

(FAO, 2005). These are considered as bottom-up approaches which help overcome the challenges of top-down approaches. Private vernacular radio can employ these approaches where applicable to improve their agricultural extension services.

Radio stations use various approaches in their involvement in agricultural development. These approaches include one way communication approach, participatory communication approach and radio listening group approach. Radio has been considered as a one-way telecommunication media or non-interactive and lack feedback facilities (FAO, 2005; Rivera *et al.*, 2003); where programmes do not involve farmers except in listening and perhaps, practicing what they learn from the transmission without any input in the programme. In the participatory radio approach, the farmer is involved in the determination of programme content, presentation and time of transmission. Experience with rural radio has shown the potential for agricultural extension to benefit by using participatory communication approach (Parvizian *et al.*, 2011).

There is also the Radio Listening Group Approach (RLGA) widely used in developing countries (FAO, 2005). It involves gathering farmers together in groups to listen to agricultural radio programmes that address their specific needs. They then discuss the extension issues raised in the programmes and help each other to overcome any difficulties of understanding before applying any of the programmes' messages or technologies that are relevant or useful. Apart from learning from content transmitted, the RLG approach provides farmers with an opportunity to learn from each other. It also creates awareness and interest at a relatively low cost per capita (FAO, 2005).

#### **2.4 Radio in Agricultural Extension**

In the effectiveness of ICTs in disseminating agricultural information farmers rated radio, television, print media, mobile phones, and internet, respectively, as the most effective tool in disseminating agricultural production. Radio ranking highest could be attributed to fact that it is inexpensive, requires less infrastructural support, easily accessible, can run on batteries and there is a variety of stations which attract a wide range of listeners, Musa *et al.*, (2011).

Radio stations can be categorized into: Public radio; private radio, community radio, rural radio stations (Ilboudo, 2005). Information is pertinent to agricultural development; it is generated and disseminated in various ways and by various actors to individual farmers. Information exchange and dissemination still remains a serious constraint on the agricultural production potential of developing countries (Owino, 1999). A lot of knowledge and information generated from research, commercial entrepreneurs or farmer experiments remains locked up from farmers who are supposed to benefit from it (Othman, Samah & Ramli, 2011). One reason for this may be dissemination of the information in English. There is a need therefore to look at exchange of information through use of private vernacular radio; that has the potential to reach illiterate rural farmers in the language they understand (Parvizian *et al.*, 2011).

In order to arouse the interest and create awareness among the listeners, radio stations present their agricultural extension programme in different formats. Majority of the farmers' listened to agricultural programmes that were presented through discussion or in dramatic format which is more enticing and fascinating to the farmers (Ango, Illo, Abdullahi, Maikasuwa, & Amina (2013).

Radio extension programmes need to be prepared and broadcasted in a way that makes them accessible to target audience in terms of subject priority and timing of the programme. A study conducted by Abubakar, Ango and Buhari, (2009) indicated that majority of farmers identified night time as their preferred time of listening to radio. They preferred 8 pm to 10 pm for listening to agricultural programmes; findings were the same from a study on community radio by Zossou, Vodouhe, Van Mele and Lebailly, (2012) where majority of farmers preferred listen to community radio between 8 pm to 9 pm because they are often busy during the whole day. It is therefore important that the radios and rural development agents consider agricultural broadcast schedules. Rural people generally prefer the neighbourhood radio stations, which provide them with more interesting and useful information, in the languages or dialects, which they can understand (Rakotoarimana, 2003). Likewise, rural farmers would prefer private vernacular radio as a source of agricultural messages. According to a survey by Media Council of Kenya (2012), five of the ten most popular Kenyan radio stations broadcast in vernacular languages. Other than language, radio can reach people isolated by geography, conflict, illiteracy and poverty (Sibanda, 2003).



According to Nazari *et al.* (2010), radio has proved to be the most effective media promoting agriculture and development in rural areas, particularly as a tool for delivery of quick information. Musa, *et al.*, (2011) noted that other than radio being an effective means of dissemination of knowledge, information and technologies, it also catalyses adoption of technologies.

For radio extension to have desired effect, the messages need to be sustained and repeated (Girard, 2001). Hence; Private vernacular radio should ensure that they maintain the dissemination of agricultural messages if farmers are to benefit and regard them as a significant source of agricultural messages.

### **2.5 Role of Private Vernacular Radio Station in Agricultural Extension**

Role is a way in which something is involved in an activity and how much influences it has on it (Hornby, 2005). Lack of agricultural information is a key factor that has greatly limited agricultural development in developing countries (Ozowa, 1997). Lack of awareness among small-scale farmers can be attributed to their high level of illiteracy. This contributes to the low level of adoption of agricultural production technologies. Access to relevant information enables farmer make appropriate decisions and hence improve agricultural productivity. Radio has proven its power to improve farmers' decision making by providing them with relevant information (Farm Radio International, 2008).

According to Gathigi (2009) in 1998, the first vernacular language FM station, and a private vernacular FM radio for that, Kameme FM, which broadcast in the Kikuyu language, was established. In the same year, KBC, sensing increased competition, established a second Kikuyu station, Coro FM. Since then, different vernacular FM stations have emerged leading to a more diversified radio industry that serves and appeals to a wide range of audiences. Vernacular stations have also increased the variety of content available. The radio industry in Kenya is still expanding.

According to the Media Council of Kenya, there are about 319 licensed radio stations in Kenya (Butunyi, 2011). In Kenya, radio is the most popular and accessible medium in the provision of information. According to Media Council of Kenya (2012), ninety five per

cent (95%) of all Kenyans listen regularly to radio. Increase in the number of radio stations has created a wide range of choice for the audiences (Gathigi, 2009) hence farmers can choose which messages to listen to. The proliferation of Frequency Modulation (FM) radios and the expanding mobile phone connectivity in Kenya offers opportunity for advisory service provision and linking farmers to new sources of agricultural information and knowledge (Butunyi, 2011; FAO, 2006). There is easy access to FM radios for they are affordable and information is easily packaged and distributed to farmers although at present, radio is underutilized (FAO, 2006). Therefore, there is still an opportunity ready for exploitation. While ICTs and their connection to radio hold promise for the future, some consider radio to be "the one to watch" (FAO, 1996). One of the strength of radio is that it can be listened to when one performs other activities, offering an opportunity to learn while conducting farming activities (Tokari, 2006). Compared to other ICT, for reaching the final agricultural information users in rural areas today, radio is the most powerful and cost-effective medium (Chapman *et al.*, 2003; FAO, 2006; Kelsey & Hearne, 1967).

Vernacular radios are popular in rural areas with majority listeners being older than 30 years (Media Council of Kenya, 2012). Farming is mainly confined in rural areas and it is the older population who are involved in it. According to Spurk, Schanne, Mak'Ochieng and Ugagu (2012) respondents prefer to listen to radio stations broadcasting in vernacular than those broadcasting in English or Kiswahili. Therefore dissemination of agricultural messages through vernacular radio would have a greater access to listeners and benefit the agriculture sector.

## **2.6 Challenges Faced by Private Vernacular Radio Stations**

In Africa, Caribbean and Pacific (ACP) countries, millions of people rely on their local radio stations, mobile phones and cyber-cafes to access information. However, the relevance, quality and quantity of information they need are not always guaranteed in current media coverage due to the challenge that media face (Technical Centre for Agriculture and Rural Cooperation, 2009).

There are several challenges that need immediate attention if the radio extension is to succeed in the packaging and transfer of information and new technologies to target groups. First the change from top-down approaches in communication creates a financial

challenge (FAO, 2006). There is need for capacity building on agricultural subjects and the insufficiency of agricultural research materials such as broadcast scripts on agricultural subjects to support the range of topics requested by farmers (Van Mele, Wanvoeke & Zossou, 2010). Radio programme preparation depends on mobility and transport is a challenge (FAO, 2006) for a programme to be prepared the producer requires traveling and making telephone calls or surfing the internet. According to Technical Centre for Agriculture and Rural Cooperation (2009) media faces many constraints including lack of skills and specialisation, poor levels of pay that lead to 'rent-seeking' behaviour, lack of equipment and transport and little to no affordable access to internet and reliable information networks.

Other constraints include the lack of networks linking extension workers and programme hosts except only through written reports; the isolation of production unit from the listeners, and hence cannot benefit from their feedback to improve the programmes (Ilboudo, 2001); there may be lack of coordination between private vernacular radio programmes and programmes run by ministries or other players; most radio programmes provide only a one-way flow of information and lack mechanism for feedback. The programmes may be irrelevant to the farmers needs and are broadcasted on inconvenient week days (FAO, 2005) making the messages inaccessible to farmers. Al-Hassan *et al.* (2011) noted that there is high tendency of disappearance of radio programmes after individual presenters leave the radio station.

Private vernacular radio is one of the stakeholders in a pluralistic extension approach, as noted by Nambiro, Omiti, and Mugunieri, (2005). For a pluralistic system to work; there is need for better co-ordination between the various service providers. The government and other stakeholders should work towards developing a strong institutional framework that will guide and enhance this mutually beneficial partnership. This offers itself as one of the challenges Private Vernacular Radio Stations, has to grapple with. Lack of networks linking extension work, radio programme hosts and the farmers, is one of the weakness of radio in dissemination of agricultural information (Ilboudo, 2005).

## **2.7 Small-Scale Farmer's Agricultural Information Needs**

Information is an essential ingredient in agricultural development programmes but farmers seldom feel the impact of agricultural innovations either because of poor access

or because of poor dissemination. Information is needed because it affects individuals' living activities (Achugbue & Anie, 2011). Most agricultural information providers give minimal attention to farmers' information needs.

Glendenning *et al.* (2010) noted that factors such as literacy or access to resources will have a large impact on farmers' information needs. However, the information needs of small-scale farmers revolve around production technologies and practices like cultivating, fertilizing, harvesting and the resolution of problems such as pest control, weed control, moisture insufficiency, soil fertility, getting farm credit, labour shortage, soil erosion problems and other crops and livestock management practices (Ozowa, 1997). According to Glendenning *et al.* (2010) farmers need information on production technologies, market and prices information, access to credit facilities, post harvesting processing and business development. Birner *et al.* (2009) included the information needed by farmers as: optimal use of inputs, farming systems, input suppliers, collective action with other farmers, quality specification of produce, time of buying inputs and selling produce, income generation options, implication of changing policies and coping with climate change.

Agricultural information needs depends on the agricultural activities individual farmers are involved in, or intend to be involved in and their immediate environmental challenges. It can be said to vary from farmer to farmer. Access to relevant information enables farmers to make appropriate decisions and hence improve agricultural productivity (Farm Radio International, 2008).

## **2.8 Gender and Agricultural Radio Extension Programmes**

In many communities, there is a clear division of labour, with definite roles for men and women in terms of crops and livestock production activities that they are responsible for (Chapman *et al.*, 2003). Women are still less likely to access agricultural information and their relative scarcity as editors, agricultural journalists and extension workers hinders the effort to address gender equality (Odame, 2009). Due to gender issues, agricultural messages need to be prepared and broadcasted in a way that makes them accessible to target audience in terms of subject priority and timing of the transmission; to fit in with work and household schedules of men and women (Chapman *et al.*, 2003). The gender

issues therefore dictate that agricultural programmes should be scheduled with a gender consideration.

Gender is a key differentiating factor with regard to access to information and radio agricultural extension programmes need to overcome this challenge. More men than women listen to radio broadcast daily (Zossou *et al.*, 2012). It may be due to the fact that more men own radio compared to women and women are more occupied in rural areas than men. Vernacular radio stations should therefore look for innovative ways to involve women, encourage their participation and ensure that agricultural messages addressing issues that concern them and are broadcasted at appropriate times of the day.

### **2.9 Relevance of Agricultural Information to Small-Scale Farmers**

The coverage of extension services and relevance of information provided to farmers is inadequate (Glendenning *et al.*, 2010). Lack of access to relevant agricultural information by farmers in developing countries cuts across all sub-sectors of agriculture (Youdeowei, 1995). Ango *et al.*, (2013) observed that majority of farmers relied on radio as their source of agricultural information compared to extension contacts, farmer-to-farmer contact and print media (Newspapers, magazines, seminars, extension bulletins, and pamphlets). There is need therefore for radio agricultural programmes meeting farmers' information need.

Farmers consider agricultural information to be relevant if it is consistent to their information needs. Relevant information may concern agricultural inputs, extension education, agricultural technology, agricultural credit, and marketing (Ozowa, 1997). The information is considered relevant if that is what farmers feel they require in the production process or marketing process. Radio agricultural programmes are relevant if the knowledge gained helps farmers in improving their agricultural activities (Ango *et al.*, 2013), therefore, the decision of whether agricultural information is relevant or not depends on individual farmer. When preparing the content of the agricultural programmes, the audience's subject priority should be paramount (Chapman *et al.*, 2003).

