Opinion leadership strategies for communicating adaptive climate change information to residents of Kitui Central Constituency in Kenya

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other university

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

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DEDICATION

To my husband and best friend, Daniel, who I fondly call Second-Self, and our two lovely gifts, Precious and Prince, for the unwavering and holistic support you gave me throughout this journey. Your financial, emotional and spiritual support was overwhelming. The prayers you said for me and the many times you took over all the housework so that I could uninterruptedly focus on my studies were very rewarding. You truly are my other self, my reflection and the joy that is embedded in me forever!

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

ABBREVIATIONS AND ACRONYMS

ACCI - Adaptive Climate Change Information
ALIN - Arid Lands Information Network
ASALs - Arid and Semi-Arid Lands
ASDSP - Agricultural Sector Development Support Programme
CBO - Community Based Organization
COP - Conference of the Parties
CRED - Center for Research on Environmental Decisions
DPPS - Department of Presidential Press Service (of Kenya)
IEBC - Independent Electoral and Boundaries Commission (of Kenya)
FAO - Food and Agricultural Organization (of the United Nations)
FGD - Focus group discussion
FGDs - Focus group discussions
FFS - Farmers Field School
GoRK - Government of the Republic of Kenya
HBF - Heinrich Böll Foundation
HIV - Human Immunodeficiency Virus
ICRISAT - International Crops Research Institute for the Semi-Arid Tropics.
IEBC - Independent Electoral and Boundaries Commission
INC - Initial National Communication
IPCC - Intergovernmental Panel on Climate Change
JICA - Japan International Cooperation Agency
JKUAT - Jomo Kenyatta university of Agriculture and Technology
KARI - Kenya Agricultural Research Institute
KCC - Kitui Central Constituency
KCCWG - Kenya Climate Change Working Group
KDC - Kitui Development Centre
KeNADA - Kenya National Data Archive

KFS - Kenya Forest Service

KNBS - Kenya Bureau of Statistics

KTN - Kenya Television Network

MET - Kenya Meteorological Department

MTAC - Media Technology and Applied Communication (of JKUAT)

NCCACC - National Climate Change Activities Coordinating Committee

NCCAP - National Climate Change Action Plan

NCCRS - National Climate Change Response Strategy

NCST - National Council for Science and Technology

NEMA - National Environment Management Authority

NDMA - National Drought Management Authority Kenya

NGO - Non Governmental Organization

NRR - Non Response Rate

NTV - Nation Television Network

OL - Opinion Leader

OLs - Opinion Leaders

SALI - Sustainable Agricultural Livelihoods Innovations Project

SHG - Self Help Group

SHRD - School of Humanities and Social Sciences

SL - Sub-locations

SSA - Sub Saharan Africa

TOT - Trainer of Trainers

UON - University of Nairobi

UNDP - The United Nations Development Programme

UNFCCC - United Nations Framework Convention on Climate Change

VSF - Veterinaires Sans Frontieres

OPERATIONAL DEFINITION OF TERMS

Adaptive capacity is the ability of residents of Kitui Central Constituency to adjust to natural or human systems so as to respond successfully to actual or expected climate change, which includes adjustment to behaviour, resource and technology use in order to moderates harm or exploits beneficial opportunities (Simpson *et al*, 2008; IPCC, 2007b).

Adaptive climate change information is any processed data whose purpose is to help residents of Kitui Central Constituency to respond successfully to challenges posed by climate change.

Climate is the mean and variability of temperature, precipitation and wind over a period of time, ranging from months to millions of years (Le Treut, 2007).

Climate change refers to any alteration in climate over time, whether due to natural variability or as a result of human activity (Hegerl, 2007).

Climate change adaptation is the process whereby governments, business, and civil society aim to moderate, cope with, and benefit from the consequences of climate change in order to manage risk and reduce vulnerability (Jopp *et al.*, 2010).

Evaluation refers to appraisal or assessment of something (in this case, opinion leadership strategies) so as to measure its effectiveness.

Opinion leaders are individuals who exert a considerable amount of influence on the opinions of residents of Kitui Central Constituency about adaptation to climate change and are therefore considered an important element in the diffusion of climate change information in the community (Rogers, 2003).

Opinion leadership is to the degree to which an opinion leader is able to influence residents of Kitui Central Constituency to adapt to climate change through communication of relevant climate change information.

Opinion leadership strategies are the formal and informal ways (including interpersonal methods/channels of communication, choice of language, framing of key messages, follow up and feedback mechanisms) through and by which opinion leaders diffuse adaptive climate change information to residents of Kitui Central Constituency.

ABSTRACT

This study was conducted to appraise opinion leadership strategies being used to communicate adaptive climate change information to residents of Kitui Central Constituency (KCC) in a bid to improve their adaptive capacity so as to reduce their vulnerability to climate change. The aim of the study was to evaluate opinion leadership strategies used in communicating adaptive climate change information to residents of KCC. The study was guided by four specific objectives which included to investigate levels of knowledge among residents of KCC on adaptive climate change information that would be useful in evaluation of opinion leadership strategies, to evaluate attributes of individuals who use opinion leadership strategies to communicate adaptive climate change information, to examine ways used by opinion leaders to communicate adaptive climate change information and to determine the moderating effects of socio-cultural factors on effectiveness of the opinion leadership strategies used to communicate adaptive climate change information to residents of KCC. The study was informed by the two step flow and the diffusion of innovations theories of communication. The mixed research design was adopted. Multistage sampling technique was used to select a quantitative sample of 573 respondents that was arrived at using standard sample size calculation formulae. Purposive sampling was used to select 32 key informants for the qualitative sample. The survey method was used to collect quantitative data from four randomly sampled sub-locations of KCC and a 98.4% response rate was achieved. To collect qualitative data interviews with eight key informants were conducted and four focus group discussions comprising of 23 participants were done. Quantitative data was analyzed using descriptive statistics (mainly percentages) and inferential statistics (the chi-square goodness of fit test) with the aid of SPSS (version 20.0) and the results presented using tables and bar graphs. Qualitative data was analyzed using emerging themes and presented as narratives that were triangulated with the quantitative data. The study concluded that although many KCC residents had basic awareness that climate was changing and there was need to adapt to it they lacked comprehensive adaptive

