

**ASSESSING COMMUNICATION CHANNELS AND THE IMPACT OF  
AGRICULTURAL INFORMATION USED BY FARMERS IN WATERMELON  
PRODUCTION IN YIMBO EAST WARD, SIAYA COUNTY**

**BY  
PETRONILA AGNETTA OGOLA**

**K50/69657/2013**

**A RESEARCH PROJECT SUBMITTED TO THE SCHOOL OF JOURNALISM  
AND MASS COMMUNICATION IN PARTIAL FULFILLMENT OF THE  
REQUIREMENTS IN THE AWARD OF MASTER OF ARTS IN  
COMMUNICATION STUDIES (DEVELOPMENT COMMUNICATION),  
UNIVERSITY OF NAIROBI**

**NOVEMBER 2015**

**DECLARATION**

This research project is my original work and has not been presented for the award of degree in any other university or institution or any other purpose.

Signature .....

Date .....

Name: PETRONILA A OGOLA

**Reg. No: K50/69657/2013**

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

Signature .....

Date .....

NDOLO JOHN ISAAC

**University of Nairobi**

## **DEDICATION**

I dedicate this work to my sisters, Christine, Bella and brother Peter, who have been my pillar during this journey; and to my mother Millicent who encouraged me not to give up even when it seemed very challenging.

## **ACKNOWLEDGEMENT**

I owe the successful completion of this project to the exceptional support of many. Firstly, my most profound gratitude goes to the Almighty God for His guidance during the process as it was immeasurable.

Secondly, gratitude goes to my supervisor Mr Isaac John Ndolo (Department of Geography and environmental studies) for his guidance during the project. He has been my teacher during the process from topic selection to the final write-up. Thank you for your guidance, encouragement and timely feedback. My sincere appreciation also goes to Mr Julius Oduor Were, Agricultural officer, Yimbo East Ward with whom I travelled with to meet the farmers who plants watermelon in the ward. I would also like to thank Mr Hassan Makena, Extension officer, Siaya County for his guidance during this process. My sincere gratitude goes to all farmers who participated in the survey.

Thirdly, I have to acknowledge the support I received from my former colleagues from Moran (EA) Publishers during the period I undertook the enormous task, another acknowledgement goes to many friends and fellow MA students, School of Journalism at the University of Nairobi for consistent support and encouragement.

## ABSTRACT

Agricultural sector forms the backbone of the global economy and serves as the means of revenue of about 50% of the world's population and Kenya is not an exception. In this regard Agriculture has been prioritized vision 2030, which aims at transforming Kenya to a middle income and rapidly industrializing country by the year 2030. This study sought to establish the communication channels used by watermelon farmers in Yimbo East Ward to access Agricultural information, the impact of the Agricultural information and challenges the farmers experience while trying to access the information. The target population of the study was 30 farmers in the region but the researcher was able to access 25 who accounted for 83%. Data was collected through structured individual interviews and observations were made during the farm visits. The data collected was analyzed using narrative analysis and exploratory analysis to graphically summarise the situation on the ground. The study found out that most of the watermelon farmer's use radios, fellow farmers and telephone calls to acquire agricultural information on watermelon production while extension officers, television, mobile text messages, farm magazines and newspapers were the channels which were least used. The study concluded that radios, fellow farmers and telephone calls had numerous strengths hence were considered more advantageous by farmers than the other channels. Further, extension officers and radio were the two channels considered by many farmers in the study to have accurate information. There is therefore need for to establish a community FM radio stations to promote dissemination of information on watermelon production and knowledge to farmers in the region because of numerous advantages of radio. Further, the watermelon farmers required agricultural information on market prices, financial management and methods of irrigation, use of insecticides and soil improvement. Positive impacts of the information experienced by farmers were mainly high quality produce and early maturity. On the other hand, the main negative impacts of the information received included lack of follow-up process to stimulate the success, higher cost but lower productivity and low selling price. Some of the challenges that farmers experience were mainly costs of acquiring information and lack of feedback. Setting up of well-equipped community resource centres would be a plus as the famers could access information at their leisure and affordably. Farmers need to be engaged, persuaded and shown the benefits of variety communication channels in watermelon production through farmers field days and demonstrations in order for them to learn, ask questions and provide their own feedback to the extension officers as well as researchers. Lastly, the study not only recommends more agricultural extension officers in the region but facilitated with necessary equipment and funds for them to remain relevant in terms of information and knowledge delivery to the farmers.

## LIST OF ACRONYMS AND ABBREVIATIONS

<b>CAK</b>	Communication Association of Kenya
<b>CBOs</b>	Community Based Organisations
<b>FAO</b>	Food and Agriculture Organization
<b>FM</b>	Frequency Modulation
<b>GDP</b>	Gross domestic product
<b>HIV</b>	Human Immunodeficiency Virus
<b>IICD</b>	International Institute of Communication and Development
<b>ICT</b>	Information communication technology
<b>KACE</b>	Kenya Agricultural Commodity Exchange
<b>KARI</b>	Kenya Agricultural Research Institute
<b>KAVES</b>	Kenya Agricultural Value Chain Enterprises
<b>KBC</b>	Kenya Broadcast Corporation
<b>KIPPRA</b>	Kenya institute for Public Policy Research and Analysis
<b>KMFRI</b>	Kenya Marine and Fisheries Research Institute
<b>KNBS</b>	Kenya National Bureau of Statistic
<b>MFLD</b>	Ministry of Livestock and Fisheries Development
<b>MOA</b>	Ministry of Agriculture
<b>MP</b>	Member of Parliament
<b>SA</b>	South Africa
<b>SAPs</b>	Structural adjustment programs
<b>SMS</b>	Short message service
<b>UNESCO</b>	United Nations Educational, Scientific and Cultural Organization
<b>USAID</b>	United States Agency of International Development

## TABLE OF CONTENTS

DECLARATION .....	ii
DEDICATION .....	iii
ACKNOWLEDGEMENT .....	iv
ABSTRACT .....	v
LIST OF ACRONYMS AND ABBREVIATIONS .....	vi
TABLE OF CONTENTS.....	vii
LIST OF TABLE .....	xi
LIST OF FIGURES .....	xii
OPERATIONAL DEFINITIONS.....	xiii
CHAPTER ONE .....	1
INTRODUCTION .....	1
1.1 Background of the Study.....	1
1.1.1 Channels of Communication .....	4
1.1.2 Watermelon Production.....	5
1.1.3 Yimbo East Ward .....	7
1.2 Statement of the Problem .....	9
1.3 Research Objectives .....	11

1.4 Research questions .....	12
1.5 Significance of the Study .....	12
CHAPTER TWO .....	13
LITERATURE REVIEW .....	13
2.1 Introduction .....	13
2.2 Concept of Agricultural Communication .....	13
2.3 Role of Communication Channels in Disseminating Agricultural Information .....	15
2.4 Communication Channels used to Disseminate Agricultural Information .....	17
2.4.1 Print Media .....	18
2.4.2 Mobile Phone Services .....	20
2.4.3 Television .....	21
2.4.4 Radio .....	23
2.4.5 Extension Officer and Fellow Farmer .....	25
2.5 Role of Agricultural Information in Improving Production .....	26
2.6 Sources of Agricultural information .....	28
2.7 Type of Agricultural information needed by farmers .....	29
2.8 Factors Affecting Dissemination of Agricultural Information .....	30
2.9 Theoretical framework .....	32
2.9.1 Diffusion of Innovations Theory .....	32
2.9.2 Two-step flow communication Theory .....	35



2.10 Conceptual framework .....	36
CHAPTER THREE .....	38
RESEARCH METHODOLOGY .....	38
3.1 Introduction .....	38
3.2 Research approach.....	38
3.3 Study population .....	39
3.4 Data Collection.....	39
3.5 Data Analysis and Presentation.....	40
3.6 Ethical consideration in the research.....	41
CHAPTER FOUR.....	42
ANALYSIS, PRESENTATION AND INTERPRETATION .....	42
4.1 Introduction .....	42
4.2 Respondents’ Demographics.....	42
4.2.1 Gender of Respondents.....	42
4.2.2 Age of Respondents.....	42
4.2.3 Highest level of Education attained by waterlemon farmers in Yimbo East ward .....	44
4.3 Land Acreage .....	45
4.4 Media Use on Agricultural production.....	45
4.4.1 Channels of communication used by watermelon farmers.....	45

4.4.2 Preferred Channel of receiving information.....	51
4.4.3 Sources of accurate information.....	53
4.4.4 Agricultural information required for watermelon production.....	55
4.4.5 Impacts of Agricultural Information Received by watermelon farmers.....	58
4.5 Factors affecting communication channels for Agricultural Information.....	59
4.5.1 Challenges affecting the communication channels .....	59
4.5.2 Ways of Improving Agricultural Information Dissemination .....	63
4.6 Discussion of the Findings .....	64
CHAPTER FIVE .....	67
SUMMARY, RECOMMENDATIONS AND CONCLUSION.....	68
5.1 Summary and recommendation.....	68
5.1.1 Participation between the gender groups .....	68
5.1.2 The communication channels used to receive agricultural information.....	68
5.1.3 Impact of the Agricultural information received through different channels.....	69
5.1.4 The challenges that watermelon farmers in Yimbo East ward encounter when trying to access information using different channels .....	70
5.2 Conclusion.....	71
5.3 Suggestions for Further Research .....	73
REFERENCES.....	74
APPENDIX I .....	86
QUESTIONNAIRE.....	86

## **LIST OF TABLE**

Table 4.1. Impacts of Agricultural Information Received by Watermelon Farmers..57

## LIST OF FIGURES

Figure 2.1. Conceptual framework .....	36
Figure 4.1. Age of Respondents.....	43
Figure 4.2. Highest level of Education .....	44
Figure 4.3. Channels of communication used by watermelon farmers in Yimbo ward ..	45
Figure 4.4. Preferred Channel of receiving information.....	51
Figure 4.5. Sources that give accurate information .....	53
Figure 4.6. Agricultural information required to improve watermelon production .....	55
Figure 4.7. Challenges affecting the communication channels .....	60

## **OPERATIONAL DEFINITIONS**

<b>Agricultural information</b>	This is the any information from Agricultural sector in the form of news, reports, and messages consumed by farmers.
<b>Communication channels</b>	The type of media through which Agricultural information is sent and received by watermelon farmers in Yimbo ward constituency.
<b>County</b>	This is a political and administrative division of a state, providing certain local government services.
<b>Complicated processes</b>	These are activities that are to employed in watermelon farming that the farmer may not understand or find difficult to implement for the purposes of production.
<b>Disseminate</b>	To spread or give out something, especially news, information, ideas, etc., to a lot of people
<b>Emerging crop</b>	This is a new crop that is currently being planted in Yimbo East ward that farmers their had not tried before.
<b>Extension officer</b>	Serves as an administrative leader and coordinator for formulating, developing, implementing and evaluating agricultural extension programs as well as develop farmers in managing resources in the rural areas.
<b>Hybrid</b>	This is the offspring of a cross between two plants varieties.
<b>ICT</b>	Electronic facilities used to create, store, manage and

disseminate information.

**Print media** Technologies that present information in forma of newspapers, magazines and books.

**Newspaper** A new publication that is produced on paper daily and is circulated physically

**Sugarbaby, Crimson Sweet  
and Charleston Gray** A variety of watermelon

**Sukari F1** Name of a watermelon hybrid variety. The 'F' in 'F1' stands for 'filial.' So in short, F1 means 'first filial generation.' This is the generation of offspring that is the first for a particular set of parents. It's a cross between two parents with completely dominant genes and traits (Battista, 2015).

**Variety** A group of organisms within a species that differ in trivial ways from similar groups

**Ward** This is an administrative of a county that is typically elects and is represented by a Member of a County Assembly.

**Watermelon farmers** These are farmers who planted watermelon in Yimbo East ward between October 2014 and May 2015.

## **CHAPTER ONE**

### **INTRODUCTION**

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

Agricultural sector forms the backbone of the global economy and serves as the means of revenue of about 50% of the world's population (Chemutai, Wanyama, Rono, Mutoko, & Macosore, 2012), Kenya is not an exception. In this regard Agriculture, has been prioritized in our national development blueprint, the Kenyan vision 2030, which aims at transforming Kenya to a middle income and rapidly industrializing country by the year 2030. The sector is identified as one of the key drivers of the economy for the last four decades through which the envisaged target of 10% annual economic growth rate will be achieved (Standard Group editor, 2014). The sector accounts for about 60% of the total labour force, 65% of Kenyan exports 20% of the total exports and 17% of the GDP and provide livelihoods to over 70% of the population (KIPPRA, 2013). This therefore shows that Agriculture is a very important sector for economic growth of any country.

For maximum production and income, farmers' capacity to control their environment is as a result of resources at their disposal including knowledge and skills. The application of these resources also depends on changes in the environment, marketplace, culture as well as the information, which flows from the source to the farmers. In this case, farmers interact with multiple sources of information to shape and enrich their knowledge base (FAO, 1995) and make production decisions to maximize output and minimize costs.

According to Davin (1976) every individual whether literate or non-literate needs information in order to make decisions thus every sector of the population engaged in agriculture needs information. Communication is therefore seen as a potent sociological tool for agricultural development.

Communication experts find it difficult to agree on a single definition of communication. Fielding (2006) defines communication as a transaction whereby participants together create meaning through the exchange of symbols. Here he stresses communication as a transaction, people working together, a way of creating meaning and the exchange of symbols. According to Raman and Singh, 2011, communication is the process of exchanging information usually through a common system of symbols. It may take a wide variety of forms which includes two people having a face to face conversation to hand signals and to messages sent over the global telecommunication networks.

Communication is a dynamic process of sharing information between individuals (Ewhrudjakpor, 1989). Age (2010) defines communication as a process in which the participants create and share information with one another in order to reach mutual understanding. In all these, we see that they attempt to answer the following questions; ‘who?’ which is the source, ‘says what?’ which is the message, ‘through what means?’ which is the channel, ‘to whom?’ which is the receiver and ‘with what effect?’ which is change in the receiver’s behaviour.

Communication is a very important tool for disseminating information to farmers. The information however has to be timely, rightly packaged, relevant and most importantly is



a vital partner in initiatives that involves voluntary change in the behaviour of the targeted group. The change of behaviour should be as a result of information received and should be passed back to the source for the communication to be complete (Adebayo, 1997).

There has been a high output of agricultural research which has led to a large pool of new technologies that are to be disseminated to farmers. To accelerate the pace at which this information reaches the farmers, a variety of approaches have been adopted with the assumption that both approaches and technical information packages will be suitable to the farmers.

In this study, we shall focus on watermelon farmers in Yimbo East ward in Bondo constituency, Siaya county. Watermelon is an emerging cash crop for the farmers of this ward. According to Makena, 2015 about 14 hectares of land in Yimbo East and West are under watermelon production, 10 of which is in Yimbo East ward. This shows that Yimbo East has the bulk of watermelon production. No research so far as been done in this region on which information they consume and the channels used for the purposes of watermelon production. The researcher therefore assessed the different communication channels used by the watermelon farmers, information needs for the farmer in the area and how useful the information is to them and the challenges that the farmers experienced while trying to access information for watermelon.

### **1.1.1 Channels of Communication**

Inagaka (2007) states that communication for development, for example, in the agricultural sector is presented with a multitude of communication approaches and techniques that can be adopted to pursue specific goals. Some of the strategies adopted include: entertainment-education, marital partners; peer education; interpersonal communication; community actions; media advocacy or even listening to indigenous music. Each of these strategies operates within a fairly tightly defined set of communication channels and spaces.

Age, Obinne and Demenongu (2012), define communication channels as the means through which messages travel from the source to the receiver and vice versa. Some of the communication channels used in disseminating agricultural information include personal contacts; radio broadcasts; publications; field days; agricultural shows; demonstrations etc. According to Age *et al*, (2012), these channels can be grouped into five categories. Physical channels which involve direct contact, this may include seminars, exhibitions. Non-physical channels, which include television, radio, phone calls, newspapers and other print media channels. Technical which could be either physical or non-physical. Human discipline channel, for example, dress put on professionals such as farmers to predict the profession and last but not least, token of communication channels, which are channels in between physicals and non-physicals. This may include signals and gestures and other symbols.

The farmers in Yimbo East ward, Siaya County live in a rural setting where infrastructure that is necessary for access to information is lacking or minimal. Most

homesteads lack basic services such as electricity and no access to proper roads. In the communication of agricultural information to the farmers, use of variety of communication channels is useful. This is because the more senses are employed in the communication process, the most likely that communication messages will be understood (Age *et al.*, 2012).