### **2.10 Contacts between other Farmers and Extension Providers**

Agricultural decisions about practices are influenced not only by the household head but also by other households, community members and other actors in and even outside the

agricultural production chain (Leeuwis, 2004; Maarse, Wentholt & Chibudi, 1998). There are other informal means of farmer to farmer exchange of knowledge and information (Leeuwis, 2004). This horizontal exchange of information does not necessarily take place in the farm alone but in other forums that farmers interact and have an opportunity to talk about agriculture. Observation of other farmers' practices is another mechanism of exchange of information, part of which practices may have been learnt from the private vernacular radio stations. Farmers speak the same language, literally and culturally, as colleagues and face similar constraints and problems and this enhances relevance and credibility of their advice and views (Scarborough, Killough, Johnson & Farrington 1997). The farming experiences exchanged by farmers are acquired from sources like vernacular radio, extension workers among others.

The dissemination of agricultural information is increasingly being assumed by multiple public and private organizations. Pluralistic involvement of extension providers exists and it includes non-profit, non-governmental organizations (NGOs), profit private companies, rural producer organizations (RPOs), private advisers, as well as national, state and municipal extension services (Rivera *et al.*, 2003). There are areas of agricultural extension advice which are best suited to private sector provision (Smith, 1997). Many planners and practitioners have started to realise that it is the traditional media, such as radio, that poor people are most likely to turn for access to information. Small-scale farmers in remote area will tend to turn to radio to get information.

## **2.11 Theoretical Framework**

The study is informed by two theories, cultivation analysis theory and signalling theory. Cultivation analysis theory argues that television and other media play an important role in how people view their world. Most people get much of their information in a mediated fashion that can shape their sense of reality (Bryant & Zillmann, 2009; Shanahan & Morgan, 1999). Signalling theory describes behaviour when two parties (individuals or organizations) have access to different information. Typically, one party, the sender, must choose whether and how to communicate (or signal) that information, and the other party, the receiver, must choose how to interpret the signal (Brian, Connelly, Trevis, Duane & Christopher, 2011).

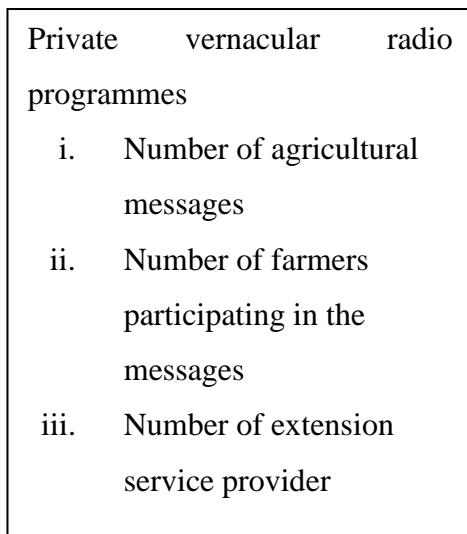
The study is further informed by the agricultural knowledge and information system (AKIS) model (Röling & Engel, 1990). The model is defined as a set of agricultural organisations and, or persons and the interactions between them, engaged in such processes as the generation, transformation, transmission, storage, retrieval, integration, diffusion and utilisation of knowledge and information, with the purpose of working in synergy to support decision making , problem solving and innovation in a given domain. This was formulated from the notion of knowledge system developed by Nagel in relation to Indian context and inspired by the American Land Grant College (Havelock, 1986; Lionberger & Chang, 1970; Swanson & Claar, 1984).

Private vernacular radio stations are among actors involved in the agricultural messages and technology promotion. The multiple actors in the AKIS face different challenges and present unique opportunities and use different approaches in bringing about adequate knowledge and technology that would improve performance of small-scale farmers. Effective linkage of the multiple actors is still a major challenge. Actors in an AKIS frequently deal with knowledge product instead of material goods (Leeuwis, 2004).

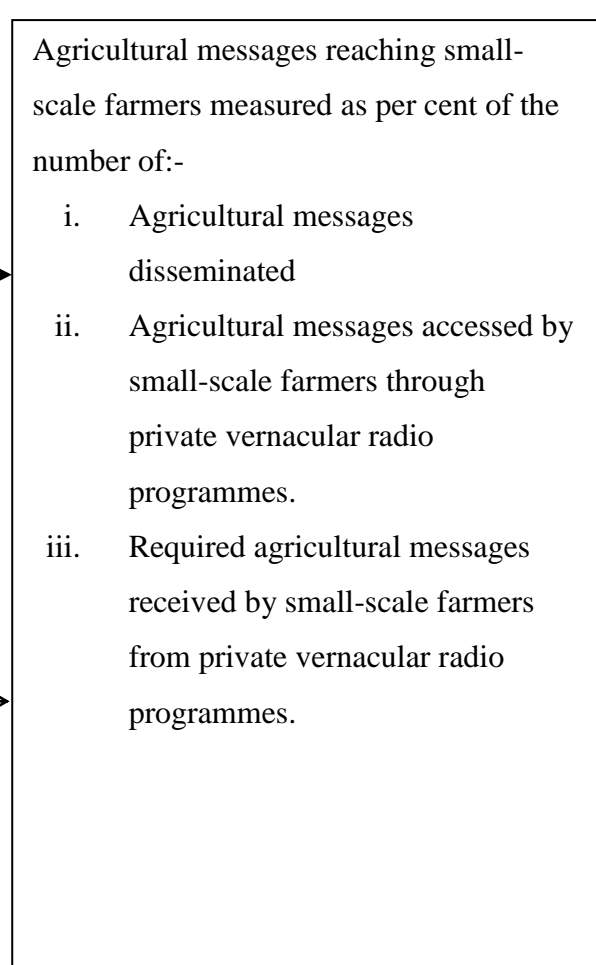
## **2.12 Conceptual Framework**

Radio is still an important medium in the provision of agricultural extension service in rural areas. This service is influenced by the language used, time when the messages are broadcasted, who and how it is packaged, relevance of the information to the farmer and their information needs. Independent variables were operationalized as the private vernacular radio programmes measured as number of agricultural message providers who use vernacular radio programmes to disseminate messages to small-scale farmers, the number of agricultural messages which can be agricultural advertisements, agricultural programmes or features with agricultural content (Production technology and market oriented messages) and the number of small-scale farmers who participate in the disseminated messages through interviews, requesting for information giving feedback through physical interaction with radio personnel or call-in, short Message service and use of internet . Moderator variables were age, gender and level of education which were controlled through random sampling. Dependent variables the Number of small-scale farmers accessing required agricultural messages and the number of agricultural messages disseminated through private vernacular radio programmes.

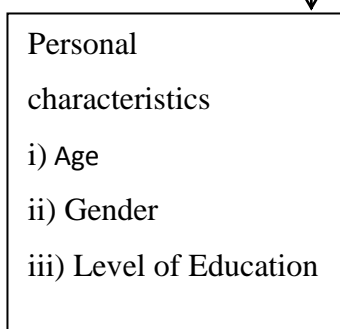
### Independent Variables



### Dependent Variables



### Moderator variables



**Figure 1:** Conceptual framework of the role of private vernacular radio stations in dissemination of agricultural messages



## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter gives a description of how the research was carried out. The discussion includes research design, location of the study, the target population, sampling procedure, sample size, instrumentation, validity, reliability, data collection procedures and analysis.

#### **3.2 Research Design**

The study employed a cross-sectional survey design. This is the design where data are collected at one point in time from a sample selected to represent a larger population (Mann, 2011). It aims at providing data of the entire population under study and can be used to describe features of the population. The advantage of cross-sectional research design are, it is inexpensive and takes little time to conduct, can estimate prevalent outcome of interest, many outcomes can be assessed, no loss to follow-up and can be used to study rare outcomes (Mann, 2011). The design is appropriate for the sources of agricultural messages and radio broadcast in Kenya which is dynamic and may change over time.

#### **3.3 Study Location**

The study was conducted in Kericho West Sub-County, Kericho County which is in the former Rift Valley province in Kenya and predominately occupied by the Kipsigis community. It borders Rachuonyo and Nyamira Sub-County to the southwest, Nyando to the west, Kericho to Northwest, Nakuru to the east and Bomet and Buret Sub-County to the south. The Sub-County occupies a total area of 515.6 km<sup>2</sup>. The Sub-County is divided in to Belgut, Kabianga and Sigowet divisions. The Sub-County's population was projected at 202,591 persons and 44,790 households by 2010 (Kericho Sub-County Statistic Officer, 2010). The Sub-County is agriculturally well endowed with about 80.5% arable land excluding water mass, gazetted forests and urban areas. Ninety five per cent (95%) of the population in the Sub-County depends on agriculture for their livelihood and agriculture contributes 80 per cent of total household income. Maize farming, small-scale (average farm size, 5 ha) tea farming, dairy production and sugarcane farming are the main activities, alongside multinational large scale tea production (Republic of Kenya, 2002).

**Table 1: Population and Households per Division in Kericho West Sub-County (N=44,790)**

<b>Division</b>	<b>Total Population</b>	<b>Households</b>
Sigowet	67,928	13,396
Belgut	64,646	13,096
Kabianga	70,017	18,298
Sub-County Total	202,591	44,790

*Source:* Sub-County Statistics Officer, Kericho 2010.

Table 1 shows the number of small-scale farmers' households in the three divisions in Kericho West Sub-County. The study's interest was the 13,096 households in Belgut division that was purposely selected as explained in section 3.5.

### **3.4 Target Population**

The target population was the number of households in Belgut division of Kericho west Sub-county which was a total of 13,096 households. This target population received radio programmes from private vernacular radio stations broadcasting in Kalenjin language. During data collection, the number of private Kalenjin vernacular radio stations operating in the Sub-County, and in the division was three. (Kericho Sub-County Statistics Officer, 2010). In the study, 152 small-scale farmers responded to the interview schedule.

### **3.5 Sampling Procedure and Sample Size**

Multistage sampling technique was used, where Kericho Sub-County and Belgut Division were purposively selected. The Sub-County and the Division were selected because they are agriculturally well endowed and classified as a high potential area (Republic of Kenya, 2002). From the 12 sub-locations in Belgut division, a list of small-scale farmers households obtained from the assistant chiefs, constituted the sampling frame; out of which, 152 households were selected using simple random sampling. The numbered list sourced from the chief was used to generate the sub-sample of each Sub-Location (see Table 2, page 22) using Stat Trek's Random Number Generator. The 152 small-scale households was the above the 100 recommended by Kathuri and Pals.

Kathuri and Pals, (1993) recommended a sample of 100 from large populations like one of 13,096 households in Belgut Division. Therefore the sample size was 152 rural

households were used, that was above the minimum number of 100 recommended. The higher number than the 100 was meant to take care of attrition. No sampling was done for the Kalenjin vernacular radio stations broadcasting in Kericho West Sub-County since what was of interest in the stations was the information broadcasted and not the number of stations.

**Table 2: Small-Scale Farmers Households per Sub-Location in Belgut Division, Kericho West Sub-County (N=152)**

<b>Location</b>	<b>Sub-Location</b>	<b>Small-Scale Farmers Households</b>	<b>Sample Size</b>
Waldai	Keben	1,056	13
	Sosiot	1,279	17
	Koitalel	1,135	15
Kaborok	Kaborok	927	12
	Kapkokwon	517	7
Kaptoboit	Kaptoboit	964	12
	Cheronget	627	8
	Kakiptui	499	6
Kipkoiyan	Kipkoiyan	1,249	16
	Borborwet	1,271	16
Kipsolu	Ainapkoi	1,270	16
	Kipsolu	1,106	14
<b>Total</b>		<b>13,096</b>	<b>152</b>

Source: Kericho Sub-County Statistics Officer, 2010.

### **3.6 Instrumentation**

Two structured interview schedules were used in the study and were developed by the researcher with input from experts from Department of Agricultural Education and Extension at Egerton University. Structured interviews enable the interviewer to ask each respondent the same questions in the same way and ensure a way of collecting high quality data (Mathers, Fox & Hunn, 2002). One of the interview schedules was for collection of data from the person in charge of programmes in the three private Kalenjin vernacular radio stations whose programmes were received in the Sub-County. The other interview schedule was for the collection of data from the sampled rural small-scale farmers from the 12 sub-locations.

### **3.6.1 Validity**

Experts in the Department of Agricultural Education and Extension assisted in reviewing the content and face validity of the instruments. A pilot test of the interview schedules was administered to measure the pertinence of the tool, validate it, measure the approach and the understanding of the questions and verify the conformity of the answers with the expected results and where necessary, reformulate, clarification or completion of the questions that were incomplete was done, as recommended by Rakotoarimana, (2003).