climate change information. Secondly, residents rated opinion leaders who had been engaging them in the adaptive climate change information discourse as more effective if they were knowledgeable, gregarious, trustworthy and credible, frequent communicators, easily accessible and had communication prowess. Thirdly, although opinion leaders had managed to demystify the complex issues surrounding adaptation to climate change by providing simple, applicable and understandable adaptive climate change information through the highly rated face to face interactions they lacked in the intensity in which they engaged with their audiences. Fourthly, the study established that various socio-cultural and economic factors had moderating effects on opinion leadership strategies thus complicating the task of disseminating adaptive climate change information and the residents' ability to put the received adaptive climate change information into use. The study recommended that opinion leaders should be supported and trained by various climate change stakeholders to empower them to surmount the challenges they faced when communicating adaptive climate change information. The study will not only benefit residents of KCC but also various climate change stake holders working in Kenyan ASALs and beyond.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Communication is an integral part of human existence in the 21st century (Tanner, 2007). According to Tanner, communication is involved in every human endeavour including business, industry, medicine, agriculture, education, politics, governance and law, and is rapidly becoming more so. Although communication as dialogue and debate occurs spontaneously in any time of social change, it is communication as a deliberate intervention to affect social and economic change that holds the most interesting possibilities (Fraser & Villet, 1994). Further on, according to Fraser and Villet, an intensified exchange of ideas among all sectors of society can lead to greater involvement of people in a common cause. Therefore, it is vital to communicate deliberately and aggressively about issues and situations that change and cause notable implications on socio-economic development of people in any given society. One such issue in the world today is climate change.

Global climate change, which IPCC (2007a) has indicated that there is compelling evidence exists and will continue to occur, is a major threat facing humanity in the 21st century (Ketiem, Njunie & Wafula, 2012). Some regions of the world are more vulnerable to climate change than others (Kumssa & Jones, 2010). Africa is among the regions that are most vulnerable to climate change due to its high dependency on rain-fed agriculture and lack of adapting strategies (King'uyu, Ogallo & Anyamba, 2011). Developing countries, Arid and Semi-Arid Lands (ASALs), and the poor in society are the most vulnerable and likely to be hit hardest by climate change (Ketiem et al, 2012) due to their low adaptive capacity (KCCWG, 2013). Climate change poses a serious threat to food security of millions of communities living in the ASALs (United Nations, 2000). ICRISAT (1998) estimates that ASALs, especially within the tropics, cover most

parts of the developing nations in the world and most parts of Sub-Saharan Africa (SSA). Among other SSA countries, Kenya is highly vulnerable to climate change and is currently facing high rate of desertification processes and environmental degradation as a result of climate change (NEMA, 2013).

The largest part of Kenya, comprising of over 88% of the total territorial area, is ASALs (NEMA, 2013). About 10 million people (30% of Kenya's population) live in the ASALs and over half of these live below the poverty line (FAO, 2013). The majority of the population in Kenya's ASALs are pastoralists, supporting over 70% of the livestock in the country (NEMA, 2013), and agro-pastoralists (FAO, 2013). In the ASALs, the livestock subsector employs 90% of the people and contributes 95% of the family income (Kilavi, 2008). Sadly, Kenyan ASALs and their inhabitants have long been marginalized politically, socially and economically (FAO, 2013). Climate change has caused negative socio-economic effects across most sectors in the country and, consequentially, adaptation to climate change remains the top priority to reduce vulnerability and enhance resilience of the social and bio-physical systems, especially among the vulnerable communities and groups living in the ASALs (NEMA, 2013).

Improving development outcomes such as literacy, social networks and access to information is critical to building the country's adaptive capacity to climate change according to NCCAP (GoRK, 2012). Although most adaptation strategies aim to spread or reduce potential risks, for example by using drought tolerant seeds and diversification to non-climate dependent income sources, adaptive capacity to make informed and flexible decisions for action is becoming even more important to ensure resilience to climate change impacts (Percy, 2013). Access and use of climate change information empowers vulnerable communities to make their own calculated and climate informed decisions on livelihood and risk management choices, innovation and use of services and resources. Climate communication and information services are clearly an essential component for enabling adaptive capacity and effective adaptation (Percy, 2013).

As such, adaptive climate change information should be communicated aggressively at local levels in view of the unique characteristics and circumstances of persons living in the ASALs. Majority of adult population in ASALs of Kenya are illiterate rural folks (KCCWG, 2013). According to Fraser and Villet (1994), rural communities in developing countries are often remote and difficult to reach; they lack the infrastructures and communication systems that help one to keep abreast of developments and function effectively as informed participants. Fraser and Villet add that in these areas, the challenge is to increase the quantity and accessibility of information, ensure its exchange in appropriate ways, and elicit more information from rural people themselves in order to guide development planning. Therefore, communicating climate information, in ways that ASALs' residents can understand and apply, is a critical resource to support effective adaptation to climate change (Percy, 2013).

Effective communication occurs only if the receiver understands the exact information or idea that the sender intended to transmit (Lothian, 2004). Among factors that influence effectiveness of a communicative venture is choice of the right medium. Media can enhance or distort the intended message (Axley, 2000; Lengel & Daft, 1988). Lengel and Daft on channel richness and media suitability to communicate change say that face-to-face is the richest medium because it has the capacity for direct experience, multiple information cues, immediate feedback, and personal focus and therefore face-to-face discussions enable the assimilation of broad cues and deep, emotional understanding of the message.

Axley (2000), and Lengel and Daft (1988) argue that rich media should be used for complex and non-routine messages (climate change has its technicality and jargon). This claim is supported by Smeltzer (1991) who found that messages about change that has serious human implications could be alienating when delivered via communication channels perceived as impersonal and distant. Quirke (2000) suggests communicating change is best done face-to-face (interpersonally). One applauded interpersonal method

is opinion leadership and it has been successfully used in many circles including politics, medicine, social and business areas to influence change.

The most striking feature of opinion leaders is their unique and influential position in their system's communication structure; they are at the centre of interpersonal communication networks - interconnected individuals who are linked by patterned flows of information (Flodgren *et al.*, 2011). In a review of concepts, measures, and strategies that can be applied to opinion-leader campaigns on climate change, Nisbet and Kotcher (2009) noted that opinion leaders not only help draw the attention of others to a particular issue, product, or behavior but also, perhaps most importantly, signal how others should in turn respond or act. In his article, *The Two Step Flow of Communication*, Katz and Lazarsfeld (1955) found opinion leaders to have more influence on people's opinions, actions, and behaviors than mass media for a number of reasons. While the mass media can act as a reinforcing agent, opinion leaders have a more changing role in an individual's opinion or action. They are seen as trustworthy and non-purposive.