### **1.1.2 Watermelon Production**

Watermelon (*Citrullus lanatus*) is a vegetable in the same family as cantaloupe, squash, cucumber and pumpkin. It is widespread in all tropical and subtropical regions of the world and is mostly grown for fresh consumption of the juicy and sweet flesh of mature fruit. China is the leading country in the production of watermelon followed by Turkey, United States, Iran and Republic of Korea (Huh, Solmaz & Sari, 2008; Wehner & Maynard, 2003). In Kenya the demand for watermelon is higher than production resulting in the fruit being very expensive (Gichimu, Owuor & Dida, 2008).

There are over 1,200 varieties of watermelon worldwide and a wide variety of watermelons have been cultivated in Africa. In Kenya, the three most common commercial watermelon cultivars include ‘Sugarbaby’, ‘Crimson Sweet’ and ‘Charleston Gray’; and one newly introduced cultivar from United States is ‘Yellow Crimson’ (Gichimu, *et al.*, 2008).

The crop is grown on well-drained, non-saline sandy loam or silt loam soils and prefers a hot, dry climate with mean daily temperatures of between 22 °C. and 30°C. Maximum and minimum temperatures for growth are about 35°C and 18°C respectively (FAO,

2010), making it an excellent crop of choice for the semi-arid areas. Small-scale farmers in the semi-arid eastern Kenya grow watermelon, mostly under rain conditions and to a lesser extent supplemental furrow irrigation. However, the yields remain low mainly due to erratic rainfall. It can however attain yields of 9000 to 18000 kg per acre.

Watermelon has critical growth periods where irrigation is a necessity for optimal yield and quality (Hartz, 1997). Water deficit during the establishment period delays growth and produces a less vigorous plant. For example, when water deficit occurs during the early vegetative period, less leaf area is produced which reduces fruit yield. The late vegetative period or vine development stage, the flowering period and the yield formation period (fruit filling) are the most sensitive periods to water deficit. During the ripening period a reduced water supply improves fruit quality. Yields are little affected by water deficits immediately prior to harvest. Within certain water deficit limits, irrigation practices do not greatly affect the number of fruits per plant but affect the fruit size, shape, weight and quality (FAO, 2015). It is recommended that irrigation should take place when, depending on the level of evaporation, the soil water has been depleted some 50 to 70% of plant available water (FAO, 2015).

Watermelon is affected by various diseases and pests. These pests include the seedcorn maggot (*Hylemya platura*), Striped cucumber beetles (*Acalymma vittatum*) and spotted cucumber beetles (*Cerotoma trifurcata*), the silverleaf whitefly etc. Watermelons are susceptible to several diseases that attack the roots, foliage and fruit. Disease control is essential in the production of high-quality watermelons. According to Thabo, 2013, the

diseases include Verticillium wilt, Fusarium wilt, Cucurbit yellow stunting disorder virus and so on.

During harvesting, watermelons are cut from the vine rather than pulled, twisted, or broken off to reduce the chances of stem decay. A long stem on the fruit should be left. To avoid bruising the melons, they are handled carefully at all times. The melons should not be stood on end to avoid bruising and flesh separation from the rind. The melons should also not be placed with the bottom sides turned up as the ground spot is easily sun scalded (Thabo, 2013).

According to Kenya Info Hub, 2015, it has become very lucrative. It has also become a very popular fruit in the recent past. It is eaten during breakfast, lunch and even during dinner. Other benefits include it being an antitoxicant to people suffering from cancer or infected by HIV. Because of these benefits, many people consume watermelon. This has provided ready market for the produce. In Yimbo ward, watermelon is an emerging cash crop. The variety mainly being planted in the region is Sukari F1.

### **1.1.3 Yimbo East Ward**

Bondo constituency in Siaya county has a surface area of 593.00 Km<sup>2</sup>, with a population of 157,522 (KNBS, 2010). It has six wards namely, Yimbo East, Yimbo West, Central Sakwa, South Sakwa, West Sakwa and North Sakwa. The study area is Yimbo East ward which is one of the administrative wards of Bondo constituency. Yimbo East ward is approximately 159 Km<sup>2</sup>. It comprises Usigu, Got Ramogi, Bar-Kanyango, Nyamonye, Othach and Pala sub-locations. Yimbo East ward borders Lake Victoria and lies

between 0°26' and 0°90' South of the Equator and from longitude 33°58'E and 34°35'W (Ombogo, 2015).

The ward has a modified equatorial climate with strong influence from local relief and the expansive lake, which influence rainfall amounts and distribution. Predominantly, the division has warm, dry and humid climate with mean annual rainfall ranging between 800-1600 mm a bi-modal rainfall pattern of long rains occurring between March and May and short rains occurring between October and November. Temperatures too vary with mean of 22.5°C and evaporation varies between 2000 mm and 2200 mm annually. The soils range from ferralsols and gleysols which are found at Yala swamp. These are water logging, fertile and variable.

The 2009 census puts the population of Yimbo East ward at 27,189. A larger percentage of this population is composed of young people who are dependants. The local economy is mainly based on subsistence farming, though other activities, such as fishing, small-scale mining, labour migration and minor trading, are important in this 'pastoral-agricultural-fishing' society (Ocholla-Ayayo, 1976). The climate is characterized by scarce and erratic rainfall, which makes food production in the community uncertain because of frequent crop failure. To a limited extent, people earn their living as teachers or employees in the nearby public primary and secondary schools and at the local Roman Catholic mission. People, both from outside and within the community, settle at the fishing beaches to trade in fish.

In 2000, the Government of Kenya in collaboration with that of Swedish government through the ministries of Agriculture and that of Livestock Development commenced the National Agriculture and Livestock Extension Programme (NALEP). NALEP's main objective was to institutionalize demand driven and farmer-led extension services. The project ran between 2000 and 2011. Through this programme, the extension officers in Bondo provided more farmer oriented extension services. In this case, farmers would come up with ideas of what kind of crops they would grow in the region that would earn them money (Mwangi, Mbai, Hedlund and Cuellar, 2006).

Further, (Mwangi *et al*, 2006), stated that one of the outcomes of NALEP was the provision of extension approaches that are specific to agro-ecological zone and the clientele. Through this, watermelon farming became one of the emerging cash crops in Bondo constituency. The farmers in the region understood the benefits of watermelon and because of the ecological conditions, it was highly likely to do very well. The first variety to be planted in the region was Sugarbaby. This was quite affordable and most farmers were able to manage it.

## **1.2 Statement of the Problem**

Agricultural information is a key component in improving agricultural production. The importance of knowledge and information sharing in research for development settings has been firmly established through research. Access to appropriate information and knowledge is known to be one of the biggest determinants of agricultural production (Masuki, Mowo, Kamugisha, Tanui, Tukahirwa, & Adera, 2010).

A number of studies have been done on communication in the Agricultural sector. A study by Shahzad, Islam, Umber, Khan, Abdal and Raza (2011) shows that various public and private organizations use communication channels such as print media in order to catalyze the agricultural innovation and diffusion process. The study further shows that print media were preferred by younger farmers compared to the older ones. The study by Abubakar, Ango and Buhari, (2009), showed that access to mass media on agricultural information is mainly through radio and television, and most of the farmers indicated that the media sources are conventional, accessible and they preferred to listen to the agricultural programmes in the night time (8pm-11.59pm). The respondents identified purchasing and maintenance of media source (television and radio) as their major problems.

Age *et al.* (2012) however concluded in their study that if there is continued imbalance in the distribution and wrongful targeting of information, the possibility of harnessing the full potentials of the rural populace towards attaining high production will ever remain problematic and in limbo. In Kenya, Crandall (2012) concluded in her study that there was increased short message service (sms) based information dissemination services which provide farmers with information regarding weather, market and other relevant information. She found out that farmers preferred calling rather than SMS due to its ease and little practice on using SMS. Masuki *et al.*, 2010, findings showed that use of telephone was appreciated by rural communities as easy, fast and convenient way to communicate and get prompt answers of respective problems.

F1 was then introduced to the farmers. It was found to be good and would do well in that



environment. However, the number of farmers engaged in watermelon farming has greatly reduced. One of the reasons cited by farmers and the extension officer in the region is the price tag of Sukari F1 which they find too high.

The effectiveness of communication channels in disseminating agricultural information for innovations in the study area has never been recognized, despite the fact that researchers are still conducting research on agriculture, there are new innovations and extension workers are still trying to bridge the gap between the research stations and the local farmers.

For watermelon farmers in Yimbo ward, information therefore is key to the success of their new venture. This information has to be relevant, timely, accurate and easy to understand to ensure that they reach their target. This study therefore seeks to find out the communication channels are used by different organisations to reach farmers in Yimbo East area and how effective these channels have been to watermelon farmers in the area.

### **1.3 Research Objectives**

The study sought to achieve the following objectives:

- i. To establish the communication channels used to receive agricultural information among watermelon farmers in Yimbo East ward.
- ii. To assess the impact of the information received from different sources by watermelon farmers in Yimbo East ward in watermelon production.
- iii. To find out the challenges that farmers encounter when trying to access information among watermelon in Yimbo East ward.

#### **1.4 Research questions**

- i. What communication channels do watermelon farmers in Yimbo East ward use to receive Agricultural information?
- ii. What are the impact of the information received from different sources by watermelon farmers in Yimbo East ward in watermelon production?
- iii. What are the challenges that farmers experience when trying to access agricultural information?

#### **1.5 Significance of the Study**

Even though information that supports agricultural production and the processes involved are available, most of this information may not reach the farmers especially those in the rural areas. Issues regarding language barrier, cost of acquiring information, poor infrastructure, limited communication tools and so on, have made the situation worse. Disseminating agricultural information through accessible channels was a suitable approach for this study. The underpinning principle in the study was to discover the main aim and objectives of the communication in the Agricultural sector. The study was expected to create an impact in the Agricultural sector that was planning to use information and different communication channels to improve watermelon production. The study recognized its worth as one of the references for the farmers, government agencies, Non-governmental organizations, private institutions who plan to disseminate information to farmers within the region or in determining the effective routes towards the success of reaching farmers with information.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter discusses some of the research work that has been done in relation to the study of effects of distribution of information in the Agricultural sector as well as the challenges experienced in distributing the information by different organizations. The discussions in this chapter are categorized into the concept of Agricultural communication, role of communication channels in disseminating Agricultural information, communication channels used to disseminate agricultural information, Role of agricultural information in improving production, the type of information needed by farmers, sources of information and factors affecting dissemination of Agricultural information. The chapter also discusses theoretical frameworks for the study, which include diffusion of innovation theory and two-step flow communication theory.

#### **2.2 Concept of Agricultural Communication**

Agricultural communication as a branch of study in agriculture, deals with the planning and management of agricultural information and methods of effectively communicating agricultural technology in order to bring about desired behaviour changes in farmers and their farming practices for improved production (Age *et al.*, 2012). Agricultural communication can be defined as the exchange of information about agricultural and natural resources industries through effective and efficient media such as newspapers, magazines, television, radio, telephones and the web to reach appropriate audiences.

Agricultural communication is a wide and varied field. It includes news writing, graphic designs, video and radio reporting and producers, special events planning, photography, web designs, advertising and also public relations (Telg & Irani, 2012). Sustainable development in the agricultural sector is dependent on generation of appropriate technologies and creation of effective communication strategy for dissemination of recommended techniques to end-users (Dimelu & Anyanwu, 2005).

Agricultural communication is not a new field; however, it has evolved over the years. During the colonial era in the United States, that is, 1700s the society was mainly agrarian. Much of the communication was word of mouth, from farmer to farmer and most information about how to grow crops came from the colonists (Boone, Meisenbach & Tucker, 2003). In December 1777, one of the first colonial-era articles encouraging farming was published. The first American agricultural magazine, the *Agricultural Museum* began publication in 1810 but lasted for only two years (Mott, 1968).

The early 1900s saw the growth of in agricultural magazines and rural weekly newspapers that farming in the news. Between 18000 and 1920, the number of farm magazines and newspapers grew from 157 to 400 and circulation of agricultural publications grew from about 1 million in the 1880 to around 17 million by 1920 (Boone *et al*, 2000). Beginning of 1920, Radio became a major force to communicate agricultural information.

In Kenya, Agricultural extension dates back to early 1900s. Several approaches were tried, including individual visits, group methods, unified extension etc. In the present age

of information revolution, the application of ICT, that is the use of radios, television, telephones, cameras, videos and computers in extension delivery is handy to some extent in a developing country like Kenya. The revolution is an intervention with the potential to ensure that knowledge and information on improved technologies, methods and practices are put into right use by farmers.

### **2.3 Role of Communication Channels in Disseminating Agricultural Information**

Information plays a key role in agricultural development and production and their effective communication will help facilitate mutual understanding among farmers, agricultural scientists and extension workers (Agboola, 2000). Knowledge and information are basic ingredients for increased agricultural production and productivity. Access to Agricultural Information is therefore one of the countervailing factors that contribute towards increased food production.

Mass media, commercials and government agencies and agents as well as the personal contact have assumed a major function of disseminating information about farm matters with other farmers, friends and relatives. Agricultural information is necessary if farmers have to advance beyond their present level of production, a steady flow of accurate, understandable, factual information links the scientist with the farmer through the various sources that communicate such information (Achebe & Lucky, 2013).

The channels used by farmers include the mass media channels such as radio, television, newspapers, farmers' magazines, leaflet and posters, from government or commercial sources. There is also personal contact with extension workers and representatives of

commercial firms either on an individual basis or in small groups. This may include exhibitions, seminars, workshops or demonstrations. There could also be personal contacts with other farmers (Adam, 2002).

Studies that have looked at channels have found that mass media channels of communication are important in conveying information and creating awareness or changing cognitions, while interpersonal channels are more likely to cause attitude change. It has been found that radio reaches the largest audience in most developing countries (Rogers & Nichoff, 2002). Radio can reach large audience at the same time. Where cost is concerned, it is an extremely economical medium as compared to other extension media and methods involving individual and group contacts. Radio is also considered as a credible source of information and is taken as authentic, trustworthy and prestigious medium of communication. Credibility refers to the trustworthiness of information perceived by farmers as important and gave weightage in adoption of information. This influenced the adoption of agricultural technology as farmers think them as praiseworthy (Kakade & Kolar, 2013). However, according to According to Ekoja (2003) television and radio play very important role in dissemination the information about agriculture for the farmer's and similarly different newspapers which publish articles and periodicals about agriculture.

Research has shown that mobile phones provide a platform to farmers for sharing and getting the information about agriculture. Farmers nowadays use mobile phones for several uses. Some use it for getting the price of product from market while others directly communicate with customers for selling their goods in better price. Furthermore,

farmers are use short message services (SMS) for keeping the up to date about weather as well as use of pesticides in their farms (Murthy, 2009).

Aderibigbe (1990) believed that interpersonal communication is the major means of linking the rural farmers since a majority of them are illiterate. Channels such village messengers, the market place and word of mouth were found to be more popular amongst the rural people. Ithiel (1983) stated that in the traditional societies, traditional forms of communication like folk songs, plays and sermon have credibility and meaningfulness which cannot be equalled with imported technologies.

Where agricultural publications are concerned, Shahzad, Islam, Umber, Khan, Abdal and Raza, 2011, concluded that the response of young farmers regarding usefulness, practicability and authenticity of information provided by agricultural publications was more positive as compared to old farmers. They also concluded that as a whole there is a need to improve the standards of the agricultural publication in the context of the practicability.

#### **2.4 Communication Channels used to Disseminate Agricultural Information**

According to Yahaya and Olajide (2000) the diffusion and adoption of innovations remains the backbone of the expected development in agriculture. Olowu (1998) noted that development and production of relevant and appropriate technologies is one of the pre-requisites for sustainable agricultural production. Over the year's different organization both local and international have produced content targeting extension offices and farmers for the purposes of improving agricultural production.

Communication plays a major role in human development especially in agriculture. Communication includes those situations in which a source transmits a message to a receiver with conscious intent to affect the latter's behaviour.

Kenya has five major types of media channels; television, radio, newspapers, mobile phones and internet. Given the literacy levels and resources, Kenyan print media readership is relatively small; approximately 37 percent of Kenyans surveyed said they had not read a newspaper in more than a year (Bowen, 2010). Readership trends are higher in more urban areas. A survey by Media Council of Kenya in 2012 of 3000 respondents revealed that 85% of respondents used radio, followed by television at 83%, newspapers at 68% and Internet and mobile phones at 42% and 41% respectively. This study shows that radio is more popular followed by TV, according to the audience research company Synovate, every quarter newspaper loses one percent of their readership, who are migrating either to radios or are receiving content in other ways (likely the internet and SMS breaking-news alerts issued by the same newspapers).

Here are some of the channels being used by different organisations to reach farmers.