### **3.6.2 Reliability**

After peer and professional critic, the instruments were piloted in Buret Sub-County that shares similar climatic conditions, language and agricultural activities as the area of the study. Thirty households were used and the reliability of the interview schedule was estimated using Cronbach's alpha procedure. A reliability coefficient of 0.77 was realised after analysis which was above the 0.7 recommended by Frankel and Wallen, (2000). The instruments were adjusted accordingly and pre-tested again to increase reliability.

### **3.7 Data Collection Procedure**

A letter of approval obtained from the Graduate School of Egerton University was presented to the National Commission for Science, Technology and Innovation to obtain a research clearance permit. As advised by the National Commission for Science, Technology and Innovation, the researcher reported to the County Commissioner and County Director of Education, Kericho County before embarking on data collection. The chiefs from respective location were notified about the study. The consent of participants in the study and private vernacular radio stations owners was sought. Structured interview schedule for vernacular radio stations was administered using face-to-face data collection technique.

Once in the farms, the researcher interviewed household heads, their spouses or eldest sibling depending on who was available. Those who were not proficient in English, the interview were conducted with the help of a trained interpreter. Reports on radio programmes type and schedule were used as secondary sources of data.

### **3.8 Data Analysis**

Descriptive statistics method of data analyses was used; specifically, frequency, percentages and means were used. The three hypotheses were tested with the use of one way ANOVA and chi-square; and inference made at 0.05 significance level. The statistical package for the social sciences (SPSS) version 17 was used in the analysis of the data. Table 2 summaries the data analysis for the study hypotheses.

The information the respondents indicated that they required (appendix A section D) listed in the interview schedule for the small-scale farmers were converted into required information index and the same was done for the accessed messages (appendix B section D). It was assumed that each of the said messages carried equal weight and was assigned a score of one. Score of 0 was assigned to any information that respondents did not require.

**Table 3: Summary of Data Analyses**

<b>Hypotheses</b>	<b>Independent variables</b>	<b>Dependent variables</b>	<b>Statistical test</b>
HO <sub>1</sub> There is no statistically significant difference between the number of extension service providers who disseminate agricultural extension messages through private vernacular radio programmes and small-scale farmers' level of access to the agricultural messages disseminated.	Number of extension providers disseminating agricultural messages	Level of access by small-scale farmers to agricultural messages disseminated	ANOVA
HO <sub>2</sub> : There is no statistically significant association between the number of agricultural messages required by small-scale farmers and level of access to the messages disseminated through private vernacular radio programmes in Kericho west Sub-County.	Number of agriculture messages required by small-scale farmers	Number of required agricultural messages accessed by small-scale farmers	Chi-square
HO <sub>3</sub> There is no statistically significant association between small-scale farmers' participation in agricultural messages disseminated by private vernacular radio and level of accessing the messages.	Number of farmers participating in agricultural messages disseminated	Number of farmers accessing agricultural messages	Chi-square

## CHAPTER FOUR

### RESULTS AND DISCUSSION

#### 4.1 Introduction

This chapter presents results and discussion of the study carried out in Kericho West Sub-County on the role of private vernacular radio programmes in dissemination of agricultural messages to small-scale farmers. The results and discussions are based on the objectives of the study presented in chapter one. The data collected was analysed using descriptive statistics for the four objectives and further, three hypotheses were formulated from objective one, two and three and inferential statistics were used to test them. Hypothesis 1 was analysed with the use of one way ANOVA and hypotheses 2 and 3 were analysed using Chi-square because the data collected by the instrument was categorical data.

#### 4.2 Farmers Personal Characteristics

A total of 152 small-scale farmers were interviewed. Personal characteristics considered in the study were age, gender and farming enterprises the respondents practised. The age of respondents had five levels. Those who were 25 years and below, 26 to 35 years, 36 to 45 years, 46 to 55 years and those who were above 55 years.

##### 4.2.1 Genders and Age of Respondents in Kericho West Sub-County

Before on embarking on the set objectives, it was important to establish the characteristics of the respondents and the instrument collected data on the respondents' gender and age which was group in to categories as represented in Table 4.

**Table 4: Gender and Age of Respondents (N=152)**

		Age in years						
		<=25	26-35	36-45	46-55	>55	Total	%
Gender	Male	8	27	18	16	16	85	<b>55.9</b>
	Female	6	18	22	9	12	67	<b>44.1</b>
	Total	14	45	40	25	28	152	<b>100</b>
<b>Total</b>	<b>%</b>	<b>9.2</b>	<b>29.6</b>	<b>26.3</b>	<b>16.3</b>	<b>18.4</b>	<b>100</b>	

Table 4 shows the age bracket, gender and the number of respondents in each category out of 152 small-scale farmers interviewed. In the study, 55.9 per cent of the respondents were male while 44.1 per cent were females. Therefore a slightly higher number of male were interviewed. Respondents who were in the age bracket of 25 years and below were 9.2 per cent; those between 26 and 35 years were 29.6 per cent, 36 to 45 years were 26.3 per cent; 46 to 55 years were 16.4 per cent and those who were more than 55 years old constituted 18.4 per cent. Majority of the respondents were in the age bracket of between 26 and 35 year, constituting 29.6 per cent. This implies that majority of the respondents in the area of study involved in farming were in the 26 to 35 years age bracket. United Nations (2014) defines the youth as those between the age of 15 and 24 years. However the African Youth Charter defines youth as those between age of 15 and 35 years. Comparing the youth and the older population, the youth who were 35 years and below interviewed were 49 or 38.9 per cent while the older respondents were (61.1%). This corresponds to what was observed by Spurk *et al.* (2010) that it is the older population that is involved in farming. The smallest group interviewed was those who were in the age category of 25 years and below. This group included the siblings interviewed where the farmer could not be reached during the interview as explained in chapter three.

#### 4.2.2 Education Level of Respondents

Small-scale farmers were required to give their highest level of education. The post-secondary school level category included those farmers with Certificate, Diploma, Degree certificates and even those who had attended short farming courses organised by various organisations offering agricultural services to farmers and issued them with certificates of participation.

**Table 5: Respondents Highest Level of Education (N=152)**

Gender	Highest level of education				Total
	None	Primary	Secondary	Post-secondary	
Male	11	20	25	29	85
%	13	24	29	34	100
Female	9	12	28	18	67
%	13	18	42	27	100
Total	20	32	53	47	152
<b>%</b>	<b>13</b>	<b>21</b>	<b>35</b>	<b>31</b>	<b>100</b>



Majority of the respondents had at least secondary education, constituting 35 per cent with secondary education and 21 per cent with post-secondary while the smallest group (13 %) had no formal education. Table 5 also shows that the percentage of males and female without formal education was the same at (13%). The highest percentage of male respondents had post-secondary education (34%) whereas the female respondents with secondary education were (42%). The female respondents with secondary education and post-secondary levels were (69%). Likewise, (63%) of the male respondents had their education level higher than the primary school level. It could be deduced that respondents with education level above primary were comparable among males and females.

#### 4.2.3 Farming Enterprise

The respondents were asked if they practiced livestock and crop production. The instrument had a list of three livestock production enterprises (Dairy, Poultry and Bees) and four crop production enterprises (Tea, Maize, Sugarcane and Coffee) that respondents were to state whether or not they practiced them in their farms. They were also given an option of giving one other crop or livestock they had in their farms. As indicated under the study location earlier, maize, tea, sugarcane and dairy were the predominate enterprises in the area.

**Table 6: Gender and Farming Enterprise of the Respondent (N=152)**

Gender	Respondents keeping livestock	Respondents growing crops
	Number	Number
Male	80	85
Female	65	67
Total	145	152

All the respondents were involved in crops production while 7 or (4.6%) of the respondents did not practice livestock production (Table 6). Table 6 shows that a slightly higher number of men (5 or 5.9 %) did not keep livestock in their farms compared to (2 or 3.1 %) for female respondents who did not keep livestock in their farms.

### 4.3 Livestock Production Enterprises

**Table 7: Livestock kept by Small-Scale Farmers in Kericho West Sub-County (N=152)**

Enterprise	No. of farmers keeping them		Those not keeping them		Total (%)
	No.	%	No.	%	
Dairy	141	92.8	11	7.2	100
Poultry	132	86.8	20	13.2	100
Bees	14	9.2	138	90.8	100
Goats	16	10.5	136	89.5	100
Sheep	6	3.9	146	96.1	100
Rabbits	6	3.9	146	96.1	100
Fish	7	4.6	145	95.4	100

The popular livestock enterprise in the area of study was dairy production that was practiced by 92.8 per cent of the respondents, followed by poultry and goats in that order. The least prevalent type of livestock was sheep and rabbit production. Any agricultural extension provider in the Sub-County should ensure that agricultural messages disseminated to the small-scale farmers in the area are related to the livestock they keep. Therefore most of the livestock related information should be on dairy cows and poultry production.

#### 4.3.1 Crop Production Enterprises

As stated in 4.3, all the respondents were involved in crop production. The three major types of crops grown in Kericho West Sub-County from the list of four specified crops in the instrument were maize, tea and sugarcane in order of popularity.

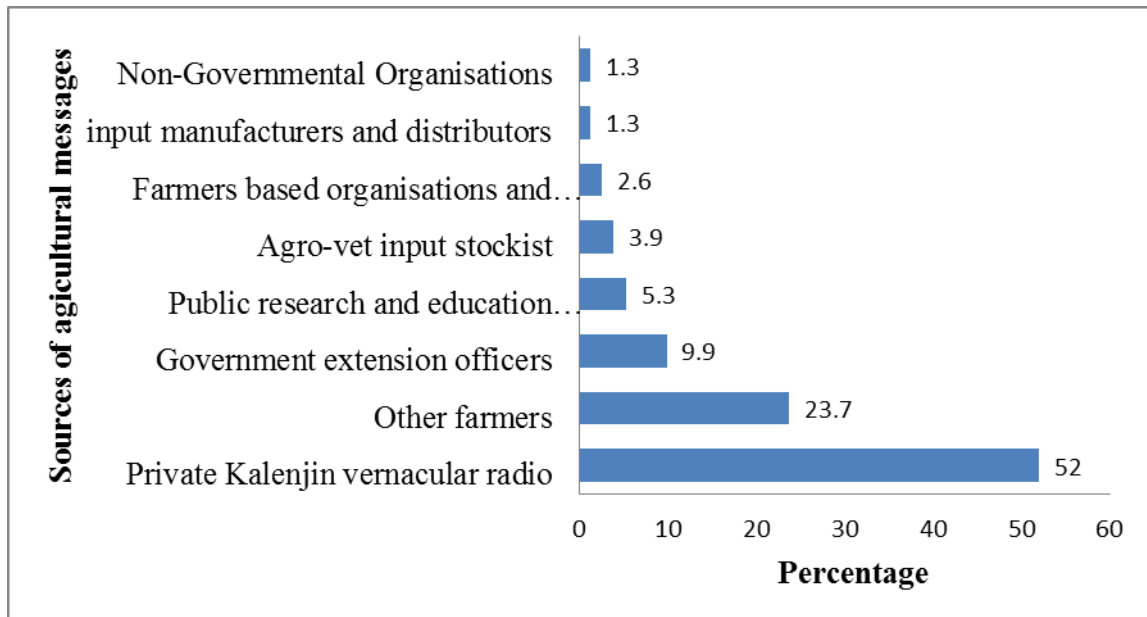
**Table 8: Crop Grown by Small-Scale Farmers (N=152)**

<b>Enterprise</b>	<b>Number growing</b>	<b>%</b>	<b>Number not growing</b>	<b>%</b>	<b>Total (%)</b>
Tea	142	93.4	10	6.6	100
Maize	148	97.4	4	2.6	100
Sugarcane	35	23	117	77	100
Coffee	12	7.9	140	92.1	100
vegetables	31	20.4	121	79.6	100
Fruits and Bananas	34	22.4	118	77.6	100
Fodder	1	0.7	151	99.3	100
Beans	7	4.6	145	95.4	100
Tobacco	1	0.7	151	99.3	100
Cassava	1	0.7	151	99.3	100
Potatoes	4	2.6	148	97.4	100
Trees	6	3.9	146	96.1	100
Millet	6	3.9	146	96.1	100
Stevia	6	3.9	146	96.1	100

Maize and tea were the most preferred crops; each was grown by over (93%) of the respondents. Other than the four listed crops in the small-scale farmers' instrument, respondents were asked to state whether they grew other crops as shown in Table 8, however, those crops were grown by less than 35 per cent of the respondents. It is expected that agricultural information providers should package information on maize, tea, bananas and vegetable production that majority of the farmers grew.