In a strategic attempt to engage the public in environmental issues and his nonprofit, *The Climate Project*, Al Gore used the concept of opinion leaders. Gore (the 45th Vice-President of the US, 1993-2001, and winner of Nobel Peace Prize jointly with the Intergovernmental Panel on Climate Change in 2007) found opinion leaders by recruiting individuals who were educated on environmental issues and saw themselves as influential in their community and amongst their friends and family. By using opinion leaders, Gore was able to educate and influence many Americans to take notice of climate change and change their actions (Lu, Jerath & Singh, 2011). Thus the use of opinion leaders to enhance communication of climate change to communities is a possible reality.

1.1.1 Synopsis of climate change communication in Kenya

On 30th August 1994, Kenya ratified the United Nations Framework Convention on Climate Change (UNFCCC) thereby signifying her determination to join the international community in combating the problem of climate change (NEMA, 2005). Kenya then moved to prepare its Initial National Communication (INC) and presented it to the Conference of the Parties (COP) to the UNFCCC in 2002. The INC concluded amongst other issues, major effort was required to educate, train and inform the public about climate issues in a responsible and effective way.

In further fulfilling its obligation to UNFCCC, Kenya undertook a capacity needs assessment in the area of climate change awareness in 2005. The results largely confirmed that the level of awareness of climate change in Kenya at the time was very low. With the growing concern on climate change, the Kenyan government established the National Climate Change Activities Coordinating Committee (NCCACC) and among the aims of the NCCACC is creation of public information and awareness (Ogola, 2011). Today, climate change awareness in Kenya is different from 2005 especially because various events that have raised climate awareness have occurred since then. A good example is The 12th Conference of the Parties (COP12) to the UNFCCC which was held in Nairobi, Kenya, between the 6th and 17th, November 2006. As a major international event, it received substantial local and international media coverage, both print and electronic, as hundreds of people from all corners of the globe gathered in Nairobi. This helped raise the level of awareness of many Kenyans on climate change (HBF, 2010).

However, despite all this, climate change awareness in Kenya is still quite low (HBF, 2010). Ogolla (2011) agrees to the prevailing low awareness when he observes that there is still a lack of general awareness about climate change issues in Kenya, about the existence of the UNFCCC, and about the opportunities it provides for mitigation and adaptation to climate change. Similarly, the survey undertaken during the development NCCAP in 2012 confirmed that public awareness about climate change in Kenya is very

low, confirming similar findings during the development of the NCCRS (2013-2017). NCCAP corroborates this position further by stating that even though significant climate change knowledge is currently generated by Kenyan institutions and individuals including government, research and academic institutions, civil society organisations (CSOs) and private sector companies, there is limited sharing of climate change information and knowledge. Its access and use have been inhibited by factors such as language barrier, unsuitable mode of communication, poor infrastructure, and poor repackaging of the information (KCCWG, 2013).

This low level of awareness is even worse in the ASALs of Kenya. In the published 'report on access and use of climate change information in the ASALs' of Kenya, KCCWG (2013) noted that although majority of the people across the counties were aware of the fact that something is happening to their climate, they did not righty associate it with the concept and phenomenon of climate change; and that though they were able to identify the impacts of climate change, they lacked access to climate change information.

Since climate change is a serious challenge requiring the active participation of all members of the society, the most up to date techniques for creating public awareness amongst all segments of the populace are recommended by NCCAP (GoRK, 2012). According to the NCCAP, in Kenya this requires the use of radio, mobile phones, television, internet, newspapers, group meetings and *barazas*, social media, opinion leaders, drama, songs, and skits. However, the question to answer is: which of these have successfully been used so far among residents of Kenyan ASALs and with what effect?

To start with, mainstream print and electronic media have been used to raise level of awareness of many Kenyans on climate change issues. Media coverage of the COP 15 was enormous with several mainstream Kenyan media houses such as the Citizen, NTV,

and KTN being present at the COP, to relay proceedings of the events to Kenya on a daily basis (HBF, 2010). In Mbeere, radio and mobile phones have been used to communicate useful climate change information to farmers (Njuki, 2013). In a more expansive initiative, radio has been used to disseminate climate adaptive climate change information to local communities (Shaka, 2013). Shaka illustrates this through RANET (Radio Internet), a pilot project run by local steering committees with guidance provided by a team from the Kenya Meteorological Department (KMD), which has been used to deliver specialized climate change information. Four stations have been established in Suswa, Kangema, Budalangi and Kwale while two others are in development in Isiolo and Baringo (Shaka, 2013).

Mainstream newspapers have from time to time, written articles on climate change. A search on the online Daily Nation (www. nation.co.ke) for climate change articles, for instance, returns 1984 articles between 1st January and 13th November 2013. Generally, media coverage of climate change in Kenya has been on a positive rise. However, the number of ASALs' residents who can afford newspapers or TV sets remains low due to prevailing high poverty levels. Additionally, there are some magazines that specialize on climate change reporting especially among CSOs. A good example that is noted in NCCAP (GoRK, 2012) is the Arid Lands Information Network (ALIN) which publishes *Joto Afrika*, a quarterly magazine that carries climate change research briefings by African scientists launched in 2011. Climate Network Africa (CNA) produces: *Impact - The CNA Newsletter*. The Kenya Meteorological Society (KMS) produces a monthly public awareness newsletter titled *"The Weatherman"* which focuses on current climate events (NEMA, 2013). However, the number of ASALs' residents who can access or have literacy skills to benefit from these publications remains limited.

According to Mwesigwa and Omukuti (2013) involvement of agricultural and livestock field extension officers ensures access and interpretation of climate information in Kenyan ASALs and proper interpretation, packaging, timely dissemination and use

translates into increased agricultural yields improved food security and therefore sustainable livelihoods. In Garissa County, community leaders such as chiefs and district livestock production officers have been used to pass essential climate change information (Nderitu, 2013). This is notably a case of use of opinion leaders to deliver climate change information in an ASAL. But the underlying question is how successfully have opinion leaders been used to communicate climate change information in ASALs of Kenya?

KCCWG (2013), did a research in Wajir, Kajiado, Kitui and Turkana ASALs counties and reported that information similar to climate change such as on environmental management, methods of farming, animal husbandry and livelihood diversification was dispensed by community leaders, religious leaders, government and NGO officials in their line of duty but they either did not come out clear or they did not engage the community specifically on climate change. As such, the information that trickled down was inadequate, shallow and almost confusing. The researchers concluded that these communities had information which they could use to improve their livelihoods but various factors hindered its effective access and use.