#### **2.4.1 Print Media**

Print media, which include newspaper and farm magazines are commonly used to disseminate agricultural information especially among the literate farmers. The increase of literacy in the country offers promises of more consumption of print media hence improved agricultural practices to the farming community. The print media widened the scope of communication (Mohsin, 1997). Print media can be bought and consumed at the farmers' convenience and it is a permanent medium as the messages are imprinted



permanently with high storage value which makes them suitable for reference (Shahzad, Islam, Umber, Khan, Abdal & Raza, 2011). Farmers can also get the appropriate advices of experts through these media to cope with the emerging problems by mailing their problems and questions to the editors or contributors as they avail their information in the magazine.

Saturday Nation publishes a pullout magazine on agriculture called “SEEDS OF GOLD” which is done in collaboration with Egerton University which is an agricultural university. “SEEDS OF GOLD” has the purpose of “Educating Farmers on the Best Farming Practices”. Contributors give their contact information so farmers can easily reach if they have queries or need more information on articles that have been written. Newspapers though accessible, are primarily concentrated in urban areas, and are expensive (the cost of newspapers in Kenya is high for most Kenyans), and are irrelevant to illiterate populations

Magazines, which are published and distributed by different organizations are weekly, monthly or bi-monthly basis targeting farmers. Some of the magazines include TOF which is a monthly magazine sent to farmer groups in Kenya and Tanzania and Farmers Voice which a bi-monthly magazine by Kenya national federation of Agricultural producers. These channels of communication provide farmers with information on organic farming methods and practical advice on how to increase yields using simple, sustainable methods.

The Smartfarmer magazine is a market leader in the dissemination of agricultural information and has been in circulation since September 2010. It is an informative, educative and inspiring publication of the agricultural industry. It is an authority on farmers' issues, their authentic voice and a means through which stakeholders receive and disseminate information. Top Farmer is a Bi-Monthly farmers' magazine that grew out of years of experience in working with farmer's groups, bilateral donors, and the ministry of Agriculture. It reaches the end-users via organized groups, through the regular newspaper distribution channels and is sold in various agro-products shops.

The ministry of Agriculture uses information boards within their offices or market centres also provide information to the target groups. Posters and written information are pinned on those boards and contact information of those concerned are included so that if they need more information they can easily access the relevant person.

#### **2.4.2 Mobile Phone Services**

The rapid growth of mobile telephony and the introduction of mobile-enabled information services provide ways to improve information dissemination to the knowledge intensive agriculture sector and also helps to overcome information asymmetry existing among the group of farmers (Mittal & Mehar, 2012). The penetration of mobile service in Kenya has reached 64.2 per 100 inhabitants (Communication commission of Kenya, 2011). At the end of June 2011, Kenya had 25.27 million mobile subscribers (CCK, 2011). Kenya's high mobile penetration rate and subscription number indicates that mobile technology is a promising business

opportunity, and an indispensable tool for empowering the country's citizens, especially its rural poor.

Mobile phones have many advantages, which include their adaptability and the capability of transferring voice, text messages and data at gradually decreasing cost (Mangstl, 2008). They are also portable, have wide range of coverage and instantaneous two-way communications. Studies have found that mobile telephony is regarded as the most successful ICT tool used in attempts to develop the global agricultural sector (Mangstl, 2008).

According to Wanga, 2012, a short message services (SMS) and voice alert services has revolutionized farming in Siaya County. The service is provided by Fibre link communication and Information technology communication organisation and has connected about 2000 farmers in the region. The system works on 'push and pull' formula where subscribers send questions and get answers.

Another new agricultural SMS-based service provider includes M-Farm Ltd., which provides access to localized, current data on markets and weather as well as a network for buying and selling farming goods through SMS (M-Farm Kenya, 2011). Kenya Agricultural Commodity Exchange (KACE) has an SMS-based information service, SokoniSMS, for farmers to receive market prices in Kenya (KACE, 2011).

### **2.4.3 Television**

Television is one of the powerful channels of the mass media, which transmit information very fast about agricultural technology among the farmers' community.

There exists a large body of research that suggests that television has an important impact on people's attitudes, beliefs, and values (Signorielli, Gross, & Morgan, 1982). Another possible mechanism is that television may help to activate already existing mental skills in the viewer. For instance, Brown (1986) has argued that television combines multiple symbol systems, such as visual images, sounds, music, spoken and written language, and present them simultaneously

Viewers' educational background (Stokes & Pankowski, 1988) and viewers literacy level Stauffer, Frost, & Rybolt (1978) seems to also make a difference in terms of how well information presented on television will be remembered. It was found that the higher their educational level and literates recalled significantly more news stories. Kunkel and Kovaric (1983) have shown that adult learners have different preconceptions of educational materials than they have of entertainment materials. Brown, Brown and Danielson (1975) found that personal interest in further learning and in the subject matter itself was positively related to adult viewers' memory for factual information from instructional television segments. The main reason however of the popularity of television among masses is that it's simply people propose to choose the easiest way to get information and learn. The simplest way can be found in television educational programs about health, education as well as agriculture development (Buren, 2000).

In Kenya there are a few television programmes running on different channels targeting farmers. One in Shamba Shape-up which is a reality television show running on citizen television that helps smallholders 'make-over' their farms by sustainably improving their crop and livestock production. Shamba Shape-Up offers an innovative way of making

sure that research and science is used by more people, (Kristjanson, 2013). Shamba Shape-Up was initially funded by USAID - US Agency for International Development, yet it currently has a whole host of sponsors. Other television programmes include Mkulima ni Ujuzi is a programme in Kiswahili on QTV that focuses on technology in Agriculture, new ways of farming.

#### **2.4.4 Radio**

In the recent years, the Kenya Frequency Modulation (FM) stations have grown Nairobi having upto 46 stations. According to Kimutai (2011), radio leads in overall media consumption followed by the mobile phone, television, newspapers and the internet respectively. Where the radio is concerned, many vernacular radios have also emerged which are able to effectively communicate to the targeted groups.

According to Moemeka (1994), since 1960, United Nations Educational, Scientific and Cultural Organisation (UNESCO) have been stressing the importance of radio broadcasting in community education, especially in the rural areas of developing societies. This is because the radio has the unique characteristics. Some of this includes the fact that radio is easy to purchase, it is versatile and there anybody literate and illiterate can learn from it and the signal is all over the country. This therefore means there is accessibility to radio. Radio therefore plays a vital role in the transmission of culture and information. The idea behind radio is that it is to survey the environment, collect stories about everyday occurrences, which are then transformed to news and information. The role of radio as a medium of information and news is given but the role of education is still not very evident. Radio effectiveness depends not only on its

intrinsic qualities but more importantly on how it is used and for what purpose. It also has to enable dialogue. In this case it just to receive feedback from the target group.

According to McAnamy (1973), there are five strategies that can be used by radio to educate and for development. One is through open broadcasting which focuses on unorganized target group. The assumption is that a good and relevant is capable of being accepted by the targeted group by itself. It is used for rural information and education. In this case there is always doubt whether the target group is listening or not. If they are listening there is doubt whether they are benefiting from it.

Instructional radio is another way of using radio for social change and development. It is directed at an organized learning group, with someone able to supervise and direct as well as elicit feedback. It has been successful in teaching civic responsibilities, practical skills and cooperative (Greenholm, 1975). The problem is that it may not be appropriate for a wide scale because on the demands on finance, transport and personnel. The rural radio forum is used in discussion and decision making in the rural area. It involves the presentation of regular radio shows of about 15-30 minutes of a mixed nature to rural audiences formed into listening groups. The groups are meant to listen and then have a discussion. It can be successful especially because the follow-ups of a radio messages may lead to positive commitments to agree upon decisions and subsequent social change. The membership in the group also helps to expose the participants to information. The other is the radio school aim to change the passive and dependent attitude of the people creating a deepening of their sense of dignity and self-worth and turning them new men and women.

*Mali Shambani*, in Kenya, is a weekly hour-long radio program on KBC Radio Taifa featuring agricultural news and responding to a wide range of topics, including market prices and trends, farming techniques, weather and seasonal issues, financing opportunities, inputs, land use, and quality standards. Each program also offers an interactive call-in component where farmers are given the opportunity to pose agricultural questions to a panel of experts either via phone or SMS. In addition, Farmer Voice Radio (FVR) is a radio extension service currently operating in Kenya, Malawi, Tanzania, Mali, Ghana and Zambia that targets smallholder farmers.

#### **2.4.5 Extension Officer and Fellow Farmer**

The government through its Ministry of Agriculture provided the bulk of extension services to both smallscale farmers and commercial producers. After the implementation of structural adjustment programs (SAPs) in the 1980s, the Kenyan government came under considerable pressure to scale down its dominant role in national economy (FAO 1997). Kenya's agricultural extension budget together with extension staff numbers has plummeted significantly. At the same time, the performance of the public agricultural extension service in Kenya was questioned and its effectiveness became a very controversial subject (Gautam & Anderso, 1999). The traditional public extension system was perceived as outdated, top-down, paternalistic, uniform (one-sizefits-all), inflexible, subject to bureaucratic inefficiencies and therefore unable to cope with the dynamic demands of modern agriculture.

Over 5 million smallscale farmers rely on only about 5,500 agricultural extension workers in Kenya for advice and information. With a ratio of one extension worker to

over 1,000 farmers, Kenya's farmers aren't getting the input they need. (Cabi, 2012). However currently the organisations that one can receive extension services in Kenya include, Ministry of Agriculture (MOA), Directorate of Extension, Research Liaison and Technical Training, Extension Services Division, Agricultural Sector Coordination Unit, Horticulture Crops Development Authority, Ministry of Livestock and Fisheries Development (MLFD), Kenya Marine and Fisheries Research Institute (KMFRI) , Public Research and Education Institutions, Kenya Agricultural Research Institute (KARI) etc.

In Tanzania, agricultural information is mainly disseminated through agricultural extension officers and farmer-to-farmer. However, the growth of extension staff in most areas has not matched the number of farmers that need the service. The country has only 3,833 extension staff while the demand stands at 12,000 (Ministerial Budget Speech, 2007).

## **2.5 Role of Agricultural Information in Improving Production**

Knowledge and information management can play a vital role in enhancing agricultural productivity and addressing the problem of food insecurity. If properly managed, intermediaries and smallholder farmers are able to receive appropriate knowledge and information in a timely manner. Such delivery of knowledge and information undoubtedly minimizes the risk and uncertainty smallholder farmers face from production to marketing of their produce (UNDP, 2012).



Within the production process, a multitude of different information is needed whose absence can decrease farmers' yield. While in the stage of planting information on high yield varieties and timing to plant are crucial, in the stages of planting and growing it is the information on fertilizer, pesticides and new techniques that can cause significant yield differences. Furthermore, information on appropriate harvesting time, climate and weather can enable farmers to gain better results (Otter & Theuvsen, 2012)

The enhancement of agricultural productivity has drawn the attention of policy makers in Kenya due to the significant role of the agricultural sector in the country's economic development (Odhiambo & Nyangito, 2003). While production and productivity targets are generally achievable, Kenya needs to adopt more cost-effective, innovative and modern approaches to agricultural knowledge management and reform and modernize its agricultural extension system.

Thus, Information and Communication Technology (ICT)-based projects were recently introduced as part of the strategies to overcome the low farm productivity and improve agricultural performance among smallholder farm households. Such projects include: DrumNet, Kenya Agricultural Commodity Exchange (KACE), Regional Agricultural Trade Intelligence Network (RATIN), National Livestock Market Information System (NLMIS), and M-farm (Ogutu, Okello & Otieno, 2013).

In spite of the expected gains from ICT-based MIS projects in theory, few studies have provided empirical evidence of the impact of such projects, particularly in the developing country context. For example, Houghton (2009) states that an indepth

econometric analysis is however required to determine and quantify the extent of the value added by mobile telephony. There is a real risk of indigeneity in comparing economic growth and mobile penetration rates, and causality is difficult to prove. Specifically, there is a dearth of empirical evidence of the impact of such projects on farm input use and productivity.

## **2.6 Sources of Agriculture information**

Farmers receive Agricultural information from a various of sources and those who provide information. For example, the conditions of weather have their source from the national meteorological department (Narula & Arora, 2010). Some information can be received from other information providers, for example, expert of agricultural information such as agricultural researchinstitutes (Jensen & Thysen, 2003), the Ministry of Agriculture (IICD, 2006), research organizations such as the ICIPE or KARI and other agencies, higher learning institutions and agriculture consultants.

According to Malhan and Rao, 2007, Agricultural Marketing Information Network (AGMARKNET), for example, which is a web portal, offers to farmers daily reports of the price. The same portal is also being used by private companies to disseminate information in rural areas.

Agricultural information has been developed and published by government agencies and academic institutions as well as Non governmental institutions and relevant private companies. This information is available in either primary or secondary form depending on the purpose of use. Produce market price is considered more accurate if the

information is directly collected from local markets. However, an effective use of new agricultural technology, such, dissemination of information in real-time is more reliable if it is proven and disseminated from government bodies or research centres.

## **2.7 Types of Agricultural information needed by farmers for production**

For farmers to maximize or improve production of their land, they need to know the best practices that have taken place in agronomy and plant breeding. This information will give the farmers information which may include general practices such as the right seed to plant, use of fertilizers, methods of irrigation, pest and disease management, harvesting, how to market and sell their produce.

There are different studies that have been done show types of agricultural information that has been disseminated to farmers. The information that is relevant before the planting period may include crop management or planning of crop activities (Tiwari, 2008), the improved seedlings (Irivwieri, 2007), the inputs and their prices and availability (Tiwari, 2008) and the fertility of the soil and irrigation methods (Ekoja, 2004).

During the time the plants grow, different types of information is required to improve the amount and the quality of produce. This information may include information on weather (Rao, 2004), fertilizer and how to supply (Ekoja, 2004), occurrence of pests and their management (Rao, 2004), weed control (Ekoja, 2004), and management of disease (Ratnam, Krishna Reddy & Reddy, 2005).

After the plants have been harvested, information on market for the plants becomes very useful (IICD, 2006), how to plan the finances and prices in the market may be needed (Irivwieri, 2007). Continuous flow of relevant information from different sources, such as government departments, sales agents, Non-Governmental institutions, mass media such as radio, web sites, may improve agricultural production.

## **2.8 Factors Affecting Dissemination of Agricultural Information**

According to Ifukor, (2013), barriers to effective of communication are factors that interfere with or affect the intended message and or prevent it from either being received or from being correctly interpreted by users. Miller (1956), an American psychologist, developed the information processing theory, and one of his observations was that the human mind could only hold 5-9 chunks of information at a time. This theory was further advanced by William McGuire in the 1970s. It was also known as the Yale Model of Information Processing Theory (IPT).

The theory argues that attitude and behavioural change will occur in response to persuasive communication only if the following steps are satisfied. Firstly, the persuasive message must be presented, secondly the message must be attended to, third the message must be comprehended, fourth the message must be accepted, fifth the message must be retained and last but not least, the message must lead to behaviour change. However, McGuire argues that there are independent variables that can affect one's understanding of a message positively or negatively such as intelligence.

In the use of technology, there are many problems and barriers in proper and suitable exploiting of information and communication technologies such as limited base of technologies, limitation in bandwidth of telecommunication, the lack of access to the internet and computer facilities in different areas, the lack of compiling the content of training for this kind of education. (Ghafourian, Nejad & Hosseini, 2012)

According to Lucky and Achebe, 2012, lack of experience combined with illiteracy restrict farmers' imagination and make it difficult to transfer new practices to them. To achieve best results with visual aids in extension with illiteracy for example, the ICT in particular, visual, the oral and the print should all be used together, so that the farmers can connect them in his/her mind on the spot.

Another obstacle in disseminating information to farmers is attitude of the information agent. Farmers in our type of economy have limited knowledge and their speech patterns and thinking tend to be different. This tends to restrict their imagination and make their understanding of scientific terms, difficult, particularly abstract concepts. Education is presumed to enhance farmers' ability to receive, decode and understand information. However, most of the farmers have low level of education and this should be taken into consideration and if not done they completely misunderstand the information (Lucky & Achebe, 2012).

Olayide (1990), observed that rural people lack infrastructural facilities such as roads, good water supply, schools, health centres and markets. He asserted that lack of indigenous capabilities for the collection and dissemination of information have been

creating great barriers in many low development communities. They also have difficulties in building sound information systems and the reason is not ignorance of what should be done but insufficient ability to translate good intension into operational activities.

Where print media is concerned, some important factors which affected their effectiveness were quality of information, newness, farmers' interest, in time publication, easy access to print media, relevance of information, literacy level of farmers, comprehensiveness, and cost of print media (Rehman, Muhammad, Ashraf & Hassan, 2011).

Adeniji (2007) observed that information needed for development has become highly segmented, divisive and uncoordinated. For information to achieve the desired results in the rural communities, the sources that provide for the flow of information should not be monopolized and politicized. Availability as well as accuracy and currency of information are a must to the rural dwellers.

## **2.9 Theoretical framework**

Diffusion of innovation theory and two-step flow communication theory were used to explain this study.