#### **4.4 Sources of Agricultural Messages**

In order to establish the sources of agricultural messages, the respondents were asked to rank eight listed sources of agricultural information (appendix A section B). The source the respondent considered most important was to be assigned number 1 while the least important source was assigned number 8. The source of agricultural information rated by respondents as number 1 was taken as the most important source. The percentage of farmers who ranked various sources of agricultural messages as number one is shown in Figure 2.



**Figure 2:** Respondents' ranking of sources of agricultural messages

Vernacular radio stations broadcasting in Kalenjji language were ranked as the most important source of agricultural messages by 52 per cent of the respondents. Other farmers were second with (23.7 %) and government extension officers third with 9.9 per cent of the respondents. This implies that private Kalenjji vernacular radio programmes play an important role as a source of agricultural messages to small-scale farmers in rural areas. This was also observed by Musa *et al.*, (2011) in a study where radio was highly ranked as an effective ICT in disseminating agricultural information. Therefore, agricultural extension service providers can enhance their reach to farmers, who require agricultural information by using private vernacular radio programmes. A study by Ango *et al.*, (2013) found out that majority of farmers relayed on radio as a source of agricultural information. Vernacular radio would be better for they speak in the language the community understand better making the programmes more acceptable.

Agricultural input manufacturers, distributors and Non-Governmental organisation were ranked as most important sources by only 1.3 per cent of the respondents, hence they can be said to be the least most important sources of agricultural messages in the area of study. They both tied in position 7 (or the last) as per the small-scale farmers ranking out of the eight listed agricultural messages providers.

Respondents were not restricted in the ranking of the eight sources of agricultural messages. Therefore, they ranked the sources as 1, 2, up to 8 and in order to determine the source with the best ranking, a mean for each of the eight sources of agricultural messages was generated using SPSS as shown in Table 9. The agricultural message source or extension provider with the lowest mean was the best ranked source by the respondents.

**Table 9: Rank Order of Sources of Agricultural Messages by Gender (N=152)**

Sources of Messages	Mean ( $\bar{x}$ )			Rank order
	(Male=85)	(Female=67)	Mean	
Private vernacular radio	2.04	2.25	2.15	1
Other farmers	2.88	2.81	2.85	2
Farmer organisations	4.58	4.55	4.57	3
Agro-Vet stockists	4.67	4.52	4.60	4
Government Ext.	4.56	4.99	4.78	5
Input manufac. & distr.	5.46	5.13	5.30	6
N.G.Os	5.82	5.78	5.80	7
Research & educ. Inst.	6.04	5.73	5.89	8

It is important to note that the minimum expected mean is 1 while the maximum expected mean is 8. If all the respondents would have ranked a given source of information as the most important and give it a score of 1 then, the mean for that source would be 1. Basing on the means ( $\bar{x}$ ) in table 9 the male respondents ranked;- Private vernacular radio; Other farmers; Government extension service; Farmer based organisation; Agro-Vet stockists; Agricultural input manufacturers and distributors; Non-Governmental organisations; and Research and education institutions in the order of importance starting with the most important source. The female respondents' ranking was as follows: Private vernacular radio; other farmers; Farmer based organisation; Agro-Vet stockists; Government extension service; Agricultural input manufacturers and distributors; Non-Governmental organisations; and Research and education institutions.

The male respondents' mean for private vernacular radio stations and Government extension service were lower than those of the female respondents. This may mean that

the male respondents ranked the private vernacular radio stations and governments extension officers as better sources of agricultural messages than the female counterparts. The mean difference of the rank order between male and female respondents, for any given source of agricultural messages was less than one. Private vernacular radio stations and other farmers were two most important sources of agricultural messages while the last two sources were the Non-Governmental Organisations and Research and education institutions.

The two most import source of agricultural messages to the respondents was private Kalenjii vernacular radio ( $\bar{x}$ =2.15) and other farmers ( $\bar{x}$ =2.85). All the other sources of agricultural messages had means ( $\bar{x}$ ) greater than 4. The means for agricultural message sources rank order by gender show that the male and female respondents' means were almost the same for, farmer based organisation and non-governmental organisations. The results shows that the private vernacular radio programmes are the small-scale farmers' most important sources of agricultural information.

#### 4.4.1 Access to Agricultural Messages from Providers

Respondents were asked whether they accessed or not accessed, agricultural messages disseminated by private Kalenjii vernacular programmes from the following listed extension service providers (government extension officers, public research and education institutions, Input manufacturers, N.G.Os, input stockists and farmer based organisations).

**Table 10: Access to Information from Agricultural Messages Providers (N=152)**

Message providers	Respondents accessing	Per cent (%)
Input manufacturers and distributors	140	92.1
Agro-vet input stockist	127	83.6
Public research and education institutions	116	76.3
Government extension officers	111	73.0
Farmers based organisations	110	72.4
Non-Governmental Organisations	87	57.2
Other farmers	11	7.2

The data in Table 10 shows that 92.1 per cent of the respondents accessed messages from agricultural input manufacturers (seed companies, agro-chemical manufactures and agricultural product processors like Brookside dairy among others). Messages from Agro-vet input stockist was accessed by 83 per cent of the respondents. Non-Governmental Organisations and other farmers had the least number of respondents accessing their messages through the radio stations. The low percentage of (7.2 %) access to messages from other farmers may be because farmers may use the radio stations to advertise their produce or be interviewed and not for the purpose of providing agricultural extension services.

The data indicated that the main users of vernacular radio station in dissemination of agricultural messages were the agricultural input manufacturers. They use the radio stations to create awareness of their products and how those products are used in the production process. As noted in section 4.8, private Kalenjin vernacular radio stations do broadcast agricultural messages that they package or those packaged by agricultural extension providers. Therefore it is a tool used to disseminate agricultural information to farmers.

#### **4.5 Access to Required Crop Production Messages**

Respondents were give specific crop production messages and asked if they required them and whether they accessed them from the private Kalenjin vernacular radio stations (Appendix A section D).

**Table 11: Specified Crop Production Messages Required and Accessed by Respondents (N=152)**

Messages	Required		Not require		Access		Not Access	
	Yes		No		Yes		No	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Pest	152	100	-	-	129	84.9	23	15.1
Weed control	149	98	3	2	128	84.2	24	15.8
Disease	148	97.4	4	2.6	118	77.6	34	22.4
Market	148	97.4	4	2.6	100	65.8	52	34.2
Fertilizer	146	96.1	6	3.9	131	86.2	21	13.8
Planting	143	94.1	9	5.5	136	89.5	16	10.5
Grading	134	88.2	18	11.8	92	60.5	60	39.5
Preservation	118	77.6	34	22.4	87	57.2	65	42.8
Harvesting	116	76.3	36	23.7	86	56.6	66	43.4

In Table 11, messages on crop pests were required by all the respondents meaning that pest affected their production process most. On access to the information from the radio stations, crop pest messages were the third most accessed agricultural message; accessed by (84.9 %) of the respondents. The most accessed messages on crop production was planting and planting materials, accessed by 89.5 per cent, types of fertiliser; methods of application, amount and time of application was second, accessed by 86.2 per cent and crop pest was the third, accessed by 84.9 per cent. The least required and accessed crop production messages disseminated by private Kalenjin vernacular radio stations were on harvesting. It can therefore be said that the most required messages are not necessarily the most accessed message by small-scale farmers from Kalenjin vernacular radio.

The study indicated that all the listed messages on crop production were required by over 76 per cent of the respondents. Therefore all the listed messages in the interview schedule were important to the small-scale farmers in the area of study. Relating this to section 4.4, there is an association between the agricultural input manufacturers who were rated highest by the respondents as the users of private vernacular radio stations in dissemination of agricultural messages and the most accessed messages.



#### 4.5.1 Access to Required Livestock Production Messages

Respondents were given 6 specific livestock production messages and asked if they required them and whether they accessed them from the private Kalenjini vernacular radio stations. Their responses are presented in Table 12.

**Table 12: Livestock Production Messages Required and Accessed by Farmers (N=152)**

Message	Required		Not required		Accessed		Not accessed	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Disease control	146	96.1	6	3.9	119	78.3	33	21.7
Feeds and feeding	144	94.7	8	5.3	128	84.2	24	15.8
Parasite control	141	92.8	11	7.2	120	78.9	32	21.1
Market and prices	136	89.5	16	10.5	108	71.1	44	28.9
Calf rearing	124	81.6	28	18.4	98	64.5	53	34.9
Milking techniques	114	75	38	25	85	55.9	67	44.1

It could be deduced from the data in Table 12 that the most required messages on livestock production were; disease control (96.1%), different types of livestock feeds (ways of feeding various stocks that the farmers kept) (94.7%) and the control of various parasites (92.8%).

As it was observed in 4.5 under messages on crop production, the most required messages on livestock production (livestock diseases 96.1%) was not necessarily the most accessed message (livestock diseases accessed by 78.3% while messages on feeds accessed by 84.2%) by small-scale farmers. Each of the messages listed in the instrument were required by over 76 per cent of the respondents and the same messages were accessed through private Kalenjini vernacular radio stations by over 55 per cent of the small-scale farmers. Vernacular radio stations therefore facilitated access to agricultural information required by rural small-scale farmers. However, the percentage of farmers who required the messages on livestock production was higher than the farmers accessing the messages through the private Kalenjini vernacular stations. The most accessed livestock production messages were on feeds and feeding accessed by (84.2%), second was on livestock parasites and their control (78.9%) while the third was on livestock diseases (78.3%). Therefore, it can be concluded that the most required agricultural messages by small-scale

farmers was not necessarily the most accessed information from private Kalenjin vernacular radio stations.

#### 4.5.2 Agricultural Messages Required by Small-Scale Farmers

Small-Scale farmers were required to state the three agricultural messages they required most for their farming activities using an open ended questions (see responses in Table 13).

**Table 13: Messages Required by Small-Scale Farmers  
N=152)**

<b>Message</b>	<b>Frequency</b>	<b>%</b>
Field management	75	49.34
Market	31	20.40
livestock management	15	9.87
Crops varieties	9	5.92
Farm inputs	8	5.26
Breeds and breeding	6	3.95
Loans	3	1.97
Green house farming	2	1.32
livestock products processing and preservation	1	0.66
fish farming	1	0.66
soil conservation	1	0.66
<b>Total</b>	<b>152</b>	<b>100.00</b>

Field management practices, like weed control, pest and crop disease control, fertiliser and fertiliser application were ranked first (was listed as the first most required messages by 49.34%). Messages on marketing like; where to market crops produce, livestock products and the prices of agricultural produce was listed as the second most required messages by 20.40%), while livestock management practices was third. The respective percentages are shown in Table 13.

Looking at specific messages, messages on field management practices were required by 49.34 per cent of the respondents; information on market for agricultural produce and their prices by (20.4%) while messages on livestock management was required by (9.87%). This had some similarity to the responses from respondents when they were

asked if the required specified messages in the instrument as shown in Table 11. Messages on crop pest control were required by all the respondents, information on weeds and weed control was required by 98 per cent, 97.4 per cent required messages on crops diseases and their control and type of fertilizers and how they are supposed to be applied was required by 96.1 per cent. These messages are all field management practices in crop production.

Agricultural messages on livestock production came third. This implies that in Kericho West Sub-County, a majority of small-scale farmers required information on crop production than livestock production messages. When small-scale farmers were asked if they required specific messages (listed in the instrument) on livestock production, disease control was the most required with 96.1 per cent respondents. Livestock feeds and feeding with 94.7 per cent was second and parasite control was third with 92.8 per cent as shown in Table 12. This implies that the main challenges small-scale farmers' encounter in livestock production is on diseases, parasite and best way of feeding animals to improve on their returns.

#### **4.6 Private Vernacular Radio as a Source of Agricultural Messages**

Respondents were asked to name three vernacular radio stations broadcasting in Kericho West sub-county that disseminated agricultural messages starting with the one with the highest frequency of messages disseminated and the third being the radio station with the least frequency of agricultural messages. The vernacular radio stations the respondents mentioned were Kass FM, Radio Injili, Chamgei FM, Kitwet and Sema FM.

**Table 14: Private Vernacular Radio as a Source of Agricultural Messages (152)**

<b>Private Kalenjin Vernacular Radio Station</b>	<b>Number of respondents</b>	<b>%</b>
Kass FM	81	53.29
Chamgei FM	53	34.87
Radio Injili	3	1.98
Other radio stations	15	9.87
<b>Total</b>	<b>152</b>	<b>100</b>

The respondents who said that they mainly obtained the messages from Kass FM were (53.29%), Changei FM (34.87%) and Radio Injili (1.98%). Some respondents (9.87%) did not rank Kass FM, Changei FM and Radio Ijili as their first source of agricultural messages.