1.2 Statement of the problem

Climate change is a global challenge and threat especially to persons living in Kenyan ASALs because of their high dependency on climate-sensitive natural resources and high poverty rates (Ketiem et al, 2012). Although the Kenya government under Vision 2030 recognizes the potential of ASALs as an important driver for economic growth (Kitiem *et al*, 2012), residents of ASALs are among the most vulnerable to climate change (Kilavi, 2008) because of the status of adaptive capacity of the people and institutions (GoRK, 2012). Therefore, farmers and pastoralists, as well as policy makers, development and humanitarian programmes are searching for the best ways to adapt to the impacts of climate change (Percy, 2013). According to the NCCAP (GoRK, 2012), improving development outcomes such as social networks and access to information

services is critical to building adaptive capacity. To ensure access to climate change information, communication plays a key role (KCCWG, 2013). However, according to KCCWG, lack of proper mechanisms of communicating has led to inadequate climate change adaptation.

As such various governmental and non-governmental initiatives as well as various national mass media outlets have been made to enhance communication of adaptive climate change information. However, public awareness on this critical phenomenon has remained low over the years (NEMA, 2005; HBF, 2010; GoRK, 2012; Ogolla, 2011; KCCWG, 2013) as prevalent impediments have continued to hinder effective communication of climate change information to grassroots communities (KCCWG, 2013). The ASALs populace which remain marginalized socially, economically and politically (FAO, 2013) have hardly been reached and adaptive climate change information is scanty or totally absent at community level in ASALs of Kenya (KCCWG, 2013). Consequentially, alternative methods including use of local opinion leaders have been used in a bid to improve communication of the essential adaptive climate change information (KCCWG, 2013; Nderitu, 2013; Shaka, 2013). This is because the way in the way in which adaptive climate change information is communicated needs to be understandable, accessible and acceptable to the end users (Nderitu & Amyaga, 2013). Effective opinion leadership, an interpersonal and rich media, is expected to achieve this (Lu *et al.*, 2011; Nisbet & Kotcher, 2009).

However, in spite of use opinion leadership strategies, awareness levels and adaptive capacity to climate change are still low among residents of Kenyan ASALs (KCCWG, 2013). The efforts of the opinion leaders are fragmented and disjointed and they do not come out clear on the subject of climate change and a monitoring and evaluation component is recommended (KCCWG, 2013). Nisbet and Kotcher (2009) recommend regular monitoring and evaluation of the processes in climate change opinion leadership campaigns. In spite of these recommendations, no study has yet been done to specifically

scrutinize the climate change opinion leadership strategies in use in Kenyan ASALs. Hence, the need for this study which was conducted to assess the opinion leadership strategies used to communicate adaptive climate change information to residents of Kenyan ASALs in a bid to establish what needs to be done better for improved outcome. To enable effective appraisal, the study was narrowed down to Kitui Central Constituency of Kitui County which is one of the ASALs constituencies in Kenya.

1.3 Objectives of the study

The study was guided by a general objective and four specific objectives as stipulated in sections 1.3.1 and 1.3.2 that follow.

1.3.1 General objective

To evaluate opinion leadership strategies used in communicating adaptive climate change information to residents of Kitui Central Constituency.

1.3.2 Specific objectives

The specific objectives of the study were:

1. To investigate the levels of knowledge on adaptive climate change information among residents of Kitui Central Constituency that will be useful in evaluation of opinion leadership strategies.
2. To evaluate attributes of individuals who use opinion leadership strategies to communicate adaptive climate change information to residents of Kitui Central Constituency.
3. To examine ways in which opinion leaders communicate adaptive climate change information to residents of Kitui Central Constituency.
4. To determine the moderating effects of socio-cultural factors on effectiveness of opinion leadership strategies used in communicating adaptive climate change information to residents of Kitui Central Constituency.

1.4 Research questions

From the above objectives, the study sought to answer the following questions:

1. What are the levels of knowledge on adaptive climate change information among residents of Kitui Central Constituency that would be useful in evaluating opinion leadership strategies?
2. What are the attributes of individuals who use opinion leadership strategies to communicate adaptive climate change information to residents of Kitui Central Constituency?
3. How do opinion leaders communicate adaptive climate change information to residents of Kitui Central Constituency?
4. Do socio-cultural factors moderate effectiveness of opinion leadership strategies used in communicating adaptive climate change information to residents of Kitui Central Constituency?

1.5 Hypotheses

From the second, third and fourth objectives, the study sought to test the following hypotheses:

1. Ho1: There is no significant difference in effectiveness of the opinion leaders who possess highly rated attributes and those who do not in communicating adaptive climate change information to residents of Kitui Central Constituency.
2. Ho2: There is no significant effect of the highly rated opinion leadership strategies on effectiveness of communicating adaptive climate change information to residents of Kitui Central Constituency.
3. Ho3: There is no significant effect of socio-cultural factors on the effectiveness of the highly rated opinion leadership strategies used in communicating adaptive climate change information to residents of Kitui Central Constituency.

1.6 Justification of the study

Historically, adaptation to climate change has received less attention than mitigation mainly because prevention is seen as better than a cure and the effects of mitigation are more measurable than adaptation (Munyiri, 2015). However, currently, adaptation is seen as necessary and complementary to mitigation efforts (Jopp, DeLacy, & Mair, 2010). According to Jopp et al., it is the principal way to deal with the unavoidable consequences of climate bearing in mind that delayed response to climate change issues may lead to higher costs in the future or even irreversible damage. Unlike mitigation efforts, where the benefits are felt globally, adaptation primarily benefits local communities, such as residents of Kitui Central, through targeted responses to local or regional climate change issues (Munyiri, 2015).

In view of this, access to information on climate change is a very powerful tool that can be used to enhance adaptation strategies by households in Kenyan ASALs where more than 30% of the country's population live and support over 70% of the livestock in the country (NEMA, 2013) which is worth US$800 million per year (USAID, 2012). ASALs farmers and pastoralists such as those living in Kitui are searching for the best ways to adapt to climate change and towards this end access to information services is critical. However, very few ASALs in Kenya to date receive radio and television coverage and although there are newspapers and magazines that report climate change, the number of ASALs' residents who can afford or have literacy skills to benefit from these publications remains limited. They therefore need a more accessible communication tool that disseminates understandable adaptive climate change information to them. Opinion leadership comes in handy here. However, efforts of many climate change opinion leaders working in ASALs of Kenya have not been as effective as they should be (KCCWG, 2013). There is therefore need to evaluate the opinion leadership strategies in use so as to establish what needs to be done differently for more productive outcome. Hence, the need for this study cannot be underscored.