### **2.9.1 Diffusion of Innovations Theory**

Diffusion of Innovation theory was proposed by Paul Lazarsfeld, Bernard Berelson and H. Gaudet in 1944 and it explains a process in which new idea, discovery or practice is communicated through appropriate channels or medium over time among and within

members of a community or social system (Garba, 2014). Rogers and Scott (1997) define diffusion as a process of communication by which an innovation is spread via certain communication channels to members of a specific community over time. Agricultural information and knowledge systems are knowledge based innovations; it is useful to apply the tenets of diffusion theory to better understand the diffusion of agricultural based information and knowledge into the social system and its implications for household food security.

The characteristics of innovations explain their rate of adoption. Five such characteristics of importance include the relative advantage reflects how the innovation is subjectively perceived superior to the previous idea; compatibility reflects how the innovation is perceived or consistent with the existing values, past experiences, and needs of the targeted adopters; complexity reflects the perceived difficulty to understand and use the innovation; trialability is the degree to which an innovation may be experimented with on a limited basis and observability reflects how the results of an innovation are visible to others. An innovation can further be changed or modified (re-invented) by a user (Tobon, 2010).

Ryan and Gross (1950) came up with four major factors of diffusion theory are innovation, communication channel, time and community to which the innovation is introduced. According to Tobon, 2010, communication channels provide information to a social system with the purpose to influence the knowledge and assessment of the innovation. Mass media is often more effective in creating awareness of an innovation, whereas personal contacts are more effective in forming an opinion about a new idea.

Such interpersonal communication is facilitated if conveyors of information are optimally similar to the receiver in certain attributes.

Innovativeness is an expression for how early an individual or other unit of adoption is adopting a new idea compared to other members of the social system. Adopters are divided into five categories, each with its own characteristics. The five categories include the innovators, secondly, early adopters, then the early majority, fourth we have late majority, and last are the laggards. Finally, rate of adoption is the relative speed with which an innovation is adopted by members of a social system.

Time is a main factor in the decision-making process, innovativeness and an innovation's rate of adoption. In the innovation-decision process, an individual passes through the stages: knowledge, persuasion, decision, implementation (adoption) and confirmation (post-adoption assessment). Information is sought at the various stages to reduce uncertainty about the usefulness of the innovation. The decision stages result in adoption or rejection of the idea (Tobon, 2010).

The social system with its interrelated units shares an interest in finding solutions to a common goal, i.e. to improve their agricultural system to enhance livelihoods. Such a system has a social and communication structure that facilitates or impedes the diffusion of innovations in the system. Norms, being part of the social system, are the established behaviour patterns for system members. Often opinion leaders play a crucial role in influencing system members. Change agents may have the explicit role to influence



members in a certain direction. Both opinion leaders and change agents are central actors in diffusion of innovations.

### **2.9.2 Two-step flow communication Theory**

Two-step flow communication theory was initially introduced by Paul Lazarsfeld, Bernad Berelson and Hazel Gaudet in 1944 while they studied the process of decision making during a presidential election campaigns. Their expectation was to find how media messages directly influence the voting intention. The surprise however was that personal contacts were mentioned more than mass media exposures such as newspapers, radios (Lazarsfeld, Berelson, & Gaudet, 1944).

According to this theory, information from the media moves in two definite stages. The information gets to the opinion leaders who first receive and conceptualise it. They then pass their interpretation with the actual media content to the rest of the population. The opinion leaders in this case are very influential in directing and changing the behaviour and attitudes of lesser active groups of the population.

According to Katz (1955), audience's reaction to media messages depends on their interpersonal exchanges within a social environment. Hence the researchers cannot treat the audiences as a homogenous entity that consumes and reacts or process to media messages uniformly.

According Postelnicu (2014), there have been some criticism on the theory saying that it is oversimplified since flow of information from mass media to the consumers has more

than two steps. More research also shows that there are more conversations among opinion leaders themselves than between opinion leaders and the less informed public.

## 2.10 Conceptual Framework

The farmers in Yimbo East ward need Agricultural information for production of watermelon. This information is disseminated using various communication channels. This study used conceptual framework on the bases of data collection and analysis by assessing the channels of communication (agricultural information), utilization of the information by farmers and evaluation of the information.

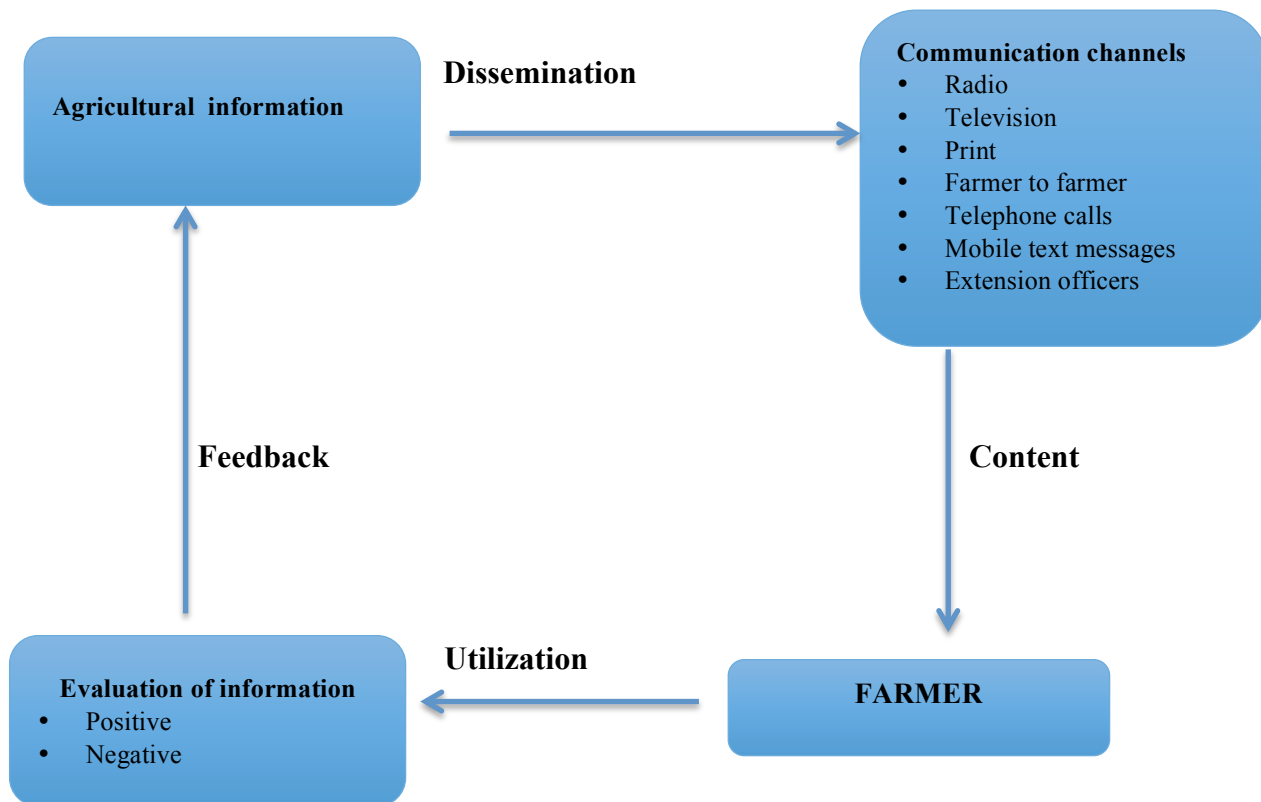


Figure 2.1: Conceptual framework Source: Researcher 2015

Watermelon production is relatively new in Yimbo East ward. It is referred to as an emerging crop. The farmers in the ward are still trying different techniques and varieties of watermelon to ensure success. This therefore means they need a lot of information to get that is achieved. Farmers' needs are first identified through research. Researched information, which leads to improved technology that suits the needs of the farmer. The improved technology inform of information is then passed to farmers through various channels and various impacts are experienced, either positive or negative. The farmers implement and give feedback to the source of information. Figure 2.1 is a flow chart of the conceptual framework.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter explains the entire process that the researcher used to obtain the information as well as data collection methods and data analysis. This includes the research approach, study population, data collection technique and data analysis method and presentation.

#### **3.2 Research approach**

According to Lindlof and Taylor (2005), qualitative research covers array of interpretive techniques which seek to describe, decode, translate and otherwise come to terms with the meaning of certain more or less naturally occurring phenomenon.

This research applied qualitative approach to describe the farmers' perception on the media channels they use to receive the agricultural information on watermelon production, the impact of the information and the challenges they have experienced. Quantitative data was used for statistical inferences of the information from the qualitative data. Qualitative data was best because of the number of subjects in the study and it also involved description, interpretation and discussion of the data collected on the farmers that plant watermelon in Yimbo East Ward.

### **3.3 Study population**

A population refers to a group or class of subjects, variables, concepts or phenomenon (Wimmer & Dominick, 2011). A population is the theoretically specified aggregation of a study element whereas a study population is the aggregate of elements from the study population. A census is described as survey of the entire study population, that is every member of the population in the study (Porag, 2015).

The target population of this study encompassed 30 farmers in Yimbo East ward who planted watermelon in their farms between October 2014 and May 2015. Since the population is small, the researcher targeted the whole population for the study. This made it a census survey. The names and telephone numbers of the farmers were provided by the Usigu Division Agriculture officer where Yimbo East ward. Due to anonymity requested by the farmers, the farmers were identified as farmer 1 to farmer 30.

### **3.4 Data Collection**

The study relied on primary data collected through structured individual interview schedules, observation made on the farms and telephone interviews for farmers who were not easily accessible. A semi-structures questionnaire containing three types of questions, namely closed questions, open-ended questions and opinion questions using Likert scales was used as a guide during the interviews. The researcher visited the accessible farmers at their farms to conduct the individual interviews and during this time was able to make observations of the activities on the farms. The telephone interviews were conducted to some of the farmers who were not available at the time of

the research. The researcher took field notes during the interviews and made observations which was useful in analyzing the data. Eighteen farmers were interviewed on their farms and seven were interviewed by phone. Those who were interviewed by telephone are part-time farmers who have other white-collar jobs and were not available during the time of the interview. The researcher was able to move from farmer to farmer using *bodaboda* services. The questions were mostly to cover relevant information about the general socio-economic characteristics of the farmers, such as age, sex, educational level, farm size; channels of information used by farmers; preferred channels of communication, accuracy of the information, impact of information received by the farmers and the challenges encountered while accessing information using different channels.

### **3.5 Data Analysis and Presentation**

Qualitative data analysis is where the data collected analysed through coding and thorough reading of explanations, understanding or interpreting of the people and situations being investigated. It is based on interpretative philosophy (Nigata, 2012). The data analysis was done qualitatively through narrative analysis. The researcher was able to sort-out and reflect on the information and stories told by the study group, enhance them and present them in a revised shape to the reader.

Exploratory data analysis is a technique used to summarise data. Most exploratory data analysis is graphical in nature or visual methods. Graphical means have been proposed for visualizing high-dimensional data items directly, by letting each dimension govern some aspect of the visualization and then integrating the results into one figure (Jain &

Dubes, 1988). For this research, exploratory data analysis was used for the main purpose of maximizing insight into the data collected. Graphs and pie charts were used for this purpose.

### **3.6 Ethical consideration in the research**

This data was carried out in partial fulfillment of the requirements for the award of Master of Arts in communication studies, University of Nairobi. The farmers that participated in the research requested for anonymity during the process of data collection. For this reason the farmers are only identified as Farmer 1 to Farmer 25.

## **CHAPTER FOUR**

### **ANALYSIS, PRESENTATION AND INTERPRETATION**

#### **4.1 Introduction**

This chapter focuses on the presentation and interpretation of the findings from the research. The discussion of the findings was done with a view of meeting the objectives of this study whose aim was to establish the impact of communication channels in watermelon production in Yimbo ward. The data was collected by way of individual interviews and observation and for those who were not available, the interview was undertaken through a telephone calls. A total of 30 respondents were targeted. The researcher was able to reach 25 respondents who accounted for about 83% of the targeted group.

#### **4.2 Respondents' Demographics**

This section discussed the respondent's gender, age and level of education.

##### **4.2.1 Gender of Respondents**

The findings showed that majority which accounted for 69.6% of the watermelon farmers were male while 30.4% were female. In this region however, it was important to note that most of the women are more active in farming, that is digging and ploughing, while the men are involved in other activities such as taking care of the animals.

##### **4.2.2 Age of Respondents**

The study further sought to establish the age of the respondents. Figure 4.1, shows that those who plant watermelon start from age 25 years but the majority are between the ages of 34-42 years.



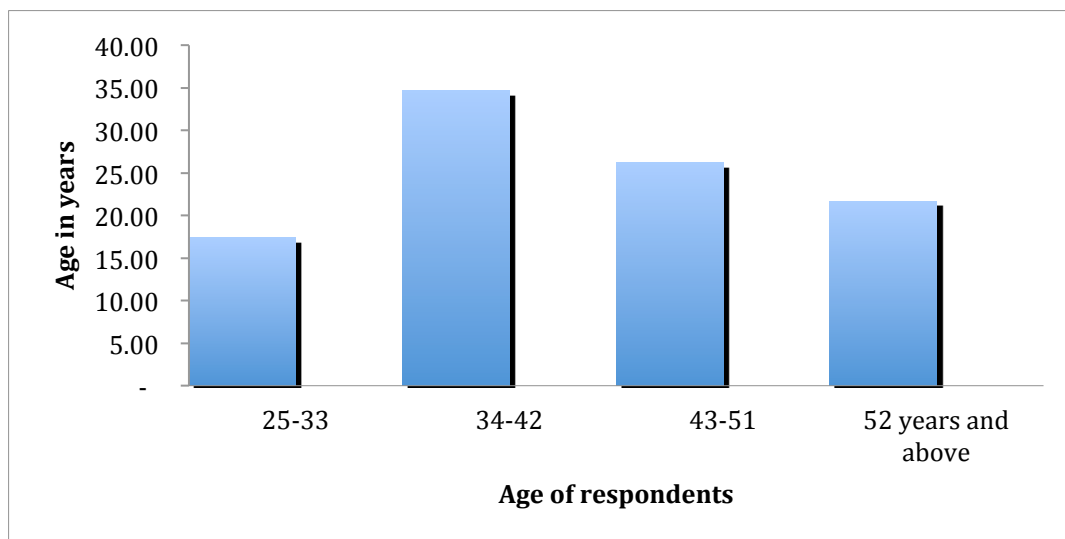


Figure 4.1. Age of Respondents (Source: Field survey 2015)

The farmers who practice watermelon farming in the region are those who understand the potential of the project and could see the benefits they could get. The younger people, that is, 25 years and below, especially the men, find fishing or *bodaboda* business more lucrative than farming. Their argument is that farming takes too long for one to realise any results, while fishing with only one day spent in the lake, they can make much more than a day spent in the farm. Even though watermelon takes only three months to mature, the uncertainty of the activity makes them opt for other sources of income. Those who are in *Bodaboda* business, get their daily income from that. Their farms are also small therefore some of them opt to engage in other businesses instead of depending on a small piece of land that the whole family depends on. It is important to note that getting farm labourers is difficult because of the same reason, it does not pay as much as the activities mentioned above.

### 4.2.3 Highest level of Education attained by waterlemon farmers in Yimbo East ward

The study further sought to establish the level of education of the respondents. The findings are stipulated in the figure 4.2.

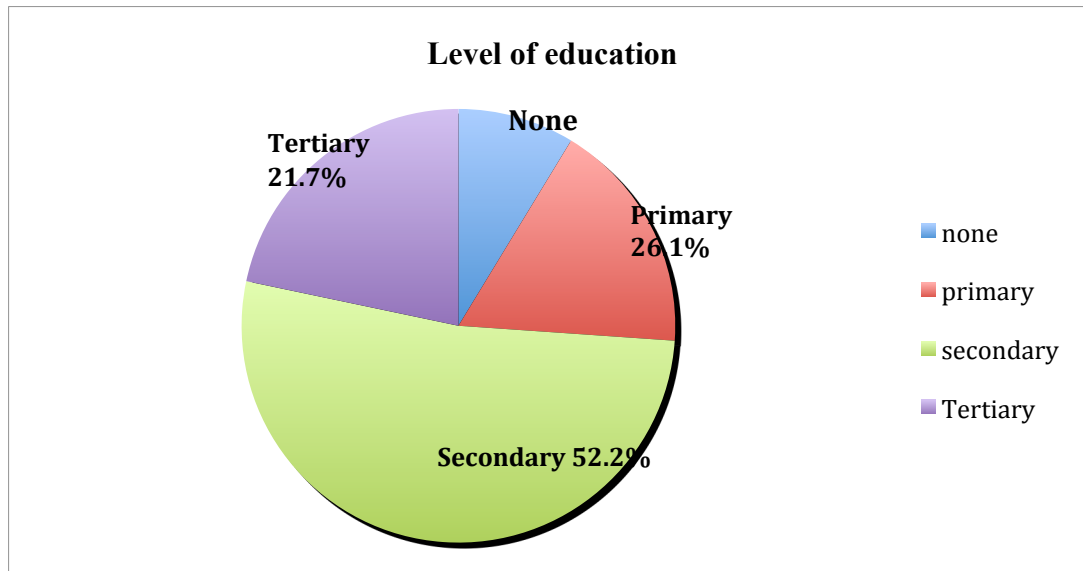


Figure 4.2. Highest level of Education attained by watermelon farmers in Yimbo East ward (Source: Field survey 2015)

From the findings presented in the figure 4.2 above, majority of the respondents have gone to school to a certain level. Secondary school certificates holders are the highest with 52.2%, while 26.1% had primary school certificates and tertiary level was at 21.7%. Only 8.7 % of the farmers had no formal education. Most of those who either had no education or had primary level of education were mostly women. This finding clearly shows that there is need to create more opportunities for women to go to school. It also shows that people in the area are relatively educated and may not have a major problem in consuming Agricultural information.