Kitwek and Sema FM were mentioned by the respondents. However, they were either not broadcasting full-time in Kalenjin language or were subsidiaries of Kenya Broadcasting Corporation and therefore did not qualify to be included in the study. The study was only interested in private Kalenjin vernacular radio stations broadcasting in Kericho West sub-county. The information in Table 14 indicated that small-scale farmers obtained agricultural messages from the following private vernacular radio stations; Kass FM, Changei FM and Radio Ijili in that order.

#### 4.7 Participation in Messages Disseminated by Private Vernacular Radio Stations

Participation of small-scale farmers in the messages disseminated by private vernacular radio programmes entails involvement of the farmers through interviews during feature or product advertisement development; call-in during live agricultural related programmes and features; texting using mobile telephone; use of Email or other social networks and when farmers were asked for information they require by those who prepared the messages or the radios reporters.

**Table 15: Respondents' Participation in Messages Disseminated by Radio Stations (N=152)**

Participation	Response				Total (N)
	Yes		No		
	Freq.	%	Freq.	%	
Call-in	81	53.3	71	46.7	152
Short Message Service	80	52.6	72	47.4	152
Asked about information required	67	44.1	85	55.9	152
Message presentation	25	16.4	127	83.6	152

Majority of the small-scale farmers' participation was by use of mobile telephones through call-in or through Short Message Services (SMS) as shown in Table 15. Comparison between various forms of participation in the messages disseminated indicated that participation was higher through call-in (53.3%) and use of short message

service (52.6%) while participation through requesting specific agricultural messages the small-scale farmers required was 44.1 per cent. The least form of participation was presentation or being heard by other farmers in the programme, feature or advertisements (16.4%).

Comparison between respondents' participation (call-in 53.3%, SMS 52.6% and presenting 16.4%) and opinion on participation of other farmers (call-in 90.8%, SMS 88.8% and others being involved in message presentation 67.8%); (see Table 16) shows that other farmers' participation was perceived as higher in the three forms of participation than individual respondent's participation. This agreed with what the presenter of "Direct Voice of the Farmer" programme aired by Chamgei FM said. He said that they mainly interviewed farmers from North Rift where a variety of farming activity was done as opposed to the area of study where farmers mainly engaged with maize, tea and sugarcane production. Therefore farmers from the North Rift had a higher chance of being on air than those from the area of study.

The presenter further said that during the agriculture programme, there was a session for call-in where farmers give their inputs. Other times, farmers called the radio station to request for specific content. Reporters were also sent to the field to have interviews with farmers. The station manager Radio Injili broadcasting from Kericho town said that farmers usually preferred to call or SMS to writing letters or Emails. It can therefore be deduced that radio use other forms of information communication technologies to increase farmers' participation and therefore enhance interactive communication. It can therefore be concluded that, private Kalenjin vernacular radio station disseminating agricultural messages to rural small-scale farmers used a participatory communication approach as opposed to one way communication approach.

**Table 16: Other Farmers' Participation in Messages Disseminated by Radio Stations (N=149)**

Participation	Other farmers' participation					
	Yes	%	No	%	Missing	(N)
Call-in	138	90.8	11	7.2	3	149
Short Message Service	135	88.8	14	9.2	3	149
Message presentation	103	67.8	46	30.3	3	149

Respondents were asked to state whether other farmers participated in agricultural messages disseminated by private Kalenjin vernacular radio station. Table 16 shows that (90.8%) of the respondents were of the view that other farmers participated through call-in. 88.8 per cent felt that other farmers participated through Short Message Service and 67 per cent, through message presentation where respondents hear other farmers in the agricultural programme, advertisement or agricultural feature. Therefore, other small-scale farmers participated more through call-in than through SMS and message presentation.

Data collected from an open ended question on other forms of participation after analysis indicated that, a small number of respondents participated through the use of the internet via Email and other social network. Some said that they participated in answering questions asked during agricultural programmes in order to win prizes and not necessarily to give their input. Apart from call-in, sending SMS and Email, other forms of participation was through listening and during live vernacular radios stations road shows.

#### **4.8 Dissemination of Agricultural Messages by Private Kalenjin Vernacular Radio**

According to information provided by Kass FM, the radio station disseminated agricultural messages in form of short features of about 5 minutes, agriculture related advertisements and agricultural programmes that took about one hour. The station had a programme on farming on Wednesday called “Shield of the farmer” transmitted between 7:30 pm and 8:30 pm. The programme was sponsored by agricultural input manufacturers like Osho Chemicals limited, Syngenta, Kenya Seed Company, and Coopers Kenya Limited. The sponsors determined the content of the messages and used the programme to push their brand and products. Therefore, sometimes it may not be related to what some farmers may have requested through calling the radio station.

The person interviewed in Kass FM and Radio Injili lamented that the government extension officers only involved the private vernacular radio stations when they wanted to invite farmers for a field day and it was quite rare; according to the station manager Radio Injili. On such occasions, the station sent reporters to prepare a programme and air it to benefit other farmers who will not have managed to attend the field day. The station also send reporters to the field once a month to look for stories on successful businesses and in case they came across a person who has succeeded in farming business, such farmers

were featured. The production manager Kass FM said that agriculture related advertisements constituted about 20 per cent of all the advertisements they aired and Mobile phone service providers took the lion's share. According to production manager Kass FM, the radio station prefers interviewing farmers so that the messages are more acceptable to the listeners. This increases credibility of the message or advice, for the listener feels that if their colleague farmer is doing it and its working, it is also bound to work in their situation.

The main source of agricultural message for the private vernacular radio programmes according to the station manager Radio Injili was agriculture input manufacturers who sponsored programmes or paid for advertisements. Such firms included Uweso, Ultravetis and Syngenta. This corresponds to the responses of the respondents who rated agricultural input manufacturers and distributors as the leading disseminators of agriculture messages through vernacular radio stations (Table 10). The second main source of agricultural messages was the internet. Radio Injili aired about 3 features per week of about 5 minutes each and a one hour programme on agriculture was aired every Thursday between 7:30 pm and 8:30 pm. The person interviewed said that this is one of the times when the messages will be accessed by a majority of the small-scale farmers. It is considered as prime time. This agrees with the observation that majority of farmers identified night time as their preferred time of listening to radio. They preferred 8 pm to 10 pm because they are often busy during the whole day (Abubakar, *et al.*, 2009; Zossou, *et al.*, 2012).

#### **4.9 Challenges Faced by Private Kalenjin Vernacular Radio Stations**

The station manager radio Injili said that they encountered challenges like, farmers asking for specific content and the first option is to seek answers from government extension officers. However, it has been difficult to get help from them due to protocol restriction which dictates who should deal with the media. The reporters seeking information are left frustrated and only turn to the internet to search for the content. Information sourced from the internet may not be relevant for instance; information on varieties or even pests may be relevant in other parts of the world and not to the target farmers.

The agricultural input manufacturers who sponsor agricultural programmes dictate the content and the season when the programmes are aired. The content and time of dissemination corresponds to the type of input they deal with and season the said

products, services is required or in use. After sometime the programme is discontinued affecting the sustainability of dissemination of agricultural messages to small-scale farmers. For radio to have desired effect, the messages disseminated should be sustained and repeated (Girard, 2001).

Preparation of radio programmers depends on mobility FAO (2006). The station manager radio Injili observed that meeting the cost of sending reporters to the field to compile agriculture messages and features was a challenge and they mostly send them when they get sponsors. The linkage structures between the radio stations and most of agriculture extension providers like the Ministry of Agriculture, Non-governmental organisation, those who generate new production technologies like universities and research stations are either lacking or ineffective. An example quoted by radio Injili correspondent confirmed the difficulty of obtaining information on purple tea; requested by their listeners from Kenya Tea Research Foundation and other public extension services. For pluralistic extension approach to succeed there is need for better coordination between various agricultural extension providers (Nambiro *et al.*, 2005). He also said; “Reporters sent to the field may not be having required competencies in agriculture and interest on farming. Most reporters are interested in political news; among others because there is a feeling that this is what most listeners are interested in”.

Other challenges the private vernacular radio station grapple with is a production crew visiting the field for a period of 3 days only to make features and agriculture programmes and are expected to generate content that could be broadcasted for a period of 3 months. The production crew felt that this time in the field was inadequate as was indicated by Changei FM Radio presenter of “direct voice of the farmer” programme. In the field, some of the farmers were shy hence one may spend a lot of time with such farmers only to end up with content that is not worth broadcasting. Some farmers even after giving very useful and credible information insist on not being aired due to certain fears. Some areas are very inaccessible and reporters, even with prior knowledge of a farmer they may want to visit and feature, it becomes impossible with the available allocated time and resources; for agricultural programmes and features that are not live broadcast, farmers may not get immediate feedback and later, the feedback may be aired when the farmer is not listening.



#### 4.10 Test of Hypotheses

The following hypotheses were tested for this study.

Ho<sub>1</sub>: There is no statistically significant difference between the number of extension service providers who disseminate agricultural extension messages through private vernacular radio stations and small-scale farmers' level of access to the agricultural messages disseminated.

The first hypothesis was tested to establish if there was a statistically significant difference between the number of extension service providers who disseminate agricultural extension messages through the private Kalenjin vernacular radio stations and farmers' level of access to the messages. Independent variable was the number of agricultural messages providers and dependent variable was access to the agricultural messages disseminated. It is important to note that a high number of agricultural messages providers may avail more information to the farmer but it may not always be the case. Likewise, a farmer may receive messages from only one provider and still access the information he or she requires.

The number of agricultural extension providers who small-scale farmers accessed their agricultural messages, through the private vernacular radio were grouped into categories depending on the number of providers whose messages were accessed by the farmers. The number of providers were categorised into: None (no messages from the agricultural providers); 1 to 2 providers; 3 to 4; 5 to 6 and those who accessed 7 or greater than 7 providers.

**Table 17: Number of Providers and the Level of Access to Agricultural Messages (N=152)**

Number of Providers	Freq.	<u>Access to Agricultural Messages</u>		
		Mean	Std. Deviation	Std. Error
None	3	7.00	7.55	4.36
1 to 2	10	12.80	2.49	.79
3 to 4	50	11.60	3.70	.52
5 to 6	81	10.57	3.96	.44
>7	8	11.37	3.20	1.13
<b>Total</b>	<b>152</b>	<b>11.03</b>	<b>3.89</b>	<b>.31</b>

Table 17 shows that majority of the respondents received information from 5 to 6 providers, who were 81 out of 152 respondents (35.29%). However they did not have significantly higher access to agricultural messages than those who were receiving messages from fewer or more providers, because the means that represent access was almost the same. For example, those who accessed 1 to 2 providers received an average (mean) of 12.80 of the messages listed in the small-scale farmers' interview schedule, while those accessing 5 to 6 providers received an average of 10.57 messages which is lower than the 12.80. In testing the hypothesis, it was assumed that the sources of information have equal weight irrespective of the information provider. Interest was on the number of information providers each respondent accessed.

**Table 18: One Way ANOVA Statistical Test for Number of Providers and the Level of Access to Agricultural Messages (N=152)**

	Sum of Squares	d.f.	Mean Square	F	Sig.
Between Groups	114.543	4	28.636	1.942	.106
Within Groups	2167.352	147	14.744		
Total	2281.895	151			

$F = 1.942$ , d. f. = 4,  $p = 0.106$

Table 18 shows that the calculated value of  $F$  is 1.942, d.f. was 4 and  $p$  was 0.106. The significance ( $p$ ) was greater than the alpha (.05). Therefore, the null hypotheses could not be rejected ( $p = 0.106$  with  $\alpha = 0.05$ , show that  $p > 0.05$ ) One way ANOVA shows that there is no statistically significant difference hence there was no need for multiple comparison between any two groups. This means that the number of service providers from whom the messages were accessed was not a significant factor in access to the messages. Hence, farmers accessing messages from fewer providers could access as much information as the farmers accessing messages from many providers.

$H_{02}$ : There is no statistically significant association between the number of agricultural messages required by small-scale farmers and level of access to the messages disseminated through private vernacular radio programmes in Kericho west Sub-County.

The second hypothesis was tested to determine the association between the number of agricultural messages required by small-scale farmers and the level of small-scale farmers' access to the messages disseminated through private vernacular radio programmes. A farmer may access agricultural messages from private vernacular radio but may not be requiring the said messages for his or her farming activities or may require the messages and not access it from the radio station.

The 17 required information (appendix A section D) listed in the interview schedule for the small-scale farmers were converted into required information index and the same was done for the 15 accessed messages (appendix B section D). It was assumed that each of the said messages carried equal weight and was assigned a score of one. A score of 0 was assigned to any information that respondents did not require. The labels assigned were, 0 – never; 1 to 4 – low; 5 to 8 – moderate; 9 to 12 - high and greater than 12 - very high. The same was done with the 15 accessed messages. 0 – Never, 1 to 4 – Low, 5 to 8 – moderate, 9 to 12 – High and greater than 12 – Very high. After categorisation, the data in Table 19 was generated using SPSS.