1.7 Significance of the study

The study could benefit the Kenya Government to meet its obligation to UNFCCC to which it is party. The importance of climate change awareness is enshrined in Article 6 of the UNFCCC, which calls upon its parties to, among other things, develop and implement educational and public awareness programmes on climate change and its effects (HBF, 2010). Also, policy makers, development and humanitarian workers, as well as farmers and pastoralists of Kitui Central Constituency have a well evaluated communicative tool (opinion leadership) at their disposal which they can then use in more effective ways to enhance their adaptive capacity to climate change. In the long run there will be improved development outcomes in Kitui Central Constituency resulting from better social networks and improved access to and use of adaptive climate change information and services.

In addition, successful adoption of the findings, conclusions and recommendations of this study by Kitui Central Constituency can form a model that can be copied by other ASALs constituencies in Kenya in a bid to increase their climate change adaptive capacities. In so doing, due to the already evident climate change vulnerability among Kenyans living in ASALs, strategic communicative intervention through effective opinion leadership strategies will enhance their adaptive capacity so that they can take advantage of opportunities or reduce risks associated with climate change. At the end there will be increased sharing of climate change information and knowledge across government, private sector, civil society organizations (CSOs), development partners, academic and research institutions and individual researchers as well as the ordinary folk living in some of the most vulnerable areas to climate change in Kenya.

1.8 Scope of the study

The scope of this research is delimited geographically to Kitui Central Constituency of Kitui County in Kenya. This geographical zone was chosen from among other ASALs because Kitui's residents are agro-pastoralists and therefore its choice helped gather data

that related to both agriculturalists and pastoralists, the two main climate-based economic activities in Kenyan ASALs. Kitui Central as opposed to the other seven constituencies of the County was chosen because of its ease of accessibility to the researcher. Further delimitation was that only four (Kaveta, Mutune, Wii and Wikililye) out of twenty-eight sub-locations from two (Kyangwithya East and Mulango) of the five Wards of the Constituency were studied. Information was therefore collected from residents and climate change stakeholders found within these geographical boundaries only. However, key informant interviews with senior officials drawn from government institutions and national NGOs provided a wider view to the issues under appraisal.

Also, the scope of the study was delimited by the type of information it sought to investigate. In this regard, the mixed research methodology was used to study communication of adaptive climate change information. Issues to do with communication for mitigation of climate change, which is another broad area of climate change communication, were not focused on. In addition, the study evaluated opinion leadership strategies used to communicate adaptive climate change information. It ignored other communication methods and channels such as broadcast and print media which have also been used to enhance dissemination of this information to residents of Kenyan ASALs. Evaluation of opinion leadership strategies this was given priority because it generated results for improvement of interpersonal communication methods which are regarded as rich media in cascading complex and non-routine messages such as is characteristic of climate change (Axley, 2000; Lengel & Daft, 1988; Quirke, 2000). Theoretically, the study was narrowed down to the propositions of the two step flow and the diffusion of innovations theories of communication.

1.9 Limitations of the study

First, since the study focused on a single communication method (opinion leadership) it generated limited data towards improvement of communication for climate adaptation among Kenyan ASALs' residents. Ordinarily, communication happens via multiple

channels and therefore future evaluation of other climate change communication media should be done so as to give a holistic picture on the best ways to enhance adaptive capacity of the ASALs' residents to climate change through increased accessibility to information. Secondly, the study findings were limited since data was collected only from Kitui Central Constituency and the factors that are at play in this ASAL may not be similar to those in other ASALs. Involvement of more ASALs could have resulted in a more comprehensive research output but this was not possible due to technical complexity. Thirdly, there was also literature review limitation because there were very few empirical studies done in the area of communicating climate change information among Kenyan ASALs. Therefore the study borrowed heavily from other countries, some which were at different development levels, so as to add scholarly thoughts to the limited local studies.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Basically, this chapter reviews literature that is related to application of opinion leadership strategies in communicating adaptive climate change information. Theoretical review was done, conceptual framework given, critique of existing and relevant empirical literature done, followed by identification of research gaps so as to justify the need for the study.

2.2 Theoretical review

The Two Step Flow and Diffusion of Innovation theories of communication support the role of opinion leadership in enhancing diffusion and adoption of innovative communication. In March 2014, President Kenyatta remarked that climate change is a reality whose pernicious effects can no longer be ignored in Africa (Njagi & DPPS, 2014). It is indeed a scientific innovation that affects not only Africa but the entire world so significantly that it calls for intense strategic public sensitization.

2.2.1 The two-step flow theory

The two-step flow of communication hypothesis was first introduced by Paul Lazarsfeld, Bernard Berelson, and Hazel Gaudet in *The People's Choice,* a 1944 study focused on the process of decision-making during the American Presidential election campaign. The researchers discovered that informal personal contacts were mentioned far more frequently than exposure to radio or newspaper as sources of influence on voting behavior (Lowery & DeFleur, 1995). Armed with this data, Katz and Lazarsfeld (1955) developed the two-step flow theory.

This theory asserts that information from the media moves in two distinct stages. First, individuals [opinion leaders] who pay close attention to the mass media and its messages receive the information. Opinion leaders pass on their own interpretations in addition to the actual media content. In so doing, opinion leaders are quite influential in getting people to change their attitudes and behaviors and their personal influence seems more important in decision making than media (Flynn, Goldsmith & Eastman, 2001).