### 4.3 Land Acreage

The research sought to establish respondents' size of land in acres. From the study findings, upto 90% of the respondent indicated that their land was less than three acres. A big piece of this land is however reserved for homestead, maize plantation and other food crops. Most of the farmers were planting the waterlemon in less than an acre piece of land with very few planting in more than an acre. These findings agree with the data from District Agricultural office that indicated that only 10 hectares of land in Yimbo East ward in under watermelon production.

### 4.4 Media Use on Agricultural production

#### 4.4.1 Channels of communication used by watermelon farmers

The respondents were asked to indicate the channels of communication they use to acquire agricultural information. The results were as outlined below:

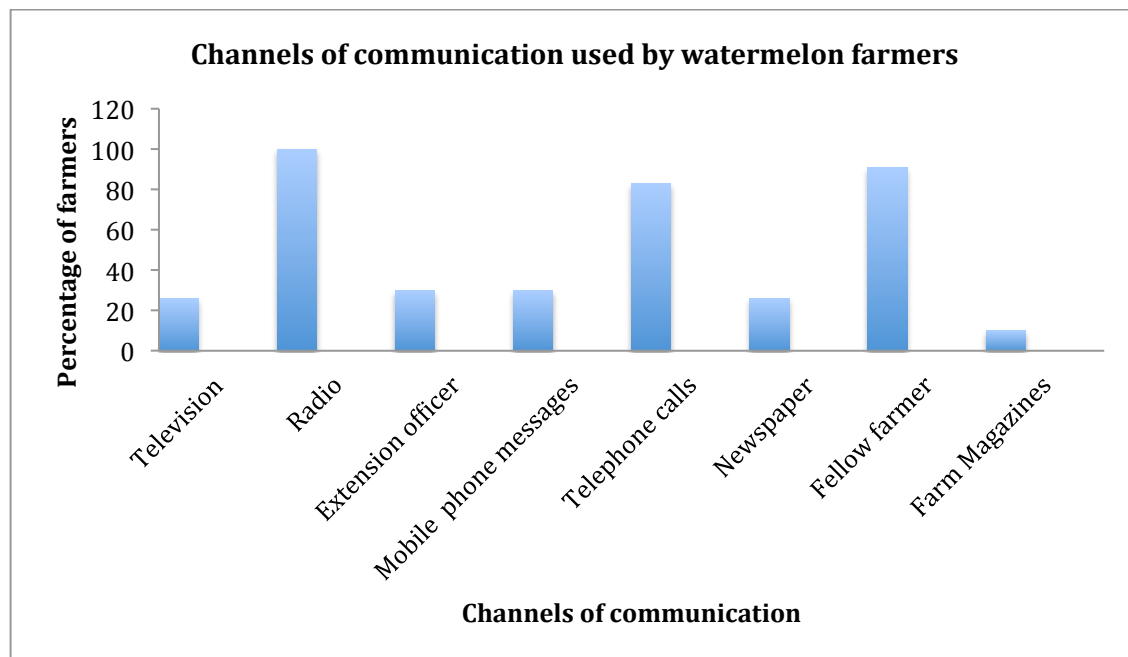


Figure 4.3. Channels of communication used by watermelon farmers in Yimbo East ward (Source: Field survey 2015)

The three channels mostly used by watermelon farmers are radio, fellow farmer and telephone calls. The least used channels are farm magazines, extension officers, mobile phone messages, newspaper and television. More discussions on the channels are here below.

#### **a) Television**

Figure 4.3 indicates that majority only seven farmers that accounted for 26% said they use television as an information channel. Most of these farmers were mostly teachers, leaving within the school compound and had electricity. They however stated that television signals especially from the free to air or more affordable digital set boxes, were not good in the area. Majority of the farmers do not have television simply because they cannot afford while others, it is due to lack of electricity. Most of the homes could not even afford solar equipment to light their homes. Shifting from analog to digital broadcasting had also prevented others as they stated that the cost of buying the televisions set boxes was quite high.

#### **b) Radio**

Findings in Figure 4.3 shows that all the respondents, use radio as a source of receiving information. The merging of technology, that is, telephone and radio has also made it more accessible to many. They are able to go everywhere with their radios, including their farms. Every home had a radio while others had more than one radio. Kimutai (2011) had established that radio leads in overall media consumption followed by the mobile phone, television, newspapers and the internet respectively in Kenya especially with the wake of many vernacular radios which are able to effectively communicate to

the targeted groups; and the findings of this study on the use of radio confirms this. Further, the presence of radio programmes such as *Mali Shambani* on KBC radio taifa featuring agricultural news and responding to a wide range of topics, including market prices and trends, farming techniques, weather and seasonal issues, financing opportunities, inputs, land use, and quality standards explains the respondents choice of this channel of communication. Having vernacula radios stations, such as, Ramogi, Sayare, Lake Victoria radio, nam lolwe and so on have made information more accessible to the farmers in that region. However, proximity of messages to the audience just like the television was the main challenge. The watermelon specific information are rare on the radio but they benefit from information on other farming matters which include improving of soil, market for their produce, prices of the farm output, new farming methods, weather forecast and so on. This makes the radio a popular channel to the farmers.

### **c) Extension Officers**

Extension officers as a channel of communication was reported to be in use by 28% of the respondents as shown in Figure 4.3. Most of the farmers who were in constant contact with extension officers are mostly those regarded as lead farmers or opinion leaders. The rest of the farmers rarely interact with extension officers. Their interaction with extension officers was mostly the initiative of the farmer. When the research was being done, there were only two extension officers in the division. One was in charge of the whole division and Yimbo West ward; and the other was incharge of Yimbo East ward. This small number made it difficult for the extension officers to be in constant contact with the farmers. This scenario is confirmed by Cabi (2012) who stated that there

are over 5 million small scale farmers rely on about 5,500 agricultural extension workers in Kenya for advice and information.

According to Mr Sewe, who is the Agricultural officer of Yimbo East Ward, the change of government activities to devolved government disrupted the activities of the ward. There were no proper systems have been put in place and therefore no budget. This was an impediment to the activities of the extension officers.

#### **d) Mobile Text Messages**

The findings show that only 28% of the farmers use mobile text messages. Almost all the farmers interviewed had mobile phones and those who did not atleast had a member in the family with a mobile phone. This agree with the information that the penetration of mobile service in Kenya which is 64.2 per 100 inhabitants according to Communication Council of Kenya (2011) which is quite significant. Even though mobile text messages are used to disseminate information such market prices, weather patterns and any other information deemed relevant to the farmers, most farmers in this area have very little practise texting as they find it cumbersome and also feel the information may be misunderstood. They say that text messages do not guarantee feedback. The better alternative is to make call. This is more convenient as you can probe more, make clarifications and get feedback. Through this, you will be able to relay the information you want well and get feedback. According to (Candrall, 2012), findings revealed that Kenyan cell phone users still prefer to call rather than SMS (short message service) due to the ease of calling and little practice using SMS. For more reach therefore a voice based product needs to be added to reach more farmers.

### **e) Newspaper**

Figure 4.3 indicates that the use of Newspaper by Yimbo East ward watermelon producers is only by 28% of the respondents. The main reason sighted for this is affordability. Newspapers are basically a luxury in this area. Most farmers can not afford to purchase a newspaper daily. The farmers who use newspapers as a channel of acquiring information normally buy *The Saturday Nation* which has a pull out magazine known as '*Seeds of Gold*'. This magazine has information on farming strategies, activities and best farming practices.

### **f) Fellow Farmers**

Majority of farmers use fellow farmers as a channel of acquiring agricultural information as reported by 91.3% of the respondents outlined in Figure 4.3. Fellow farmers get information from many sources including their own experinces. Going to another farmer's farm and seeing what they have done, getting to know their challenges and how they have been able to overcome was said to be more fulfilling. They also have lead farmers whose farms are used for demonstration purposes and training especially by NGOs when they have new projects. These farms are normally opened to other farmers who want to learn. An interview with Mr Eric Aluoch of USAID (KAVES) in Kisumu who stated that local farmers are very skeptical and will not believe anything you say without seeing. This is why USAID (KAVES) together with other NGOs in the region use "farmer-to-farmer" extension method to support farmers, introduce a new ideas and so on where a lead farmer's farm is used as a training ground. Through this, most farmers feel that they benefit more because they get to experience the process. This confirms what Katz (1955) stated that audience's reaction to media messages depends

on their interpersonal exchanges within a social environment. Personal contacts amongst farmers yield more fruit more than other mass media as they are able to share their experiences and get feedback. This together with farm visits would give farmers tangible evidence of each other's successes and failures. In this approach there would be farmer to farmer approach where farmers perceived to lead are often called model, master, or lead farmers and are chosen according to their agricultural expertise approach (Franzel, 2015).

### **Telephone Calls**

Telephone calls usage by watermelon farmers in Yimbo East ward was reported by 84% of the respondents as shown in Figure 4.3. Most farmers prefer calling either the extension officer or fellow farmer for information. Conversations through telephone calls are found to be more complete as there is a beginning and a conclusion which maybe difficult with mobile text messages. Telephone calls also makes it possible to reach and share information with other farmers who are far away about their experiences and farm related issues. However, the challenge the farmers experience is the cost of telephone calls which they find to be exorbitant and may not utilise this channel as much as they would want.

### **h) Farmers' Magazine**

Figure 4.3 shows that farmers who use Farmers' Magazine as a channel for receiving information were very few, about 10%. Some of the the farmers who indicated this as a source, said they mainly access digital farmers magazines from the internet for specific



information. A pull out magazine known as ‘Seeds of Gold’ that is part of *The Saturday Nation* newspaper in Kenya is very popular among the farmers in this area.

#### 4.4.2 Preferred Channel of receiving Agricultural information

The study also sought to determine the preferred channel of receiving Agricultural information by the watermelon farmers. The responses were rated on a five point Likert scale where: 5= strongly agree, 4= agree, 3 =Moderately agree, 2= disagree and 1 = strongly disagree.

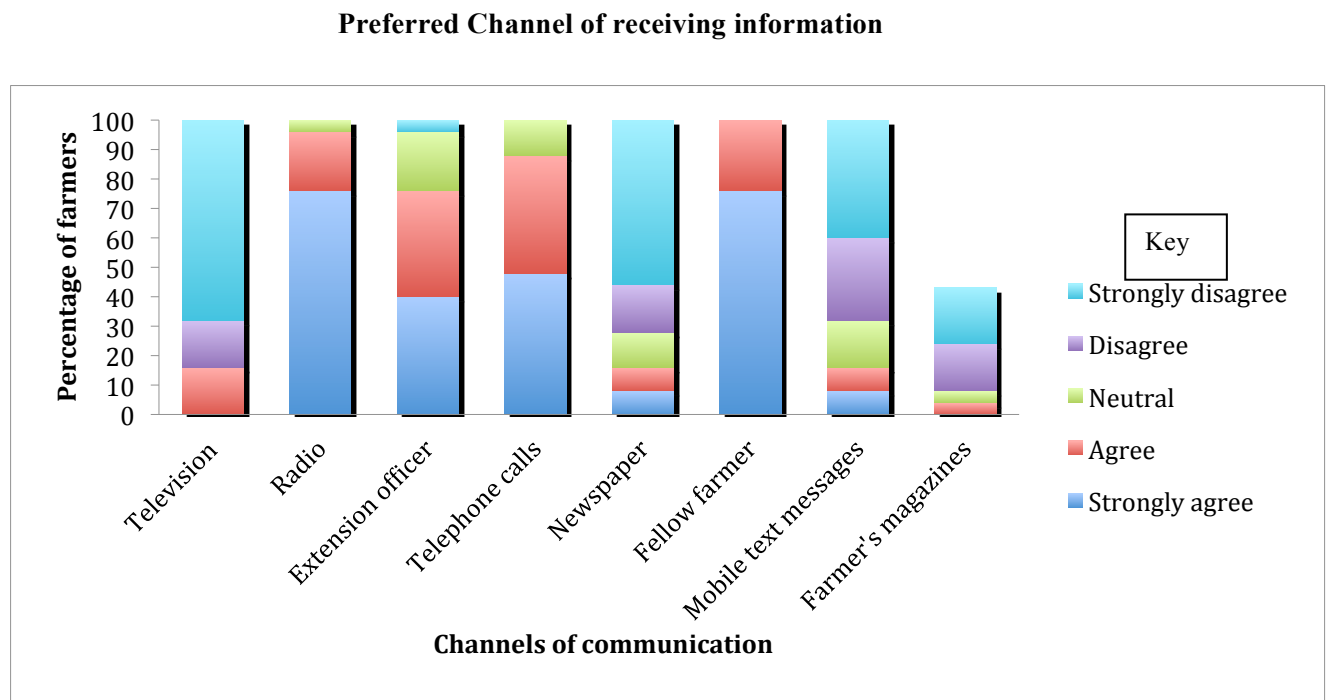


Figure 4.4. Preferred Channel of receiving information (Source: Field survey 2015)

From Figure 4.4 above, majority of the farmers indicated that their preferred channels of receiving Agricultural information are the radio, fellow farmers, telephone calls and extension officers in that order. Radio was preferred because it is easily accessible,

gives information, educates as well as entertains. The fact that the radio is now two-way where the farmers can call in and participate and also give their opinion on topics being discussed gives it an upper hand. Now, with the vernacular radios, the farmers can speak in a language they understand with the experts brought during the programs. It makes it easier for them to understand and follow the program. The disadvantage of radio is that you cannot see what is being said and so in this case fellow farmer has an upper hand as the farmers can witness for themselves what is being said. Telephone calls are also preferred because the farmers can have a two-way conversation and get solutions to their problems. Farmers can also invite each other to their farms to witness what is going on. The only challenge would be the cost of the telephone calls.

*“What makes telephone calls to be prohibitive sometimes is the cost of calling. If these cost were reduced, we would constantly communicate with farmers not only from here but also from other parts of the country to learn from their experience.”* (Farmer 3, July, 2015)

On the other hand, most of the respondents strongly disagreed that farmers’ magazines, television, newspaper and mobile text messages respectively were the preferred channels of receiving information. Newspapers are found to be expensive and magazines are rarely available.

Other preferred sources of agricultural information used by farmers included the field days involving farmers, organized agricultural exhibitions or shows from the Agricultural Society of Kenya (ASK), *Barazas* specifically to discuss farming issues

organized by the area chief and the internet albeit by very few. In this region, there has not been any *Baraza* organized for the sake of farming. The chief's *Baraza* takes place once a week and farming issues are normally put as any other business in the agenda and therefore not were utilized properly. Internet is mainly used by highly educated farmers especially those at tertiary level.

#### 4.4.3 Sources of accurate information

Even though the channel of information is important, the source of information is crucial for credibility purposes. Some of the channels are also sources of information, for example, the radio. The responses were rated on a five point Likert scale where: 5= strongly agree, 4= agree, 3= neutral, 2= disagree and 1 = strongly disagree was used to gauge the farmers perception. The researcher used frequency to analyse the data.