**Table 19: Level of Required Information and Level of Access**

Level of required	Level of access					Total
	Never	Low	Moderate	High	Very high	
Moderate	0	1	1	2	1	<b>5</b>
High	0	0	3	19	4	<b>26</b>
Very high	5	4	21	34	57	<b>121</b>
<b>Total</b>	<b>5</b>	<b>5</b>	<b>25</b>	<b>55</b>	<b>62</b>	<b>152</b>

Table 19 shows that majority of respondents who required the messages were in very high level (category). They were 121 out of 152 respondents or 79.61 per cent. Likewise, majority of the respondents were in very high level of access (62 out of 152 respondents or 40.79%) to agricultural messages disseminated by private Kalenjin vernacular radio programmes. Table 19 shows that as the level of messages required by small-scale farmers increased, the level of access to agricultural messages (disseminated through private vernacular radio) by small-scale farmers also increased. This can be interpreted that as the number of agricultural messages required by small-scale farmers increased, the level of access to the messages disseminated through private vernacular radio also

increased. The required information index and the accessed information index as explained earlier were used to generate Table 20.

**Table 20: Chi-Square Tests for Required Information and Level of Access**

	<b>Value</b>	<b>df</b>	<b>Asymp. Sig. (2-sided)</b>
Pearson Chi-Square	24.675	8	.002
Likelihood Ratio	23.557	8	.003
Linear-by-Linear Association	.910	1	.340
<b>N of Valid Cases</b>	<b>152</b>		

---


$$X^2 = 24.675, \text{ d. f.} = 8, P = 0.002$$

Comparison of  $p = 0.002$  and  $\alpha = 0.05$  show that  $P < \alpha$ , this implies that there is a statistically significant association between the level or number of agricultural messages required by small-scale farmers and the level of access to the agricultural messages disseminated by private vernacular radio programmes. The null hypothesis was hence rejected. This may be interpreted to mean that the more information there is; that is required by farmers, the more the farmers are able to access. This may be due to the fact that the farmers may be keener in listening to agricultural messages when they need the information being disseminated than when they do not need it.

Ho<sub>3</sub>: There is no statistically significant association between small-scale farmers' participation in agricultural messages disseminated by private vernacular radio and level of accessing the messages.

The third hypothesis was tested to establish if there was a statistically significant association between small-scale farmers' participation in the agricultural messages disseminated by private vernacular radio programmes and the level of access to the messages disseminated. The responses to appendix A section D and F were grouped in to categories of never (small-scale farmers who never participate in messages disseminated), low, moderate, high and very high levels of participation or levels of access to agricultural messages.

**Table 21: Level of Participation and Level of Access (N=152)**

Participation level	Level of access					Total
	Never	Low	Moderate	High	Very high	
Never	5	1	6	7	10	<b>29</b>
Low	0	1	7	15	11	<b>34</b>
Moderate	0	3	4	21	17	<b>45</b>
High	0	0	8	12	24	<b>44</b>
<b>Total</b>	<b>5</b>	<b>5</b>	<b>25</b>	<b>55</b>	<b>62</b>	<b>152</b>

Majority of respondents who participated in the messages disseminated by private Kalenjin vernacular radio programmes were in moderate level of participation or category, they were 44 out of 152 respondents. Majority of the respondents were in very high level of access (62 out of 152 respondents or 40.79%). Table 21 shows that as the level of participation increased, the level of access also increased. There is a direct association between level of participation and level of access to agricultural messages disseminated by the private vernacular radio programmes.

**Table 22: Chi-Square Tests for Level of Participation and Level of Access (N=152)**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	33.649 <sup>a</sup>	12	.001
Likelihood Ratio	30.316	12	.003
Linear-by-Linear Association	10.718	1	.001
N of Valid Cases	152		

$\chi^2 = 33.649$ , d. f. = 12,  $P = 0.001$

Table 22 shows the  $P$  value as 0.001 which is less than  $\alpha$  (0.05). The Chi-Square ( $\chi^2$ ) test implies that there is a statistically significant association between participation and access to agricultural messages disseminated by private Kalenjin vernacular radio stations. Therefore the null hypothesis was rejected. It could therefore be concluded that farmers' access to agricultural messages disseminated by private vernacular radio may be influenced by farmers' participation in the messages. However, the converse may also be true that is, participation in messages may influence the accesses to the messages.

## CHAPTER FIVE

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

#### 5.1 Introduction

This chapter gives the summary of the study, in terms of the location of the study, the general objectives and methodology. It also looks at some of the highlights of the analysed data and general characteristics of the respondents. The conclusions and recommendations which were made basing on the findings are also briefly discussed.

#### 5.2 Summary of the Study

Radio is an important extension tool that can be used, inexpensively in sharing agricultural information with small-scale farmers in the remotest part of the rural areas. The use of vernacular in radio broadcasts makes programmes acceptable to rural farmers and should be developed to supplement public extension. In the process, vernacular radios use certain approaches, face challenges and offer opportunities to small-scale farmers. This study sought to investigate the role of private vernacular radio stations, if they disseminated agricultural messages required by small-scale farmers in Kericho West Sub-County, their operational approaches and challenges they faced. A cross-sectional survey research design was used to collect data form a sample of 152 rural, small-scale farmers' households and all the three inventoried private Kalenjin vernacular radio stations. An interview schedule whose Reliability coefficient was 0.77 was used to collect data from small-scale farmers and the radio stations. The statistical package for social sciences (SPSS) version 18 was used to analyse data and hypotheses tested with ANOVA and Chi-square at 0.05 significance level.

Majority (55.9%) of the respondents interviewed were between 26 and 45 years. A slightly higher number of males were interviewed than females (55.9% males and 44.1% females) and 47 per cent of the respondents had secondary education. All respondents grew crops and kept livestock except 4.6 per cent who did not keep animals. The two major crops grown in the area of study were maize and tea while the livestock stocks reared were dairy cows and poultry.

All the three private vernacular radio stations disseminated agricultural messages, Further, Kass FM, Chamegi FM and Radio Injili disseminated required agricultural message in that order of importance according to small-scale farmers' responses. They accessed agricultural messages from, Government extension officers, public research and education institutions, agricultural input manufacturers, and distributors, Non-Governmental Organisations, Agro-vet stockists, Farmers Based Organisations, Private vernacular radio stations and other farmers. Private vernacular radio stations were ranked as the most important source of agricultural messages by 52 per cent of the respondents. When the mean for each of the eight sources of agricultural messages was calculated to determine the source with the best ranking, the two most important sources of agricultural messages were private Kalenjin vernacular radio (mean of 2.15) and other farmers ( mean of 2.85). This implies that private Kalenjin vernacular radio stations was the best ranked source of agricultural messages and therefore it plays an important role in the dissemination of agricultural messages to small-scale farmers in rural areas. In the area of study there were 3 private vernacular radio stations that broadcasted in the dominant vernacular language and all the three vernacular radio stations disseminated agricultural messages.

Majority of the respondents received agricultural messages from between 5 to 6 agricultural information providers. However they did not have significantly higher access to agricultural messages than those who were receiving messages from fewer or more providers. Testing the hypothesis ( $H_{O1}$ ), showed that there was no statistically significant difference between the numbers of agricultural extension providers who disseminate agricultural extension messages through private vernacular radio and the small-scale farmers' level of access to the disseminated messages. It can therefore be concluded that the difference in small-scale farmers' access to agricultural messages from different number of agricultural extension providers using private vernacular radio stations to disseminate agricultural information is not significant.

Analysis of data obtained from an open ended question asking respondents to list three of most important agricultural messages they required for their farming activities indicated that majority of the respondents (49.34%) required messages on field management practices, (20.40%) required messages on marketing while the third most required

messages was on livestock management. Therefore, respondents required information on crop production more than on livestock production.

From a list of messages on crop production, the most required messages were on crop pest control, which was required by the entire respondent. It was the third most accessed message from the private vernacular radio stations (accessed by 84.9% of the respondents). The most accessed messages were on planting and planting materials accessed by 89.5 per cent. Likewise the most required messages on livestock production were on disease control (required by 96.1%). While the most accessed messages on livestock production were on livestock feeds which were accessed by 84.2 per cent of the respondents. Therefore the most required messages by small-scale farmers are not necessarily the most accessed messages from the private vernacular radio programmes.

As the number of agricultural messages required by small-scale farmers increased, access level to the messages disseminated by private vernacular radio programmes also increases. The Chi-square test showed that there was a statistically significant association between the number of agricultural messages required by small-scale and level of accessing the messages by the small-scale farmers from the private vernacular radio programmes.

Small-Scale farmers participated in the messages disseminated by private Kalenjin vernacular radio station by being interviewed in the production process of the agricultural feature, product advertisement or programmes; call-in during live agricultural related programmes and features; texting using mobile telephone; use of Email or other social networks. Participation was highest through call-in (53.3%) and use of short message service (52.6%) while participation through requesting for specific agricultural messages the small-scale farmers required was 44.1 per cent. The least form of participation was presentation or being heard by other farmers in the programme, feature or advertisements (16.4%). Comparison between respondents' participation (call-in 53.3%, SMS 52.6% and presenting 16.4%) and perception of other farmers' participation (call-in 90.8%, SMS 88.8% and others being involved in message presentation 67.8%); shows that perception of other farmers' participation was higher in the three forms of participation than the reported individual respondent's participation.



The findings showed that as the level of participation by small-scale farmers in the agricultural messages disseminated by the private vernacular radio stations increased, the level of access to the messages also increased. The Chi-Square ( $X^2$ ) test showed that there was a statistically significant association between small-scale farmers' participation and access to agricultural messages disseminated by private Kalenjin vernacular radio stations. Therefore, it can be deduced that to increase farmers' access to agricultural messages disseminated by private vernacular radio; participatory communication approach should be encouraged. The three private Kalenjin vernacular radio stations used a participatory communication approach in their involvement in dissemination of agricultural messages.

The challenges faced by the people in charge of agricultural extension programmes working in the private vernacular radio stations included, limited resources to send reporters to the field, poor linkage between them and agricultural extension providers, content was dictated by the sponsors hence some of the farmers requirements were not met and discontinuation of the messages by the sponsors in seasons their products were not in high demand affecting programme sustainability among others.

The key findings: Compared to NGOs; agricultural input manufactures and distributors; government extension services; farmer based organisations; Agro-Vet input stockists; research and education institutions and other farmers, private vernacular radio programmes were the most important source of agricultural messages to the small scale farmers. The small-scale farmers receiving messages from a higher number of agricultural extension providers did not have a significantly higher access to the messages than those receiving them from fewer providers.

The most required agricultural messages were not necessarily the most accessed messages from the private vernacular radio programmes. As the number of messages required by farmers increased, access to the messages disseminated by the private vernacular radio programmes also increased. Hence the more there is, that is required by small-scale farmers, the more they are able to access.

Small-Scale farmers participated in the messages disseminated through private vernacular radio programmes. There was a statistically significant relationship between participation

and access to the disseminated messages. Therefore participation may influence access to the disseminated agricultural messages.

The people in charge of agricultural programmes faced challenges like: Limited resources for sending reporters to the field; lack of or inefficient linkage between them and agricultural extension providers; content of the agricultural messages was dictated by the sponsors hence some of the small-scale farmers requirements could not be met and discontinuation of the messages by the sponsors in seasons when their products were not in high demand affecting programme sustainability among others.

### **5.3 Conclusions**

The private vernacular radio programmes were the most important source of agricultural messages to small scale farmers in the rural areas. They helped small-scale farmers' access messages from agricultural extension providers. Agricultural extension providers were not necessary disseminating the most required messages through the private vernacular radio programmes. The more messages that small-scale farmers required, the more they had access to from the private vernacular radio. Small-Scale farmers participated in the messages disseminated and participation in the disseminated messages increased access to the disseminated messages. The people in charge of the agricultural programmes (disseminated by the private vernacular radio) faced challenge like the content being determined by the programme sponsor hence may not be related to farmers requests; lack of or inefficient linkage between them and other agricultural extension providers; meeting the cost of sending reports to the field to compile agricultural message among others.

### **5.4 Recommendations**

From the findings and conclusions of the study, the following recommendations are made:-

1. Agricultural extension providers should use the private vernacular radio as a medium of disseminating messages to small-scale farmers in rural areas together with other methods that they employ, in order to increase access to the messages.