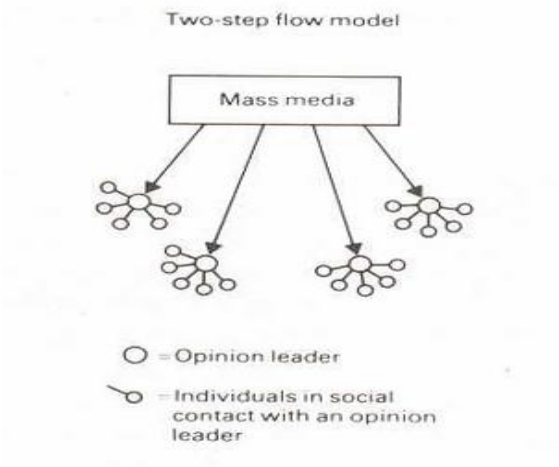


Figure 2.1: Katz & Lazarsfeld (1955) Model of Two Step Flow Theory
Source: http://www.utwente.nl

Brosius and Weimann (1996) explain one of the benefits of the two step flow theory as reemphasizing the role of the group and interpersonal contacts. The idea remains that the most efficient media is word-of-mouth, and it is by reaching the influentials with other forms of media that this word-of-mouth is generated (Griswold, 2007). Lengel and Daft (1988) analyze channel richness and suitability to communicate change as follows:

> Face-to-face is the richest medium because it has the capacity for direct experience, multiple information cues, immediate feedback, and personal focus. Face-to-face discussions enable the assimilation of broad cues and deep, emotional understanding of the message. Telephone conversations

> and interactive electronic media provide rapid feedback, but lack the element of 'being there'. Eye contact, gaze, blush, head nods, posture and other body language cues are eliminated. Electronic media therefore fall short of the richness of face-to-face communication. Written media that are addressed, such as memos, notes, and reports, can be personally focused, but they convey limited cues and are slow in feedback. Impersonal written media (including fliers, bulletins, and standard computer reports) are the leanest, providing no personal cues, and not enabling feedback (Lengel & Daft, 1988: 226).

Fraser and Villet (1994) support this claim when they argue that:

> Much more is now known about the interpersonal communication skills development field workers need in order to function more effectively as agents of change with rural people. These skills include the use of techniques such as focus group discussions, illustrated discussion tools such as flipcharts that have been pretested to be effective for rural viewers, and other media such as video and audiovisuals that can be used to share ideas and cause reflection, or as part of a training methodology involving presentation, discussion and practice. Interpersonal communication skills can improve activities at all levels, enhancing management, teamwork and the morale of personnel (Fraser & Villet, 1994:2).

The two step flow of communication has remained relevant over the years. In Kitui County, the empirical study by KCCWG (2013) revealed high access of climate change information from interpersonal communication with up to 32.4 % preference by locals to get climate change information through community barazas and another 19.9% through workshops. From the same study, certain residents confirmed positive influence by agricultural officers to move from planting drought sensitive to drought resistant crops

so as to cope with climatic change. They were happy with the yields, and they shared information with others (peer to peer influence). This illustrates what Puri (2011) meant by saying that information can reach a member of audience directly or through reaching a second hand, third hand or even fourth hand. It is the interest of this study to find out whether opinion leaders of Kitui Central Constituency have effectively used opinion leadership strategies to influence residents' adaptive capacity to climate change.

2.2.2 Diffusion of innovations theory

Diffusion of innovations theory predicts that media as well as interpersonal contacts provide information and influence, as well as opinion and judgment. It focuses on the conditions which increase or decrease the likelihood that a new product, idea or practice will be adopted by members of a given society or culture. In this study, it will be critical to investigate factors which influence adoption of adaptive climate change information by residents of Kitui Central Constituency.

The idea of diffusion was first broadly introduced in 1962 by Everett Rogers (Orr, 2003). Rogers (1962) differentiates adoption from diffusion: whereas the diffusion process occurs within society as a group process, the adoption process appertains to an individual; and whereas the diffusion process refers to the spread of a new idea from its source of invention or creation to its ultimate users or adopters, the adoption process refers to the mental process through which an individual passes from first hearing about an innovation to final adoption. Rogers identified four areas of diffusion and adoption of innovation as significant: the adoption process, the rate of adoption of innovations, adopter categories and opinion leadership.

Though mass media has a very powerful effect on diffusion by spreading knowledge of innovations to a large audience rapidly, it is strong interpersonal ties that are usually more effective in the formation and change of strongly held attitudes (Orr, 2003). Orr asserts that opinion leaders are more trusted channels and they have greater effectiveness

in dealing with resistance or apathy on the part of the recipient. He further says that persuading opinion leaders is the easiest way to foment positive attitudes toward an innovation (Orr, 2003). Based on this premise, this study will evaluate how effective opinion leaders have been in fomenting positive climate change adaptive attitudes and behavior among residents of Kitui Central Constituency.

Rogers (2003) explains that the types of opinion leaders that change agents should target depend on the nature of the social system which can be characterized as heterophilous or homophilous. He distinguishes the two. Homophilous social systems tend toward system norms. Most interaction within them is between people from similar backgrounds. People and ideas that differ from the norm are seen as strange and undesirable. These systems have opinion leadership that is not very innovative because the systems are averse to innovation. Heterophilous social systems tend to encourage change from system norms. In them, there is more interaction between people from different backgrounds, indicating a greater interest in being exposed to new ideas. These systems have opinion leadership that is more innovative because these systems are desirous of innovation. Here, change agents can concentrate on targeting the most elite and innovative opinion leaders and the innovation will trickle-down to non-elites with enthusiasm rather than resistance.

In a modern social system, opinion leaders are innovative (Le Anh Tuan, Dzung & Palis, 2010). However, in traditional social systems, opinion leaders may be indicative of traditional behavior and norms - adhering to local values and practices - and are, in some cases, even strongly against change or external influence. This is due to the fact that opinion leaders are vested with leadership authority by group members, and in order to maintain this position, the individual has to reflect underlying norms and values for that area of consumption leadership (Loudon & Britta, 1979). When opinion leaders exhibit a level of change that is no longer a tradition in that social system, they may be at risk of losing credibility and influence on their former followers (Le Anh Tuan *et al.,* 2010).

Therefore, successful efforts to diffuse an innovation depend on characteristics of the situation. Despite the continuous exposure to hardship and distress, ASALs communities maintain a strong social system of resource sharing, borrowing, lending and gifting (UNDP, 2007). Most of the ASALs population is organized into extended families and clans, which provide important support during times of hardship (UNDP, 2007). As such, applying the concept of diffusion of innovations theory in disseminating adaptive climate information through opinion leadership strategies should have strong support from the already established social systems. However, it is vital to investigate whether the social systems are averse or appreciative of innovations and how this impacts on opinion leaders' efforts to disseminate adaptive climate change information.