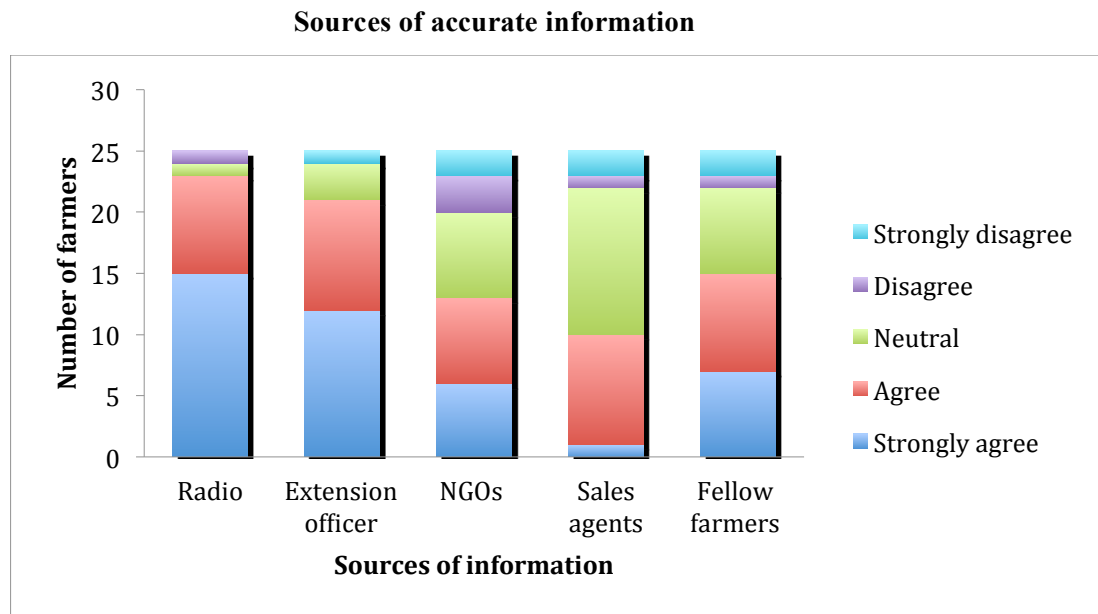


Figure 4.5. Sources that give accurate information (Source: Field survey 2015)

From the findings, majority of the respondents strongly agreed that radios, extension officers, fellow farmer and non-governmental organizations in that order gave accurate

information to watermelon farmers. The radio was found to give accurate information because of the experts that are normally included during programming. For extension farmers, whenever they were available or if the farmer called them they would understand the issue and help. So farmers in this region feel that they are quite useful and would prefer if they were more. As much as the fellow farmers are preferred, there are times that one cannot bank on their information. This is because the conditions of their farms may not be the same, for example, the soil pH, the activities on that farm and so on and also the status or capabilities of the farmers are different. One farmer may be able to afford some of high-end equipment and other resources while the other may not.

Non-governmental organizations are seen when introducing a new project. This could be a new variety of a plant, new farming methods and so on. The strength they have is that most use Participatory rural appraisal, where the farmers are given the opportunity of exploring their problems, rate them according to importance and come up with possible solutions. However, in most cases their agenda come out eventually and most farmers adopt it only because of the funding and support they get.

Most sales agents were found to have only one agenda and that is to sell their products. Most farmers feel that they do not care whether their products work or not so long as they make a sale. They also do not follow up until they want to make another sale.

#### 4.4.4 Agricultural information required for watermelon production

The respondents were asked to indicate the type of Agricultural information they required for watermelon production. These information needs would indicate to the information sources the right channel to use to reach the watermelon farmers.

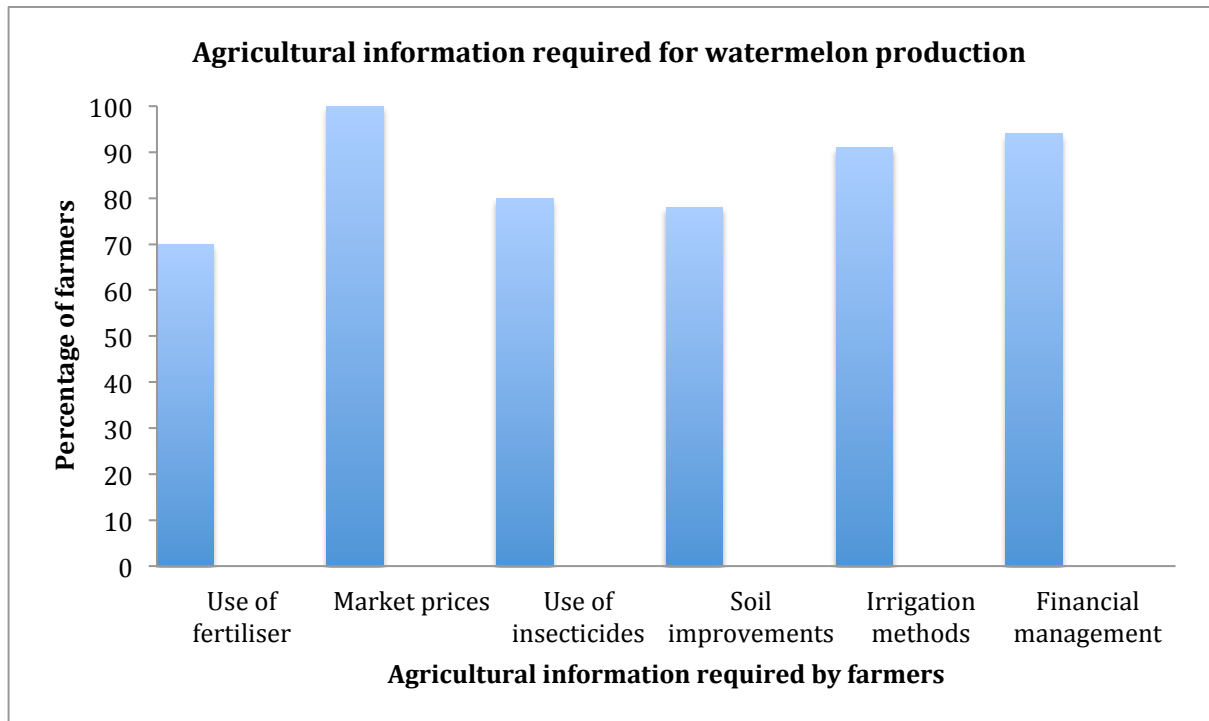


Figure 4.6: Agricultural information required for watermelon production (Source: Field survey 2015)

From the study, it clearly shows that these farmers are really in need of information. Market prices, financial management and irrigation methods were the information mostly sought by farmers. Most of these farmers were practising agribusiness for the first time.

*“Selling of this watermelon has been very tricky. In the market around here, they buy as a whole but in Kisumu at the municipal market, they buy it kilograms. The prices are*

*very different and sometimes you get loses because we cannot figure out the best way to sell them.*” (Farmer 3, July, 2015)

Currently they sell their watermelons through agents who take advantage of their ignorance on market prices. Text messages if sent in real time concerning watermelon market prices in Yimbo East ward and it’s environs would be beneficial to the farmers.

As most of farmers leave near the lake, they felt irrigation methods would be valuable to them. This would enable them to plant off and on season. Through this, they can supply during low season and maximise on returns. This information would be delivered well through demonstration by using one of the farmer’s farms. The other farmers can visit the farm and learn how to irrigate their land.

Where financial management was concerned, most farmers were getting into farming before calculating the cost of the project. This included cost and gross margin analysis, expected risks how to mitigate them. Financial management is crucial because it is a new venture and the produce is highly perishable. Most of the farmers could not tell how much they had spent in the whole project. It was therefore very difficult for them to tell whether they had made a profit or a loss.

*“The last time I planted watermelon. I worked backwards and realised from the amount spent and the return received, I had actually made a loss.”* (Farmer 25, October, 20)

The farmers need business acumen and this can be done if they had centres where they can go for training or even have radio programs which specifically deal with agribusiness.

The farmers indicated that use of fertiliser, use of insecticides and soil improvement are information that they constantly need to increase production and lower the cost of production. Being near the lake they sometime they experience flooding hence regularly need to improve their soil. This information is normally needed promptly but the farmers say that NGOs or even government institutions deliver this information late and most times it is not useful to the famer. Timely delivery of information therefore becomes important and a channel such as the radio can be useful for that.

The issue of where to sell and the market conditions became apparent to most farmers once they harvested the watermelons. The farmers' produce was ready during the high season when the market was flooded with watermelon; and most only realised that watermelon was highly perishable and needed proper handling. The assumption was that there was always going to be a market for watermelon. They therefore need to learn the market trends and adopt farming methods that ensure that they produce during off season.

*“I thought I will just put my watermelon in a lorry and go to Kisumu and sell them all. I did not realise that it was the peak season and therefore there was plenty in the market and this reduced my price. I also incurred loses because of rotting and damages to some.”* (Farmer 1, August, 2015)

Loses were experienced due to rotting and low selling price.

The main variety of watermelon currently in Yimbo East ward is Sukari F1 and the farmers find the seeds to be very expensive in comparison to Sugarbaby, which was relatively cheaper. The farmers, therefore, need information of other watermelon

varieties that can do well in their area and are affordable. This information can be delivered through radio or other literature such leaflets, posters and so on.

#### 4.4.5 Impacts of Agricultural Information Received by Watermelon Farmers

The respondents were asked to indicate the impacts of the information they acquired on watermelon production. Table 4.1 shows both positive and negative impacts used to depict the views of the farmers.

**Table 4.1: Impacts of Agricultural Information Received by Watermelon Farmers**

<b>Positive Impacts</b>	<b>% of Farmers</b>	<b>Negative Impacts</b>	<b>% of Farmers</b>
Increased amount of production	48	Failure of production	52
High quality production	92	Higher cost but low production	82
Early maturity	70	Low selling price	77
Lower production costs	40	Complicated farming processes	22
Higher selling price	44	No follow up information providers	85

The findings indicate that 92% of the watermelon farmers were in agreement that high quality production was a positive impact from the Agricultural information they received. This was due to the introduction of a new hybrid variety (Sukari F1) which produces very large fruits weighing between 7-15 Kilograms which in their opinion is a better quality. The cost of the seeds were however found to be on the higher side. They said they buy 500 grams at Ksh7500 which most farmers cannot afford.



Lack of follow-up from those who provide information was the negative impact experienced by most of farmers who produce watermelon. This was indicated by 85% of the farmers. For example, bulk SMS was one way and no follow up is done to ascertain whether the information is useful to the farmers or not. The few extension officers are also overwhelmed and do not have the necessary resources to do follow up. Other information channels such as the newspapers, farmers magazines or even radio which normally target the masses are used for dissemination of information purposes only with no follow up strategy.

About 82% of the farmers stated that high cost and low production as a negative impact. Most farmers felt that they spent a lot of money in production especially in the month of March, 2015, but lost through flooding contrary to the information received which indicated that there would be reduced rainfall.

*“We lost a lot of our watermelon plants especially those that were near the lake because of flooding. The information we received was that the rains would be moderate, instead we got rains in excess which caused flooding, hence lose in production.”* (Farmer 1, October, 2015)

Low selling price was indicated by 77% of the farmers as a negative impact mainly because of the losses they experienced by selling through middlemen. They have been receiving conflicting information regarding prices of watermelon. Another issue was that most farmers planted watermelon during the high season and when they got into the market it was flooded with watermelon. Losses were also experienced due to rotting. The farmers need real time information on watermelon prices in Yimbo East ward and its

environs so they are able to price their produce well. They also need training on costing of their activities so they able to price their crops well to avoid loses.

Early maturity which is a positive impact indicated by up to 70% of the farmers was because of the new variety of seed which grow faster. Most of the farmers in the region find farming of watermelon as straightforward process and therefore didn't find information on watermelon production complicated as indicated by 22% of the farmers.

Farmers indicated that they needed more information on how to increase amount of production and lower production costs, as the information they had received was not enough. They were spending a lot of money mainly on insecticides and protecting the plants from diseases. They need more information on better ways of farming; the stage of planting; information on other high yielding, pest and disease resistant varieties; timing to plant; information on fertilizer, pesticides and new techniques of farming and so on.

#### **4.5 Factors affecting communication channels for Agricultural Information**

##### **4.5.1 Challenges affecting the communication channels**

The study sought to establish the problems encountered in accessing information by the watermelon farmers of Yimbo East ward.

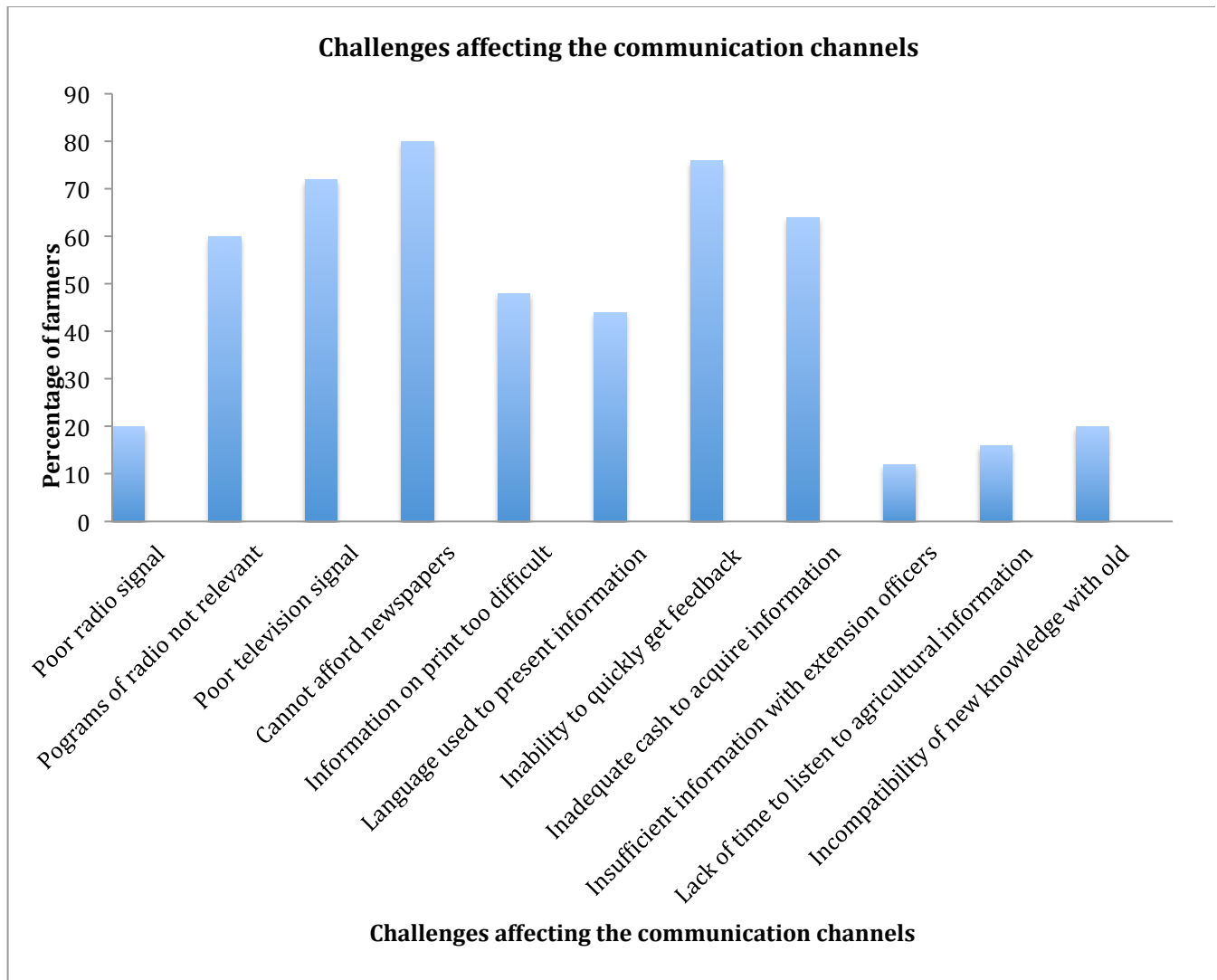


Figure 4.7. Challenges affecting the communication channels (Source: Field survey 2015)

From Figure 4.7, majority of the respondents agreed that inability to ask questions and quickly get feedback, unaffordability of newspapers every week, inadequate cash to acquire the information, programs of radio not being relevant and poor television signal, were the main problems encountered in accessing information by the watermelon farmers of Yimbo East ward as indicated by the mean scores of 76%, 80%, 64%, 60%, and 72% respectively. Inadequate cash is a challenge experienced in acquiring

information through most of the channels. Making telephone calls, for example, which is one of the most effective ways of getting information is found to be expensive because of the challenge of buying airtime. They find the cost of airtime to be very high. Extension officers who are also preferred by farmers have the challenge of not giving feedback as quickly as the farmer would need. This is attributed to the fact that they are few and also may not have the necessary resources to constantly and promptly keep in touch with the farmers

Ramogi Radio, which is one the most popular radio stations in the area, targets Luos communities and those who understand the language all over the country. Therefore, most times the information aired does not target a particular group but a wide spectrum of listeners hence may not be relevant information to watermelon farming in particular, which makes it a challenge.

On the other hand, most of the respondents agreed to a moderate extent that information on print is too difficult to understand and language used to present the information at 48% and 44% respectively. This is because from the demographics, most of the farmers have atleast a secondary education, therefore are able to read. The issues sighted as difficult concepts to understand included scientific and chemical names.