2. The focus of agricultural extension service provider should be on the relevance of the disseminated messages rather than, the number of agricultural messages the provider is disseminating through private vernacular radio programme.
3. Private vernacular radio programmes should use a participatory communication approach to increase access by small-scale farmers to the disseminated messages.
4. People in charge of private vernacular radio programmes should identify the challenges encountered in their involvement in dissemination of agricultural messages and come up with mitigation measures to increase success of the programmes.

### **5.5 Recommendations for Further Research**

A similar study needs to be carried out with all private vernacular radio stations in Kenya in order to understand the role they play in dissemination of agricultural messages. There is need also for a study to be carried out to identify the gap in the linkages between all the players in the generation, transformation, transmission and utilisation of agricultural knowledge and the private vernacular radio stations can then evaluate their effectiveness for the benefit of small-scale farmers.

## REFERENCES

- Abubakar, B. Z., Ango, A. K. & Buhari, U. (2009). The Roles of Mass Media in Disseminating Agricultural Information to Farmers in Birnin Kebbi Local Government Area of Kebbi State: A Case Study of State Fadama II Development Project. *Journal of Agricultural Extension Vol. 13 (2)* December 2009. Page 49.
- Achugbue, E. I. & Anie, S. O. (2011). *ICTs and Information Needs of Rural Female Farmers in Delta State*, Library Philosophy and Practice (e-journal). pp 448. Page 67 <http://digitalcommons.unl.edu/libphilprac/448> Retrieved on 17/9/2012.
- Alex, G. (2002). *Agricultural Extension Investments: Future Options for Rural Development*. The World Bank. Washington, DC.
- Al-Hassan, S., Andani, A. & Abdul-Malik, A. (2011). *The Role of Community Radio in Livelihood Improvement: The Case of Simli Radio*: Field Action Science Report (online), Vol. 5/2011. Retrieved August, 2011, from [hppt://factsreport.revues.org](http://factsreport.revues.org).
- Ango, A., Illo, A., Abdullahi, A. & Amina A. (2013). Role of Farm-Radio Agricultural Programmes in Disseminating Agricultural Technology to Rural Farmers for Agricultural Development in Zaria, Kaduna State, Nigeria. *Asian Journal of Agricultural Extension, Economics & Sociology 2(1): 54-68, 2013; Article no. AJAEES.2013.005*. Retrieved December, from [www.sciencedomain.org](http://www.sciencedomain.org)
- Benham, M & Behrens, T. (2005). *Leadership for Community Change; Crossing Boundaries, Changing Community, Lessons in Collective Leadership*. Kellogg Foundation. Retrieved November, 2007, from [www.wkkf.org](http://www.wkkf.org)
- Birner, R. K., Davis, J. P., Pender, E., Nkonya, P., Anandajayasekerem, A. & Mbabu, D. (2009). From the “Best Practices” to “Best Fit”: A Framework of Analyzing Pluralistic Agricultural Advisory Services Worldwide. *Journal of Agricultural Education and Extension 15(4)*: pp. 341-355
- Brian, L., Connelly, S., Trevis, C. R., Duane, I. & Christopher, R. R. (2011). *Signalling Theory: A Review and Assessment Journal of Management Vol. 37 No.1*, January 2011. Retrieved September 2011 <http://www.sagepub.com>
- Bryant, J. & Zillmann, D. (2009). *Media Effects: Advances in Theory and Research*. Taylor & Francis e-library. Retrieved October 2011, from [hppt://books.google.com](http://books.google.com)
- Butunyi, C. (2011). Curse or Blessing? Radio Industry chew over Technological Changes. *Daily Nation Newspaper*, August 6, 2011. Printed by Nation Media Group Limited, Nairobi, Kenya.

- Chapman, R., Blench, R., Kranjac-Berisavljevic', G. & Zakariah, A. B. T. (2003). Rural Radio in Agricultural Extension: The Example of Vernacular Radio Programmes on Soil and Water Conservation in Ghana. *Agricultural Research and Extension Network Paper No. 127*. (DFID), London.
- Communications Commission of Kenya (2011). Sector Statistics Report: Retrieved April, 2013 from website: <http://www.cck.go.ke/resc/downloads>.
- FAO. (2006). *Report of the Sensitization Workshop on Rural Radio for Policy and Decision Makers in East and Southern Africa*. Rome, Italy.
- FAO. (2005). *A Radio Broadcast Model for Rural Women and Farm Households*. Retrieved April, 2007 from website: <http://www.fao.org>.
- FAO. (1996). *Food for All*. Report of the World. Food Summit 13-17 November, 1996. Rome, Italy.
- Farm Radio International. (2008). *Communicating With Radio: What Do We Know? Findings Form Selected Rural Radio Effectiveness Evaluations*. African Farm Radio Research Initiative (AFRRI). Farm Radio International. Ottawa, Canada.
- Frankel, J. R. & Wallen, N. E. (2000). *How to design and evaluate research in education*. New York: McGraw-Hill Publishing Co.
- Gathigi, G. W. (2009). *Radio Listening Habits among Rural Audiences: An Ethnographic Study of Kieni West Division in Central Kenya*. Ohio University.
- Girard, B. (2001). 'The Challenges of ICTs and Rural Radio'. *Paper presented at the First International Workshop on Farm Radio Broadcasting*, 19–22 February 2001, FAO, Rome.
- Glendenning, C. J. Babu, S. & Kwando, A. (2010). *Review of Agricultural Extension in India: Are Farmers' Information Needs Being Met?* International Food Policy Research Institute. New Delhi. Retrieved December, 2010 from [www.ifpri.org/publication](http://www.ifpri.org/publication).
- Havelock, R. G. (1986). *Modelling the Knowledge System*. Westview press, Boulder.
- Hilliard, R. L. (2009). *Farm and Rural Radio: Some Beginnings and Models*. FAO, New York. Retrieved, 30/11/2013 from [www.fao.org](http://www.fao.org).
- Hornby, A. (2005). Oxford advanced Learner's Dictionary of Current English. (7<sup>th</sup> Edition). Oxford University press, Oxford.

- Ilboudo, J. P. (2005). *'Prospects for Rural Radio in Africa'*, *Radio in Transition*. Baobab Publishing and Oxford.
- Ilboudo, J. P. (2001). *'Rural Radio: Africa's Internet'*. Retrieved April, 2007 from website: [www.fao.org/News/2001/011205-e.htm](http://www.fao.org/News/2001/011205-e.htm).
- Ilboudo, J. P. (1998). *Rural Radio: Role and Use over the Past Three Decades*. Education and Communication Service, FAO, Rome. Retrieved on 30/11/2013 from [www.fao.org](http://www.fao.org)
- Kadenge, E. (2001). *Rural, Radio Resource Pack- 05/1*. Technical Centre for Agricultural and Rural Co-operation, Wageningen, Netherlands.
- Kathuri, N. J. & Pals, D. A. (1993). *Introduction to Educational Research*. Printed by Educational media centre, Egerton University, Njoro.
- Katz, E. (2002). *Innovative Approaches to Financing Extension for Agriculture; and Natural Resource management-conceptual Considerations and Analysis of Experience*. Swiss Centre for Agricultural Extension, Lindau.
- Kelsey, D. L. & Hearne, C. C. (1967). *Cooperative Extension*. Cornell University Press, Ithaca, New York.
- Kericho Sub-County Statistic Officer. (2010). *Kericho District statistics annual Report*, Kericho District.
- Kwama, K. (2006). *Radio Stations Become The Towers Of Babel*, The Standard Newspaper, 19 September 2006. Standards Media Group, Nairobi, Kenya.
- Leeuwis, C. & Van den Ban, A. (2004). *Communication for Rural Innovation. Rethinking Agricultural Extension. (3<sup>rd</sup> Edition)*. Oxford, Blackwell Publishing.
- Lionberger, H. & Chang, H. (1970). *Farm Information for Modernising Agriculture: The Taiwan System*. Praeger, New York.
- Maarse, L., Wentholt, W. and Chibudi, A. (1998). *Making Change Strategies Work - Gender sensitive, client oriented livestock extension in Coast Province, Kenya*. Koninklijk Institute Voor De Tropen. Amsterdam. December, 2013. Retrieve from [www.amazon.com](http://www.amazon.com).
- Mann, C. J. (2011). Observational Research Methods .Research Design II: Cohort, Cross Sectional and Case Control Studies: *Emergency Medical Journal*. Retrieved, December, 2011 from [www.emj.bmj.com](http://www.emj.bmj.com).

- Mathers, N., Fox, N. & Hunn, A. (2002). *Trent Focus for Research and Development in Primary Health Care: Using Interviews in a Research Project*. Trent Focus, Sheffield.
- Mbeke, P. & Mshindi, T. (2008). *Kenya Media Sector Analysis Report*. Canadian International Development agency CIDA-Kenya.
- Media Council of Kenya. (2012). *The Performance of Vernacular Radio Stations in Kenya September/October, 2011 Monitoring Report*. Media Council of Kenya, Nairobi, Kenya.
- Ministry of Agriculture and Rural Development. (2001a). *National Agricultural Extension Policy*. Nairobi, Government Printers.
- Ministry of Agriculture and Rural Development. (2001b). *National Agriculture and Livestock Extension Programme Implementation Framework*. Nairobi, Government printers.
- Musa, N., Githeko, J. & El-Saddig, J. (2011). Effectiveness of Information and Communication Technology in disseminating agricultural Information. *African Crop Science Conference Proceedings*, Vol. 10. pp. 355-357.
- Muyanga, M. & Jayne, T. S. (2006). *Agricultural Extension in Kenya: Practice and Policy Lessons*. Working Paper 26 (2006) Tegemeo Institute of Agricultural Policy and Development, Egerton University, Nairobi, Kenya.
- Nambiro, E., Omiti, J. & Mugunieri, L. (2005). *Decentralisation and Access to agricultural Extension services in Kenya*. Strategic Analysis for Growth and Access. December, 2013 retrieved from [www.saga.cornell.edu](http://www.saga.cornell.edu).
- National Association of Farm Broadcasting. (2011). *Harvesting the Power of Farm Broadcasting*. New York.
- Nazari, M. R. & Hassan, A. (2010). Radio as an Educational Media: Impact on Agricultural Development. *The Journal of the South East Asia Research Centre for communication and humanities*. Vol. 2. pp.13.
- Ndoo, C. (2006). As SMS Service Grow, Some See A Sprawl. *Daily Nation*, 8 August. Printed by Nation Media Group Limited, Nairobi, Kenya.
- Niang, T. (2002). *Rural Radio in Action: A C.T.A Experience*, Technical Centre for Agricultural and Rural Cooperation, CTA, Netherlands.

- Odame, H. H. (2009). *The Role of Media in Agriculture and Rural Development of ACP Counties*. Synthesis Report. Retrieved August, 2011 from <http://www.cta.int>.
- Othman, M., Samah, B., Samah, A. & Ramli, S. (2011). Receiving the Agriculture Information through Mass Media and Interpersonal Sources among the Rural Community. *American Journal of Agricultural and Biological Sciences* 6 (3): 451-461, 2011 ISSN 1557-4989 © 2011 Science Publications 8.
- Owino, F. (1999). *The Role of International Organisations and Non-Governmental Organisations in Information Support for Agricultural Policy Formulation in Kenya*. Study report. Wageningen, CTA.
- Ozowa, V. N. (1997). *Information Needs of Small-scale Farmers in Africa: The Nigerian Example*. Retrieved April, 2007. Website: <http://www.cgiar.org/newsletter/june97/9cgnews>
- Parvizian, F., Hosseinnejad, G. H. & Lashgara, F. (2011). Investigating the Role of Radio and Television Programs on the Improvement of Agricultural Extension. *American journal of scientific research. Issue 16:132-144. (2011)*. Retrieved August, 2011 from <http://www.eurojournals.com>
- Rakotoarimana, J. (2003). *Research in the Area of Rural media. The Methodologies Approaches used for gathering and utilising Feedback form Listeners. Research on Audience and Listeners*. Rome Italy (FAO)
- Republic of Kenya. (2002). Kericho District Development Plan (2002-2008). *Effective Management for Sustainable Economic Growth and Poverty Reduction*. Nairobi, Government Printers.
- Rivera, W. M. (2001). *The Invisible Frontier: the Current Limits of Decentralization and Privatization in the Developing Countries*. An International Perspective (2001); Erudition Press.
- Rivera, W. M. & Qamar, M. K. (2003). *Agricultural Extension, Rural Development and the Food Security Challenge* Extension, FAO, Rome.
- Röling, N. (1988). *Extension Science. Information Systems in Agricultural Development*. Cambridge University press, Cambridge.
- Röling, N. & Engel, P. (1990). IT from a Knowledge system Perspective: Concepts and Issues. Knowledge in society. *The International Journal of Knowledge transfer*, 3 6-18.
- Scarborough, V. S., Killough, D. A., Johnson & Farrington. (1997). *Farmer Led Extension. Concepts and Practices*. Intermediate Technology Publishers, London.