Innovations are more likely to gain popularity within a social system when opinion leaders are supportive; conversely, opinion leaders can hinder the diffusion of innovations they perceive negatively (Rogers, 2003). According to Rodgers, opinion leaders act as a source of social pressure toward a particular choice and as a source of social support to reinforce a choice once it has been made. In particular situations, Rodgers suggests that there is a reasonable chance that, given concerted effort, support for these valuable products and ideas may be pushed to the tipping point especially for heterophilous social systems. As such, support for opinion leaders is critical for promoting change.

2.3 Conceptual framework

In view of the propositions of the two step flow and the diffusion of innovations theories, it was possible to identify and operationalize the variables for evaluating opinion leadership strategies used to communicate adaptive climate change information to residents of Kitui Central Constituency. These were then used to propose relationships and were represented as the conceptual framework (Figure 2.2) for the study which formed a context for interpreting and explaining the study findings.

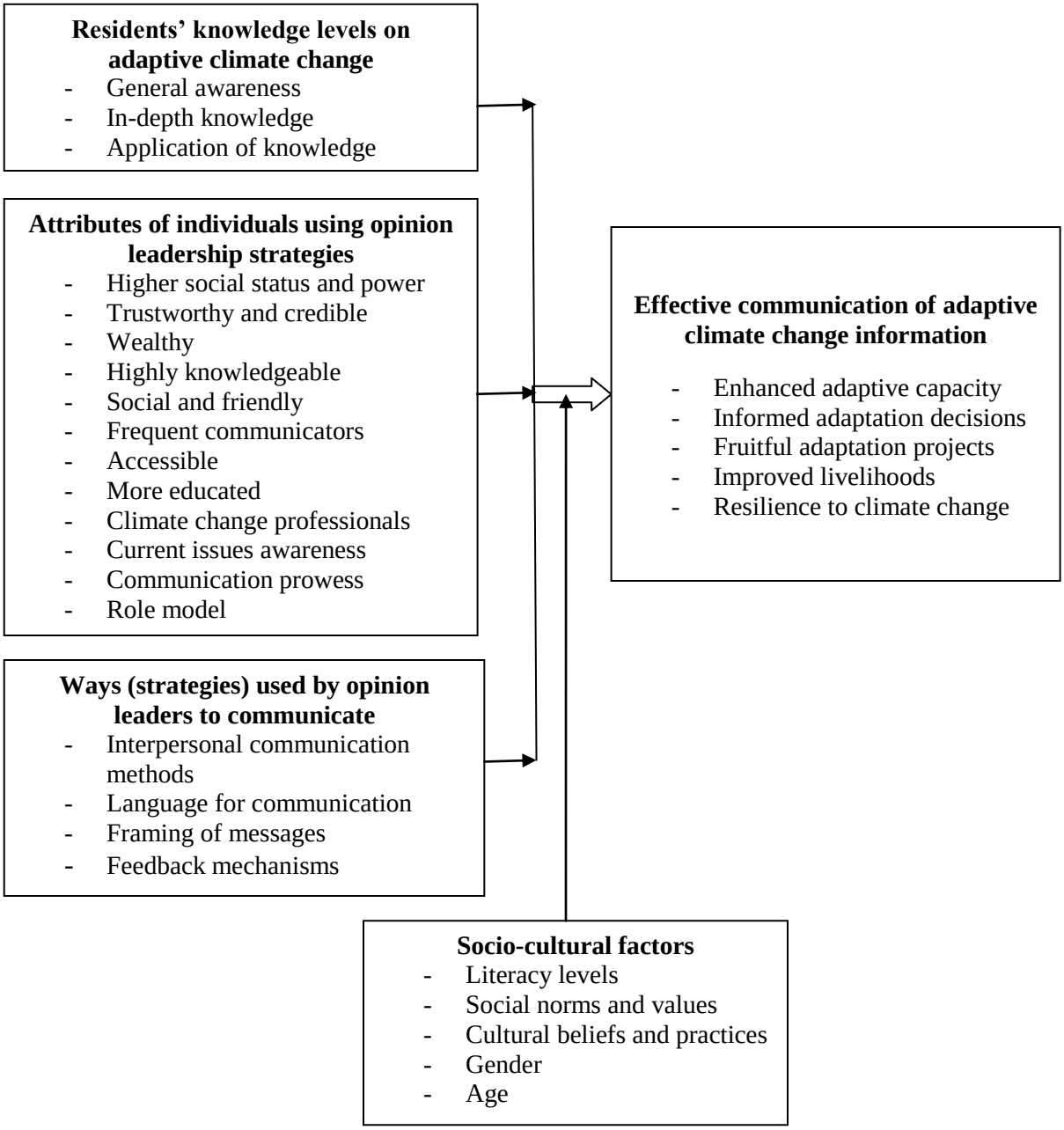


Figure 2.2: Conceptual Framework

From the conceptual framework there were three independent variables for the study (residents' knowledge levels on adaptive climate change information, attributes of individuals who communicate using opinion leadership strategies, and strategies used by opinion leaders to communicate), one moderating variable (the socio-cultural factors) and one dependent variable (effective communication of adaptive climate change information). Therefore, it is the residents' knowledge levels on adaptive climate change, attributes of individuals who use opinion leadership strategies to communicate, the opinion leadership strategies they use in view of any moderating factors that influence effectiveness of communication of adaptive climate change information to residents of Kitui Central Constituency. Scholarly views on each of these variables were explored before undertaking the study as discussed in sections 2.3.1 to 2.3.5 that follow.

2.3.1 Knowledge levels on adaptive climate change information in Kenyan ASALs

Access to information on climate change characteristics is a very powerful tool that can be used to enhance the adoption and implementation of adaptation strategies by households in SSA (Antwi-Agyei, Dougill & Stringer, 2013). This is particularly important for Africa considering that most farming systems in SSA depend on rain-fed agricultural systems and as such lack of appropriate climate information is critical for food security (Antwi-Agyei *et al.,* 2013). Successful implementation of climate adaptation strategies requires that residents do not only have sufficient knowledge about the available options, but also have adequate capability to assess the available options so as to make informed decisions on the best adaptation strategies (Lee, 2007).

However, sadly, there have been information barriers to successful implementation of adaptation practices in SSA (Antwi-Agyei *et al.*, 2013). For instance, drought preparedness involves the development of emergency plan and early warning systems that have the capacity to provide real-time climate information to aid decision making on drought (Boyd *et al.,* 2013) at affordable and understandable means to local communities. However, when such climate information is provided, it usually comes in

the form of seasonal forecasts that may not be useful in long-term planning of agricultural activities (Ziervogel, Johnston, Matthew & Mukheibir, 2010) or in forms that ordinary residents cannot access.