Insufficiency information with extension officers, incompatibility of new knowledge with people's attitude and interest and belief, poor radio signals and lack of time to listen to agricultural information were the problems to be at low levels at 12%, 20%, 20% and

16% respectively. Radio as the most used and preferred channel of receiving information can be affirmed by this information since most farmers have time to listen to it and also rarely experience bad signal. This is because most of the radio stations that transmit in the local dialect have their transmitters nearby therefore the listeners do not experience bad signal. Kenya Broadcasting Corporation, which airs farming programs in Kiswahili has its boosters in Kisumu which is a few kilometers from East ward.

Other challenges encountered in accessing information by watermelon producers in Yimbo East ward as reported included having no computers to access the internet as well as lack of cash to purchase the required bandwidth, inability to access extension officers due to their limited numbers and workload, limited linkages between the farmers and information channels, lack of power or electricity (most homes are not connected to electricity because they cannot afford), and difficulty in understanding the information given in mediums such as the radio as there are no demonstrations to make the information more practical.

#### **4.5.2 Ways of Improving Agricultural Information Dissemination**

When the respondents were asked of the various ways of improving dissemination of agricultural information to make it easily accessible, affordable and reliable, they opted for methods such as use of community radios that would broadcast more relevant information to the farmers, improvement of the road network and connection to electricity which were seen as a barrier to communication and in establishing linkages with agricultural stakeholders such as the extension officers; there was need for more extension officers and them being pro-active in order to give timely information;

establishment of telephone linkages with extension officers; encouraging more field days, agri-business trainings and seminars, farmers' *barazas* with the Siaya County Ministry of Agriculture providing lunch as incentive; and increasing extension services on watermelon production. Other suggestions included the improvement of linkages among farmers and chiefs to encourage more *barazas* that would enhance information sharing; direct link with agricultural officers; and more farmers' interactions. There were suggestions of building a resource centre or community library where farmers can source the information that they require affordably. The other most important thing was for the Agricultural office to have up to date data of all the farmers so they are able to relay information to the farmers as soon as they are received. Currently the office do not have up to date data, therefore, reaching farmers with information is difficult.

#### **4.6 Discussion of the Findings**

The study found out that all the watermelon farmer's at Yimbo East Ward, Siaya County indicated that radio, fellow farmers and telephone calls as the most popular channels that they used. Further, television, mobile text messages, newspaper and farmers' magazines were the channels least used by the watermelon farmers.

On the other hand, the study established that apart from radio; extension officers, telephone calls and fellow farmers were the preferred channels of receiving information for watermelon production. This was mainly because of their accessibility, accuracy of their information and demonstration (especially where fellow farmers are concerned). According to Kimutai (2011), radio leads in overall media consumption followed by the mobile phone, television, newspapers and the internet respectively. Mobile phones

usage has also increased because of many advantages which include their adaptability and the capability of transferring both voice and data at gradually decreasing cost (Mangstl, 2008). Lack of electricity in most homes in the region and the shift from analog to digital television has made it difficult for most of the farmers to own a television set.

The study further found out that most of the watermelon farmers required agricultural information on market prices, financial management, use of insecticides and soil improvement. High quality production and early maturity were the positive impacts of the information mentioned by most farmers they that acquired from different sources of information. On the other hand, negative impacts of the information mentioned by most farmers included lack of follow-up process by those who disseminate information to farmers to stimulate the success and higher cost but lower production. Complicated farming processes was mentioned by fewer farmer as a negative impact. The findings backs Otter and Theuvsen (2012) who argued that while the stage of planting, information on high yielding varieties and timing of planting are crucial, it is the stages of planting, information on fertilizer, pesticides and new techniques that can cause significant yield differences (Otter & Theuvsen, 2012).

The study also established from majority of the respondents that inability to ask questions and quickly get feedback, unaffordability of newspapers every week, inadequate cash to acquire the information, programs of radio not being relevant and poor television signal, were the main problems encountered in accessing information by the watermelon farmers of Yimbo East ward. Insufficiency information with extension

officers, incompatibility of new knowledge with people's attitude and interest and belief, poor radio signals and lack of time to listen to agricultural information were the problems found to be at low levels.

Further, the study found out that other problems to accessing agricultural information affecting watermelon producers in Yimbo East ward included having no information centres such as a community library that they can get information, inability to access extension officers due to their limited numbers and workload and difficulty in understanding the information given in mediums such as the radio as there are no demonstrations to make the information sink. These findings leads to affirmation of Otter and Theuvsen (2012) that information on appropriate harvesting time, climate and weather can enable farmers to gain better results if delivered in time and in the right context (Otter & Theuvsen, 2012).

On ways of improving agricultural information dissemination, the study established that methods such as improvement of the road network, connecting the farmers with electricity and in establishing linkages with agricultural stakeholders such as the extension officers; extension officers being pro-active in order to give timely information; establishment of telephone linkages with extension officers; encouraging more field days, agri-business trainings and seminars, farmers' *barazas* with the Ministry of Agriculture providing lunch as incentive; and increasing extension services on watermelon production. The findings of this study affirms the arguments of Rehman *et al.* (2011) that factors affecting the effectiveness of information received include the quality of information itself, newness, farmers' interest, in time publication, easy access



to print media, relevance of information, literacy level of farmers, comprehensiveness, and cost of print media.

## **CHAPTER FIVE**

### **SUMMARY, RECOMMENDATIONS AND CONCLUSION**

This chapter summarises, gives recommendation and conclusion that were drawn from the study. This chapter assesses the findings of the study in relation to the objectives that were set out at the beginning of the research.

#### **5.1 Summary and recommendation**

##### **5.1 .1 Participation between the gender groups**

The study established that majority of the watermelon farmer's at Yimbo East Ward, Siaya County are men which accounted for 69.9%. Further, majority (73.9%) had at least secondary school level of education. Most of the farmers in that had less that 3 acres of land, which showed that they are mostly small scale farmers.

##### **5.1.2 The communication channels used to receive agricultural information**

The study found out that all the watermelon farmer's in Yimbo East Ward, Siaya County used radios, fellow farmers and telephones calls as the channels most used to acquire Agricultural information by watermelon farmers in Yimbo East ward. Further, television, mobile text messages, farm magazines and newspapers were the channels which were least used. On the other hand, the study established that radio, extension officers and fellow farmers were the preferred channels of receiving information for watermelon production. The study also found out that radio and extension officers were the channels of information that gave accurate information to watermelon farmers.

The study recommends that stakeholders (research agencies, NGOs, NARES, CBOs) establish community FM radio stations to convey messages that are more relevant to the farmers. Agricultural stakeholders i.e. research agencies, NGOs, Government of Kenya etc. should also invest adequately in Rural Knowledge Centres (RKC)s, libraries, Market Information Centres (MICs) and other information centres and equip them with ICT facilities like computers, high-speed internet, telephones, mobile phones and faxes which the farmers can access at no or affordable costs.

### **5.1.3 Impact of Agricultural information received from different sources**

The study further found out that all the watermelon farmers required agricultural information on market prices, financial management, use of insecticides and soil improvement. The positive impacts, which the farmers experienced to a greater extent were higher quality production and early maturity. Increased amount of production, Lower production cost and higher selling price were experienced to a moderate extent. This showed more information is needed in the three areas. The study recommends that the sources of information has to do more research on how to increase their production, teach farmers on how to manage their costs through cost and gross analysis, and also do market research on prices of watermelon and deliver that information to farmers on real time basis.

The negative outcomes of the information recieved mentioned by most farmers included lack of follow-up process to stimulate the success and higher costs but lower production. Follow up by those who provide information is important. Non-governmental organization and sales agents need to have a proper system to ensure follow up is

achieved. The government should also endeavor to increase the number of extension officers in the area to ensure that they are able to go back to the farmers to check implementation.

#### **5.1.4 The challenges that watermelon farmers in Yimbo East ward encounter when trying to access information using different channels**

The study established that the main challenge that farmers experience while trying to acquire information through different channels are inability to ask questions and quickly get feedback; and lack of money to acquire the information. The study recommends that apart from increasing number of extension workers, the farmers should engage more with the lead farmers in their area who are able to gather information from different sources. The farmers should also endeavor to attend more field days, agri-business trainings and seminars, farmers' *barazas* with the Ministry of Agriculture where they are able to ask their questions and get feedback. There is need for a community information centre where newspapers, computers connected to the internet and televisions or radios that broadcast programs tackling pertinent issues that farmers are interested in at no cost or minimum costs.

Another important challenge is the information received from the radio is not relevant. This challenge can be overcome by having community radio, which broadcast in the local language and deals with issues that the local deal with on an everyday basis.

## **5.2 Conclusion**

Radio, fellow farmers and telephone calls are the channels that had numerous strengths hence were considered more advantageous by farmers compared with the other channels. Therefore, they are most suitable for the communication and dissemination of information on watermelon production and knowledge to farmers. Extension officers and radio were the two channels considered by many farmers in the study to be accurate, informative and comprehensible. Radio was also considered to be most accessible.

Therefore, there is need for researchers, government organisation and policy makers to consider establishing a community FM radio station in the region to promote dissemination of information on watermelon production and knowledge that is more relevant to the farmers. Radio has largely been under-utilized despite its numerous advantages. Farmer groups and ‘farmer to farmer’ extension are also good ideas, which should continue to be supported by the relevant stakeholders as they are very popular knowledge sources among farmers. It was also noted from this study that access to agricultural information and knowledge improved quality of production and early maturity. It is important that information flow to agricultural producers is enhanced by having up to date information on the farmers, having the right information and intensifying the use of appropriate communication channels.

The education level of farmers was found to be significant in regards to the choice of communication channels the farmers would use. There was need for systems to be placed to ensure that farmers especially the women who do not have formal education get some kind of education. It is hoped that the free primary and secondary education

initiatives by the Government of Kenya will continue to boost literacy levels in the Ward. Education will also be very important in bridging the gap between resource-poor farmers in the Ward and people in the urban areas (like researchers, policy makers and NGOs). Farmers who are more educated would be in a better position to utilize ICTs, which are relatively complex, in acquiring information efficiently and cost-effectively.

Lastly, there is need to ensure there are not only more extension officers but also equipped with the requisite facilities as well as streamlining their activities so as to improve the efficiency with which they provide extension services for greater impact in information and knowledge delivery. Lack of follow-ups was seen as the main disadvantage of using the different communication channels including the extension officers. Information concerning what the farmers are more interested in is also crucial so that the relevant information is disseminated to farmers using right channel. Radio is perceived as the most accessible and accurate, it therefore important to ensure that relevant information is reaching the farmers through this channel. Farmers need to be engaged, persuaded and shown the benefits of effectiveness of communication channels in watermelon production through farmer field days and demonstrations in order for them to learn, ask questions and provide their own feedback to the extension officers as well as researchers. The cost acquiring information is also a big challenge and a more cost effective means need to be put in place including resource centres where farmers can get information at no or affordable cost.

### **5.3 Suggestions for Further Research**

This study focused on assessment of communication channels and the impact of agricultural information used by farmers in waterlemon production in Yimbo East ward, Siaya County. The researcher recommends that a study should be done on effectiveness of the Agricultural information in improving watermelon production in the same ward.

## 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*. 13 (2)
- Adam, S. (2002). A Model of Web Use in Direct and Online Marketing. *Journal of Electronic Markets and Business Media*. 12 (4), 262-269.
- Adebayo, K. (1997). *Communication in Agriculture*. Nigeria: Greenlinks International Abeokuta
- Adeniji, M.A. (2007) Information needs and seeking habits of academic staff in Ibogun Campus of Olabisi Onabanjo University, Ogun State. *Gateway Library Journal*, 10 (2), 127-135.
- Agboola, A.T. (2000). Five decades of Nigerian university libraries. *Ibadan University Library Annual Report (1984)*. Ibadan: University Press. 50, 280-289
- Age, A. I. (2010). *Basic Agriculture for Universities in Nigeria*. Nigeria: Larigraphic publishers.
- Age, A. I., Obinne, C. P. O., & Demenongu, T. S. (2012). Communication for Sustainable Rural and Agricultural Development in Benue State, Nigeria. *Sustainable Agriculture Research journal*, 1(1), 118
- Achebe, N.E.E and Lucky. A. T. (2013). The Effect of Digital Divide on Information Accessibility among Undergraduate Students of Ahmadu Bello University, Zaria. *Research journal of information technology*. 5 (1), 1-10
- Aderibigbe, A. S. (1990). An Evaluation of the Efforts of Communication Pattern on the Adoption of IITA Research Findings by the Grass Root Farmers in Ayepe,



- Alabata and Ijaiyi Village in Oyo State. M.L.A. Dissertation, Department of Communication and Language Arts, University of Ibadan. 97
- Battista, J (2015). F1 Generation: definition & Offspring. Retrieved from <http://study.com/academy/lesson/f1-generation-definition-offspring-quiz.html>
- Boone, K., Meisenbach, T., and Tucker, M. (2003). *Agricultural communication: changes and challenges*. New Jersey, NJ: Wiley-Blackwell
- Bowen, S. A. (2010). An examination of applied ethics and stakeholder management on top corporate websites. *Public Relations Journal*, 4(1), 1-19.
- Brown, L. (1986). What books can do that TV can't. *School Library Journal*, 38-39
- Brown, R. D., Brown, L. A., and Danielson, J. E. (1975). Instructional treatments, presenter types, and learner characteristics as significant variables in instructional television for adults. *Journal of Educational Psychology*, 67(3), 391-404.
- Buren, E. D. (2000). *Cultural Aspects of communication for development*. Iran: IRIB Press
- Cabi (2012, July 2). MFarmer: Providing Kenya's farmers with agricultural information via mobile. Retrieved from <http://www.cabi.org/projects/project/33024>
- Chemutai, A., Wanyama, J. Rono, S.C, Komen, J, Macosore, Z, and Mutoko, C. M. (2012), *Role of print material in catalyzing dissemination of agricultural technologies in the north West Kenya*. Nairobi: KARI
- Crandall, A. (2012). *Mobile phone usage at the Kenya base of pyramid*. Nairobi. IHUB
- Communications Commission of Kenya (CCK) (2011). Quarterly Sector Statistics Report April- June 2010/2011. URL (accessed November 2011)
- Davin, D. (1976). *Woman-work: Women and the party in Revolutionary China*. Oxford: Clarendon Press

- Department of Agriculture, Forestry and fisheries, SA. (2013). Production guide. Bitter watermelon. Retrieved from <http://www.nda.agric.za/docs/Brochures%5CBITTERWATERMELON.pdf>
- Dimelu, M. U. and Anyanwu, A. C. (2005). Importance of Radio – Rural forum (Listening Group) as an Extension Strategy in Nigeria. *Proceedings of the ninth Annual National Conference of the Agricultural Extension Society of Nigeria*. 30-33.
- Ekoja, I. (2003). Farmer’s access to agricultural information in Nigeria. *Bulletin of the American society for information science and technology*, 29 (6), 21- 23
- Ekoja, I.I. (2004). Sensitising users for increased information use: the case of Nigerian farmers. *African Journal of Library, Archives and Information Science*, 14(2), 193-204.
- Ewhrudjakpor, C. (1989). *Sociological Perspective of Human Communication In: Bittner, J.K. (ED). Mass Communication. An introduction 5th ed.* Engikewood Clifts, New Jersey: Prentice Hall
- FAO. (1995). Selected indicators of Food and Agriculture Development in Asia-Pacific, 1983 – 93. *FAO RAP*, 23
- FAO (2015). Crop Water Information: Watermelon. FAO WATER. Retrieved from [http://www.fao.org/nr/water/cropinfo\\_watermelon.html](http://www.fao.org/nr/water/cropinfo_watermelon.html)
- Fielding, M. (2006). *Effective Communication in Organisations*. New Delhi: Juta & Co,(Pty) ltd)
- Franzel, S (2015). *Farmer to Farmer Extension Approaches*. Washington: Sage press
- Garba, S. A. (2014). Impact of ICT course on pre- service teachers’ acquisition of ICT literacy skills and competence in Nigeria. *International Journal of Modern Education Research*, 1(2), 37-42.