- Shanahan, J. & Morgan, M. (1999). *Television and Its Viewers: Cultivation Theory and Research*. Cambridge University Press. Cambridge. Retrieved December, 2011 from [www.cup.cam.ac.uk](http://www.cup.cam.ac.uk).
- Sibanda, J. (2003). *Improving Access to Rural Radio by 'Hard-to-Reach' Women Audiences*. FAO, Harare, Zimbabwe.
- Sitawa J. K., Ogutu, L. & Ngunjiri, S. W. (2010). *The Potential of Radio broadcast as a Medium for Disseminating Agricultural Information and Technologies*. Kenya Agricultural Research Institute. Retrieved, September, 2012.
- Smith, L. D. (1997). *Decentralisation and Rural Development: The Role of the Public and Private Sectors in the Provision of Agricultural Support Services*. Paper prepared for the FAO/IFAD/World Bank Technical Consultation on Decentralisation. December, 16 -18, 1997. Rome, Italy.
- Spurk, C., Schanne, M., Mak'Ochieng, M. & Uguga, W. (2012). "Good Information in Short Supply" Final Report. Retrieved December, from [www.zhaw.ch](http://www.zhaw.ch)
- Swanson, B. & Claar, J. (1984). *The History and Development of Agricultural Extension. A Reference Manual*. FAO. Rome.
- Technical Centre for Agriculture and Rural cooperation (CTA). (2009). *The Role of Media in the Agricultural and Rural Development of ACP Countries*. Retrieved from <http://annualseminar2009.cta.int> on 6/12/13.
- Tokari, N. (2006). Making it Easier with Radio. *South Pacific Agricultural News*, SPAN VOL.23 No.7. University of the South Pacific-Alafua Campus, Samoa.
- UN (2014). *Definition of Youth*. Retrieved from [www.un.org](http://www.un.org) on 11/1/15
- UNDP. (2004). *Pawan Chopra Community Radio in India Step by Step- A Guide for Community Radio*, UNDP India.
- US Department of Agriculture. (2011). U.S. Farmers Rely On Internet More and More: USA Department of Agriculture Report. December, 2013. Retrieved from <http://www.huffingtonpost.com>.
- Van Mele, P., Wanvoeke, J., & Zossou, E. (2010). *Enhancing rural learning, linkages and institutions: the rice videos in Africa*. *Development in Practice*, 20(3), 414-421. Retrieved September, 2012 from [www.africarice.org](http://www.africarice.org)
- Wehmeier, S., McIntonsh, C., Turnbull, J., & Ashby, M. (2005). *Oxford Advanced Learner's Dictionary*, 7<sup>th</sup> Edition. Oxford University Press, Oxford.

World Bank. (2012). *Module 1: ICT in Agriculture Development*. February, 2014. Retrieved from [www.ict.inagriculture.org](http://www.ict.inagriculture.org).

Youdeowei, A. (1995). *The Role of Information for Rural Development in ACP Countries*. Proceedings of an International Seminar, Montpellier, France.

Zossou, E., Vodouhe, D., Van Mele, P. & Lebailly, P. (2012). Linking farmers' access to rural radio, gender and livelihoods: case study of rice processors in Benin. *Paper presented at the Third IAALD Africa Chapter Conference*. Johannesburg, South Africa, 21-23 May 2012.

## APPENDICES

### Appendix A: Small-Scale Farmers' interview schedule

#### Section A: Respondent's Characteristics

The responses will be marked using a tick [√].

1. Gender, Male [ ] Female [ ]
2. Age in years,
  - 25 and Below [ ]
  - 26 – 35 [ ]
  - 36 – 45 [ ]
  - 46 – 55 [ ]
  - Over 55 [ ]
3. What is your highest level of education?  
None [ ] Primary [ ] Secondary [ ] Post-secondary [ ]
4. Do you engage in the following enterprises?
  - a) Livestock production Yes [ ] No [ ]
    - i) Dairy Yes [ ] No [ ]
    - ii) Poultry Yes [ ] No [ ]
    - iii) Bees Yes [ ] No [ ]
    - iv) Any other specify \_\_\_\_\_
  
  - a) Crop production Yes [ ] No [ ]
    - i) Tea Yes [ ] No [ ]
    - ii) Maize Yes [ ] No [ ]
    - iii) Sugarcane Yes [ ] No [ ]
    - iv) Coffee Yes [ ] No [ ]
    - v) Any other specify \_\_\_\_\_

### **Section B: Source of agricultural information**

Rank the following extension providers from 1 - 8 in order of importance as your main source of agriculture information, 1 being most important source and 8 the least important source.

<b>Agriculture extension provider</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
5. Government extension officers								
6. Public research and education institutions								
7. Agricultural input manufacturers and distributors								
8. Non-Governmental Organisations								
9. Agro-vet input stockist								
10. Farmers based organisations and cooperatives								
11. Private Kalenjin vernacular radio								
12. Other farmers								

### **Section C: Access to agricultural messages from other extension provider**

Do you receive agricultural messages from the following extension providers through the private Kalenjin vernacular radio stations?

13. Government extension officers	Yes [ ]	No [ ]
14. Public research and education institutions	Yes [ ]	No [ ]
15. Agricultural input manufacturers and distributors	Yes [ ]	No [ ]
16. Non-Governmental Organisations	Yes [ ]	No [ ]
17. Agricultural input stockist	Yes [ ]	No [ ]
18. Farmers based organisations and cooperatives	Yes [ ]	No [ ]
19. Any other extension providers	Yes [ ]	No [ ]
20. If yes please name them		

21. List in order of priority three most important agricultural information you require for your farming activities.

- i. \_\_\_\_\_
- ii. \_\_\_\_\_
- iii. \_\_\_\_\_

**Section D: Information required and accessed through private Kalenjin vernacular radio by small-scale farmers' in Kericho West Sub-County.**

<b>Agricultural messages</b>	<b>Do you require this message for your farming activities?</b>		<b>Do you access this message from private Kalenjin radio stations?</b>	
<b>Crop production practices messages</b>				
22. Planting and planting materials	Yes [ ]	No [ ]	Yes [ ]	No [ ]
23. Fertilisers and fertiliser application	Yes [ ]	No [ ]	Yes [ ]	No [ ]
24. Weed control	Yes [ ]	No [ ]	Yes [ ]	No [ ]
25. Pest control	Yes [ ]	No [ ]	Yes [ ]	No [ ]
26. Disease control	Yes [ ]	No [ ]	Yes [ ]	No [ ]
27. Time and methods of harvesting	Yes [ ]	No [ ]	Yes [ ]	No [ ]
28. Preservation practices	Yes [ ]	No [ ]	Yes [ ]	No [ ]
29. Quality/grading of produce	Yes [ ]	No [ ]	Yes [ ]	No [ ]
30. market and prices	Yes [ ]	No [ ]	Yes [ ]	No [ ]
31. Do you require any other agricultural information on crops?	Yes [ ]	No [ ]	Yes [ ]	No [ ]
32. Any other specify _____				
<b>Livestock production practice</b>				
33. Feeds and feeding	Yes [ ]	No [ ]	Yes [ ]	No [ ]
34. Calf rearing	Yes [ ]	No [ ]	Yes [ ]	No [ ]
35. Milking and milking techniques	Yes [ ]	No [ ]	Yes [ ]	No [ ]
36. Parasite control	Yes [ ]	No [ ]	Yes [ ]	No [ ]
37. Disease control	Yes [ ]	No [ ]	Yes [ ]	No [ ]
38. Livestock product market and prices	Yes [ ]	No [ ]	Yes [ ]	No [ ]
39. Do you require any other agricultural information on livestock?	Yes [ ]	No [ ]	Yes [ ]	No [ ]

40. If yes, please specify \_\_\_\_\_

**Section E: Private vernacular radio as a source of agricultural messages**

41. Rank in order of priority the private Kalenjin vernacular radio stations you normally obtain agricultural messages from.

1. \_\_\_\_\_ 2. \_\_\_\_\_  
3. \_\_\_\_\_

**Section F: Small-scale farmers' involvement in agricultural messages disseminated by private Kalenjin vernacular programmes.**

42. Do you participate in the programmes disseminating agricultural messages through the following means:-

- i) Call-in during, before or after Yes [ ] No [ ]
- ii) S.M.S Yes [ ] No [ ]
- iii) Message presentation Yes [ ] No [ ]
- iv) Being asked about agricultural information you require? Yes [ ] No [ ]
- v) Any other form of involvement specify \_\_\_\_\_

43. Do other farmers participate in agricultural messages disseminated by Private vernacular radio through

- vi) Call-in during, before or after Yes [ ] No [ ]
- vii) S.M.S Yes [ ] No [ ]
- viii) Message presentation Yes [ ] No [ ]
- ix) Any other form of their involvement specify \_\_\_\_\_

## **Appendix B: Interview Schedule for Officer In-charge of the Radio Programmes**

### **Section A: Background information**

1. Which radio station do you work for?
2. What is your designation in this organisation?
3. Do you broadcast agricultural messages or agricultural programmes?  
Yes [ ]      No [ ]
4. What forms the bulk of the programmes that your radio station transmits?
5. What percentage constitutes agricultural related messages transmitted by the station?

### **Section B: Relevant agricultural messages**

6. Please state your sources of agricultural messages or information (agricultural related advertisements and programmes) that you broadcast.
7. Which firms or organisations use you radio station to disseminate agricultural messages or information to farmers?
8. How are farmers involved in the agricultural messages or agricultural programmes disseminated by your station?
9. What are the challenges faced by your radio stations in its involvement in dissemination of agricultural messages or programmes to farmers?
10. How can you categories the agriculture related information or messages transmitted by the station?

## APPENDIX C

### Request for Research Permit

**EGERTON**

Tel: Pilot: 254-51-2217620  
254-51-2217877  
254-51-2217631  
Dir. line/Fax: 254-51-2217847  
Cell Phone



**UNIVERSITY**

P.O. Box 536 - 20115  
Egerton, Njoro, Kenya  
Email: bpgs@egerton.ac.ke  
www.egerton.ac.ke

OFFICE OF THE DIRECTOR GRADUATE SCHOOL

Ref: EM121613/06 .....

9<sup>th</sup> September, 2013  
Date: .....

The Secretary,  
National Council of Science and Technology,  
P. O. Box 30623-00100  
**NAIROBI.**

Dear Sir,

**RE: REQUEST FOR RESEARCH PERMIT – MR. JOSEPH MWANGI  
MITHAMO – REG. NO. EM12/1613/06**

This is to introduce and confirm to you that the above named student is in the Department Agricultural Education and Extension, Faculty of Education and Community studies, Egerton University.

He is a bona-fide registered Masters student in this University. His research topic is **“The Role of Private Kalenjin Vernacular Radio Programmes in Disseminating Agricultural Messages to Small Scale Farmers in Kericho West District”**.

He is at the stage of collecting field data. Please issue him with a research permit to enable him undertake the studies.

We have enclosed all the necessary documentation required for your necessary action.

Yours faithfully,

  
Prof. M.A. Ombere  
**DIRECTOR, BOARD OF POSTGRADUATE STUDIES**

Encl.

MAO/cwk

---

*Egerton University is ISO 9001:2008 Certified*



## Appendix D: Letter of Research Authorisation



### NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: +254-20-2241349, 20-267 3550,  
0713 788 787, 0735 404 245  
Fax: +254-20-2213215

Email: [secretary@nacosti.go.ke](mailto:secretary@nacosti.go.ke)  
Website: [www.nacosti.go.ke](http://www.nacosti.go.ke)

9<sup>th</sup> Floor Utalii House  
Uhuru Highway  
P.O. Box 30623-00100  
NAIROBI-KENYA

Date:

When replying please quote

24<sup>th</sup> September, 2013

Our Ref: NACOSTI/RCD/10/013/58

Joseph Mwangi Mithamo  
Egerton University  
P.O.Box 536  
Egerton.

#### RE: RESEARCH AUTHORIZATION

Following your application dated 10<sup>th</sup> September, 2013 for authority to carry out research on *"The role of private Kalenjin vernacular programmes in disseminating agricultural messages to small scale farmers in Kericho West District,"* I am pleased to inform you that you have been authorized to undertake research in Kericho County for a period ending 31<sup>st</sup> December, 2013.

You are advised to report to the County Commissioner and the County Director of Education, Kericho County before embarking on the research project.

On completion of the research, you are expected to submit two hard copies and one soft copy in pdf of the research report/thesis to our office.

DR. M. K. RUGUTT, PhD, HSC.  
DEPUTY COMMISSION SECRETARY  
NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

Copy to:

The County Commissioner  
The County Director of Education  
Kericho County.