- Gautam, M., & Anderson, J, R (1999). *Reconsidering the Evidence on the Returns to T&V Extension in Kenya*. Operations Evaluations Department World Bank
- Gautam, M. (2000). *Agricultural Extension: The Kenya Experience: an Impact Evaluation*. Washington, DC: World Bank
- Kakade, O. (2013). Credibility of Radio Programmes in the Dissemination of Agricultural Information: A Case Study of Air Dharwad, Karnataka. *OSR Journal Of Humanities And Social Science*, 12 (3), 18-22
- Ghafourian, A., Nejad, G. R. H. H., & Hosseini , S. J. (2012). Identifying the Barriers of Using Information and Communication Technologies in Agriculture Sector in Iran. *World Applied Sciences Journal*, 16 (4): 485-492
- Gichimu B. M., Owuor, B. O., & Dida, M. M. (2008). Agronomic performance of three most popular commercial watermelon cultivars in Kenya as compared to one newly introduced cultivar and one local landrace grown on dystic nitisols under sub-humid tropical conditions. *ARPN Journal of Agricultural and Biological Science*, 3, 5-6
- Greenholm. L. (1975). *Radio study group compaignsin the United Republic of Tanzania*. Paris: UNESCO
- Hartz, T.K. (1997) Effects of drip irrigation scheduling on muskmelon yield and quality. *Sci. Hort.* 69,117–122.
- Horton, P., and Hunt, C. (1980). *Sociology*. Maryland, USA: Mc-Graw and Hill
- Houghton, D. (2009). *Cell Phones and Cattle: The Impact of Mobile Telephony on Agricultural Productivity in Developing Nations*. Duke University Durham, North Carolina. Honors Thesis.
- Huh Y.C., Solmaz, I., and Sari. N (2008). *Morphological characterization of Korean and Turkish watermelon germplasm*. Pretoria: Department of Agriculture, Forestry and Fisheries

- Ifukor, O. M. (2013). Channels of information acquisition and dissemination among rural dwellers. *Information journal of library and information science*, 5(10), 306-312
- Ithiel de Sola, P. (1983). *Traditional Media in Information*. New York, NY: John Wiley
- Inagaka, N. (2007). *Communicating the impact of communication for development: Recent trends in Empirical research*. Washington, DC: World bank
- Irivwieri, J.W. (2007). Information needs of illiterate female farmers in Ethiopia East local government area of Delta State. *Library Hi Tech News*, 9(10), 38-42.
- Jain, A & Dubes, R. (1988). *Algorithms for clustering data*. Michigan: Prentice hall
- Jensen, A.L., & Thysen, I. (2003). Agricultural information and decision support by SMS. *Proceedings of the EFITA 2003 Conference* (pp. 286 – 292). Hungary: Debrecen.
- John, O, O. (2013). Influence of traditions/customs and beliefs/norms on women in tree growing in Siaya County, Kenya. *Global Journal of Environmental Science and Technology*, 1(1),01-06
- Kakade, O and Kola, T. (2013). Media habits among women organic farmers in Karnataka. *International Journal of Humanities and Social Science Invention*, 2(8), 05-10
- Katz, R. L. (1955). Skills of an effective administrator. *Harvard Business Review*, 33(1), 33–42.
- Kenya info hub (2015, July, 14). *Watermelon farming in Kenya*. <http://www.kenya.info.ke/2015/07/watermelon-farming-in-kenya-2015.html>
- Kimutai, C.(2012, November, 13). *Research shows radio is king in Kenya*. Retrieved from <http://www.bizcommunity.co.ke/Article/111/19/68555.html>

- KIPPRA (2013). Kenya economic report 2013. Retrieved from <http://www.kippira.org/downloads/Kenya%20Economic%20Report%202013.pdf>
- KNBS (2010). The 2009 Kenya Population and Housing Census: Volume 1C. Kenya. Kenya National Bureau of Statistic
- Kristjanson, P. (2013). Advancing climate-smart agriculture. Retrieved from <http://ccafs.cgiar.org/research/annual-report/2013/tv-show-empowers-farmers-kenya#.VREwfrok-JU>.
- Kenya Agricultural Commodity Exchange Limited (KACE Ltd.) (2011). Retrieved from <http://www.kacekenya.co.ke>.
- Kunkel, D., and Kovaric, P. (1983). *Mental effort and learning form TV: Comparing expectations for PBS and commercial network programming*. Paper presented at the annual conference of the International Communication Association, Dallas, Tx.
- Lazarsfeld, P.F., Berelson, B. & Gaudet, H. (1944). *The people's choice: How the voter makes up his mind in a presidential campaign*. New York: Columbia University Press.
- Lindlof R., & Wurf, R., (2005). *Qualitative communication research methods* (2<sup>nd</sup> edition). London: Sage Publications
- Lucky, A. T., and Achebe, E. E. (2013). Information Communication Technology and Agricultural Information Dissemination: A Case Study of Institute of Agricultural Research (IAR) Ahmadu Bello University, Zaria, Kaduna State. *Research Journal of Information Technology*, 5(1): 11-17
- Malhan, I.V., & Rao, S. (2007). Impact of globalization and emerging information communication technologies on agricultural knowledge transfer to small farmers in India. *Proceedings of the World Library and Information Congress: the 73<sup>RD</sup> IFLA General Conference and Council*, (pp. 1 -20). South Africa: Durban.

- Masuki, K. F., Mowo, J. G., Kamugisha, R., Tanui, J., Tukahirwa, J., and Adera, E. O., (2010). Integrated information and communication technologies for farm-level access to natural resource management information: A case of South Western Uganda. Kampala: Africa Highland initiative
- Mangstl, A. (2008). Emerging issues, priorities and commitments in e-Agriculture. *Agriculture Information Worldwide*, 1(1), 5 – 6.
- McAnamy, E. (1973). *Information Center on Instructional Technology, Academy for Educational Development*. Washington: Sage press
- M-Farm (2011). Retrieved from <http://www.mfarm.co.ke>.
- Miller, G. (1956). The Magical Number Seven, Plus or Minus Two: Some Limits on our Capacity for Processing Information
- Mittal, S., and Mehar, M. (2012). How Mobile Phones Contribute to Growth of Small Farmers? Evidence from India. *Quarterly Journal of International Agriculture*, 3, 227-244
- Moemeka, A. (1994). *Communicating for Development: A New Pan-Disciplinary Perspective*. Newyork: Cambrige Universty Press.
- Mohsin, M. (1997). Impact of mass media in diffusing agricultural technologies. M. Sc. Thesis, Dept. of rural Soc., Univ. of Agri., Faisalabad.
- Mott, F. (1968). *A history of American Magazines. Volume V: 1905-1930*. London: Oxford University Press
- Muchai, K (2009). Communication Channels used in dissemination of soil fertility management practices in the Central Highlands of Kenya. Retrieved from <http://www.slideshare.net/CIALCA/kimarumuchai-communication-channels-used-in-dissemination-of-soil-fertility-management-practices-in-the-central-highlands-of-kenya>

- Mugenda, O. M. & Mugenda, A.G. (1999). *Research methods: Quantitative and qualitative approaches*. Nairobi, Kenya: Acts Press.
- Murthy, C. S. H. N. (2009). Use of convergent mobile technologies for sustainable economic transformation in the lives of small farmers in rural India. *The Turk. Online Journal. Dist. Educ*, 10 (3): 32-4
- Mwangi , J., Mbai, j., Hedlund H., & Cuellar, M. ( 2006). *The National Agriculture and Livestock Extension Programme (NALEP) Phase I Impact Assessment*. Stockholm: SIDA
- Narula, S.A., & Arora, S. (2010). Identifying stakeholders' needs and constraints in adoption of ICT services in rural areas: the case of India. *Social Responsibility Journal*, 6(2), 222 - 236.
- Nigata, T. (2012, March 06). *Qualitative data analysis*. Retrieved from <http://www.slideshare.net/tilahunigatu/qualitative-data-analysis-11895136>
- Ocholla-Ayayo, A. B. C. (1976). *Traditional Ideology and Ethics among the Southern Luo*. Uppsala: The Scandinavian Institute of African Studies.
- Odhiambo, W & Nyangito, H. (2003). *Measuring Agricultural Productivity in Kenya*. Nairobi: KIPPRA
- Ogutu, S., Okello, J., & Otieno, J. (2013). Impact of Information and Communication Technology- based Market Information Services on Smallholder Farm Input Use and Productivity: The Case of Kenya. *Selected paper prepared for presentation at the 4<sup>TH</sup> International Conference of the African Association of Agricultural Economists (ICAAAE)* , Hammamet, Tunisia , 22-25 September
- Olayide, S. O. (1990). *A Quantitative Analysis of Food Requirements, Supplies and Demand in Nigeria*. Ibadan Nigeria: Ibadan University Press

- Oliver, P. (2006). *Social research methods*. Washington, DC: Sage
- Olowu, D. (1998). Building Critical Capacities for Sustainable Development in Africa: Matters Arising. *International Journal of Technical Cooperation*, 4 (1), 1–19.
- Ombogo, G. (2015, February 10). *Bondo Farmers turn bare land into green paradise*. Retrieved from <https://sjpaderborn.wordpress.com/2015/02/12/a-successful-agriculture-project-in-kenya/>
- Otter, V., and Theuvsen, L. (2012). *ICT and farm productivity: Evidence from the Chilean agricultural export sector*. Gottingen: University of Gottingen
- Porang, P. (2015, August 31). *Census, sampling survey, sampling design and types of sample design*. Retrieved from [http://www.slideshare.net/ParvejAhmedPorag/census-sampling-survey-sampling-design-and-types-of-sample-design?qid=d3e3326a-7dd7-455a-a999-b36d0f07a12d&v=qf1&b=&from\\_search=3](http://www.slideshare.net/ParvejAhmedPorag/census-sampling-survey-sampling-design-and-types-of-sample-design?qid=d3e3326a-7dd7-455a-a999-b36d0f07a12d&v=qf1&b=&from_search=3)
- Postelnicu, M. (2014). *Two-step flow model of communication*. USA: Encyclopedia britannica
- Raman, M., and Singh, P., (2012). *Business communication*. New Delhi: Oxford University Press
- Rao, S.S. (2004). Role of ICTs in India's rural community information systems. *Info*, 6(4), 261 – 269.
- Ratnam, B.V., Krishna Reddy, P., & Reddy, G.S. (2005). eSagu: an IT based personalized agricultural extension system prototype – analysis of 51 farmers' case studies. *International Journal of Education and Development using Information and Communication Technology*, 2(1), 79-94.



- Rehman, F., Muhammad, S., Ashraf, I., & Hassan, S. (2011). Factors affecting the effectiveness of print media in the dissemination of agricultural information. *Sarhad J. Agric.* 27, 1
- Rogers, E. M., & Scott, K. L. (1997). *The Diffusion of Innovations Model and Outreach from the National Network of Libraries of Medicine to Native American Communities*. New Mexico: University of Mexico
- Roger, E. (1976). *Communication and Development: Critical Perspectives*. New Delhi. Sage publications
- Rogers, L. and Nichof, G. (2002). The communication of agricultural research to farmers in Africa. *Proceedings of the 2nd General Conference on Making Agriculture More Meaningful to Farmers*. Dakar, Senegal, March 24-28.
- Ryan, B. & Gross, N. C. (1950, January). *Acceptance and diffusion of hybrid corn seed in two Iowa communities*. Ames, Iowa: Iowa State College of Agriculture and Mechanic Arts
- Servaes, J. (2002). *Approaches to development communication*. Paris. UNESCO
- Shahzad, M., Islam, F., Umber, S., Khan, I, A., Abdal, M., and Asif Raza. M. ( ). Role of agricultural publications in disseminating agricultural information among farming community of district faisalabad. *Pak. J. Agri. Sci.*, 48(3), 221-224
- Signorelli, N., Gross, L., & Morgan, M. (1982). Charting the mainstream: television's contributions to political orientatio. *Journal of communication*, 32, 100-27
- Standard group editor. (2014, July 16). Agriculture ministry establishes insurance scheme to cushion farmers. *Standard digital*. Retrieved from <http://www.standardmedia.co.ke/procurement/article/2000128354/agriculture-ministry-establishes-insurance-scheme-to-cushion-farmers>

- Stauffer, J., Frost, R., and Rybolt, W. (1978). Literacy, illiteracy, and learning from television news. *Communication Research*, 5(2), 221-232.
- Stokes, L. C., and Pankowski, M. L. (1988). Incidental learning of aging adults via television. *Adult Education Quarterly*, 38(2), 88-99.
- Sule, A. M., Sanni A. O., Ayanda, J. O., and Olowosegun, T. (2009). Use of information and communication technology tools (ICTs) in fisheries/ aquaculture extension service delivery in Borgu local government area of Niger state, Nigeria. *Wilolud Online Journals*, 3:1-7
- Thabo, R. (2013). *Bitter waterlemon*. Pretoria: South Africa, department of Agriculture and forestry
- Tiwari, S.P. (2008). Information and communication technology initiatives for knowledge sharing in agriculture. *Indian Journal of Agricultural Sciences*, 78(9), 737 – 747.
- Tobón, S. (2010). Formation integral to competencies. Pensamiento complejo, currículum, didáctica to evaluation. Bogotá: Ecoe.
- Telg, R., and Irani, T. A. (2012). *Agricultural Communications in Action: A Hands-On Approach*. New york: Delmar Cengage learning
- UNDP, (2012). *Promoting ICT based agricultural knowledge management to increase production and productivity of smallerholder farmers in Ethiopia*. Ethiopia: UNDP
- Wanga, J. (2012, Aug 6). *New SMS service to revolutionise farming in Nyanza*. Retrieved from <http://www.businessdailyafrica.com/-SMS-service-to-revolutionise-farming-in-kenya-Nyanza-province/-/1248928/1472522/-/91b1s5/-/index.html>

Wehner T. C., and Maynard. D.N. (2003). Effectiveness of print media in the dissemination of agricultural information. *Sarhad Journal of Agriculture*, 27(1), 119

Yahaya, M.K. and Olayide, B. R. (2002). Effectiveness of contact Farmers strategy in Oyo State ADP. Administrative Lessons for Poverty Alleviation in Agricultural technology Transfer. *Proceedings of the 6<sup>th</sup> Annual National Conference of the Agricultural Extension Society of Nigeria (AESON)*, 247-253

## APPENDIX I

### QUESTIONNAIRE

The purpose of this survey is to determine the effectiveness of communication channels in watermelon production. Your feedback of this survey is extremely important to us and will be very much appreciated.

Please mark  $\times$  in the [ ] in front of the choice you have made

### SECTION

#### A: Respondent Background

Date of interview: \_\_\_\_\_ Name (Optional): \_\_\_\_\_

#### SECTION 1: DEMOGRAPHICS

1. Gender: Male [ ] Female [ ]
2. Age: (a) 16-24 [ ] (b) 25- 33 [ ] (c) 34-42 [ ] (d) 43-51 [ ] (e) 52- and above [ ]
3. Level of education:  
(a) None [ ] (b) Primary [ ] (c) Secondary [ ] (d) Tertiary [ ]
4. Size of your land in acres \_\_\_\_\_

#### SECTION B: MEDIA USE

5. **What kind of information channel do you currently use? (You can make more than one choice).**

- [ ] Television            [ ] Mobile text messages            [ ] Fellow farmer  
[ ] Radio                [ ] Newspaper                        [ ] Telephone calls  
[ ] Extension officer    [ ] Farmers magazines

[ ] Others (please specify) \_\_\_\_\_

**6. Which is your preferred channel of receiving Agricultural information? Use a scale of 1 – 5 where 1= strongly disagree and 5 = strongly agree**

	<b>Strongly disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly agree</b>
Television					
Radio					
Extension officers					
Telephone calls					
Newspapers					
Fellow farmers					
Mobile text messages					
Farmer's magazines					

**Other than the above, who or what are your main agricultural information providers?**

---

---

**7. Do you believe that the following sources give you accurate information?**

Use a scale of 1 – 5 where 1= strongly disagree and 5 = strongly agree

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Radio					
Extension workers					
Private companies					
Sales agents					
Fellow farmers					

**8. What type of Agricultural information do you require for watermelon production? (You can mark more than 1)**

- Use of fertilizers       Market prices       Use of insecticides  
 Methods of irrigation       Soil improvement  
 Financial management  
 Others (please specify) \_\_\_\_\_

**9. Which positive impacts have resulted from the information you have received from these providers? (Please tick any that apply.)**

- Increased amount of production  
 Higher quality of production  
 Early maturity  
 Lower production cost  
 Higher selling price  
 others (please specify) \_\_\_\_\_

**10. Which negative impacts have resulted from the information you have received from these providers? (Please tick any that apply.)**

- Failure of production  
 Higher cost but lower production

- Low selling price
- Complicated processes
- No follow-up process to stimulate the success
- Others (please specify)\_\_\_\_\_

**SECTION C: Challenges affecting the communication channels**

**11. a) What are the challenges encountered in accessing information by the residents of Yimbo East ward?**

	Yes	No
Poor radio signal		
Programs of radio are not interesting		
Poor television signal		
Cannot afford to buy newspapers every week.		
Information on print is too difficult to understand		
Language used to present the information		
Inability to ask questions and quickly get feed back		
Lack of money to acquire the information		
Insufficiency information with extension officers		
Lack of time to listen to agricultural information		
Incompatibility of new knowledge with people's attitude, interest and belief		

**b) List other challenges encountered in accessing information? \_\_\_\_\_**

---



---

---

---

**12. What are your opinions for improving the agricultural information dissemination?**

---

---

---

---