The lack of appropriate information on climate change characteristics could be related to the lack of adequate and state-of-the art equipment at meteorological departments across this region (Antwi-Agyei *et al*., 2013). Many of the weather stations are ill-equipped to produce real-time scale climate information for adaptation. This prevents the timely prediction and forecast of the rainfall pattern to enable farmers to make informed decisions. Farmers in SSA therefore, according to Antwi-Agyei *et al*., 2013, tend to use their indigenous and agro-ecological knowledge, based on the past experience, to form complex mental models of the climate with which they forecast the weather.

In Kenya, although research, workshops, conferences and other engagements by various governmental and non-governmental bodies from all over the world have resulted into a pool of invaluable information on the subject of climate change, such information is either consolidated or scattered at various levels of its management with evident challenges to its access by relevant stakeholders (GoRK, 2012). An opinion poll carried out between 2007 and 2008 by the Gallup, reveals that over 44% of Kenyans have no knowledge of climate change (HBF, 2010). Sadly, a majority of this group are poor rural people who depend on climate sensitive economic sectors such as pastoralism and agriculture for their sustenance (HBF, 2010; UNDP, 2007). Yet, access and use of climate change information empowers vulnerable communities to make their own calculated and climate informed decisions on livelihood and risk management choices (Percy, 2013).

Research in Wajir, Kajiado, Kitui and Turkana ASALs counties by KCCWG (2013) reports that information similar to climate change dispensed by community leaders, religious leaders, government and NGO officials in their line of duty is inadequate,

shallow and almost confusing. The researchers conclude that it was not specifically packaged as climate change information. Extension workers, for instance, confirmed that they did not package information as climate change information but as agriculture information which they then disseminated during farmer field days. Likewise, KCCWG noted that, information on livestock management, disseminated by livestock officers and NGOs like VSF Belgium and VSF Germany, was not given out specifically as climate change information.

Very few ASALs in Kenya to date receive radio and television coverage even after the recent liberalization of the airwaves (UNDP, 2010). To worsen this infrastructural handicap, like many other publics, residents of ASALs are increasingly distrustful of both news and advertising from mass media, preferring instead recommendations from friends, family, coworkers, and peers (Keller & Berry, 2003). This is an open embrace of opinion leadership communicative interventions. However, using opinion leadership strategies to resolve the low awareness levels on climate change among residents of Kenyan ASALs means not only defining or framing the complexities of the issue in a way that connects to the specific core values of various publics, but also reaching these audiences with carefully crafted messages (Nisbet & Kotcher, 2009) so that there is change of knowledge capacity that is currently there.

2.3.2 Attributes of effective opinion leaders for climate change information

Motivated by the seminal work by Katz and Lazarsfeld (1955), researchers have contributed to the understanding of opinion leaders by systematically analyzing the process of how individuals emerge as opinion leaders in a community (Watts & Dodds, 2007), how they facilitate the diffusion of information by their influence on the opinions of others (Iyengar *et al.,* 2011; Van den Bulte & Joshi, 2007), the characteristics of these individuals (Myers & Robertson, 1972), and how to identify them, often with the aim of marketing products through them (Valente *et al.,* 2003; Vernette 2004). To evaluate opinion leadership strategies used to communicate adaptive climate change information,

it was deemed of paramount importance to examine the attributes of opinion leaders at work in Kitui Central Constituency. This is because, for effective opinion leadership campaigns, it is important to first recruit individuals in a social system that can make effective opinion leaders (Nisbet, 2009). This recruitment should be based on desired characteristics of such personalities.

Across categories of opinion leaders, there are important shared traits and behaviors that can be divided into a few dimensions (Katz, 1957): *Who one is* - certain personality characteristics or values held by the individual; *What one knows* - the degree of knowledge and expertise that one has about a particular issue or product; and *Whom one knows* - the number of contacts one has as part of their circle of friends and acquaintances. Opinion leadership is not a general characteristic of a person but rather limited to specific issues. Individuals who act as opinion leaders on one issue may not be considered influentials in regard to other issues (Valente, 2003).

A later study directed by Katz and Lazarsfeld (1957) revealed that opinion leaders seem evenly distributed among the social, economical, and educational levels within their community, but very similar in these areas to those they influence. Loudon and Britta (1979) corroborate this when they say that opinion leaders have approximately the same social-class position as non-leaders, although they may have higher social status within the class. Typically the opinion leader is held in high esteem by those who accept his or her opinions. Consequentially, opinion leaders seek the acceptance of others and are motivated to enhance other people's social status. Since they provide advice and information to other people, they have to maintain a high level of credibility. However, opinion leaders do not necessarily hold formal positions of power or prestige in communities but rather serve as the connective communication tissue that alert their peers to what matters among political events, social issues, and consumer choices (Nisbet & Kotcher, 2009; Vaneck, Jager & Leefalang, 2011). Instead, influentials are better educated and more affluent than the average person and it is their interest and

belief that they can make a difference in the world around them that makes them influential (Nisbet & Kotcher, 2009). They are individuals who pay close attention to an issue, frequently discuss the issue, and consider themselves more persuasive in convincing others to adopt an opinion or course of action.

When compared to their peers, opinion leaders tend to be more exposed to all forms of external communication (Flodgren *et al.,* 2011). Opinion leadership is usually done by an active media user and who interprets the meaning of media content for lower-end media users. As such, media messages are particularly targeted at those people who will credibly repeat them at others. These social leaders, once infected with enthusiasm, will not only become valuable advocates, but will also be listened to by their own large constituency. This two-step process effectively bounces the message off the opinion leader into the mind of the actual targets. Additionally, according to Flodgren *et al.*, opinion leaders are people who are seen as likeable, trustworthy and influential. The Social Learning Theory hypothesizes that individuals perceived as credible, likeable and trustworthy are likely to be persuasive agents of behavioural change.

Campbell (2011) establishes that for effective communication of climate change messages trust of the communicator matters and in this regard family, friends and religious leaders are given higher trust as sources of information by the public than scientists. According to Campbell, this strong trust allows opportunities for appropriate messages to be disseminated if such networks are well used and although one cannot use family and social networks where issues confront large and diverse populations, it is important to proactively develop many lines of communication for key messages using social networks whose interests do not directly conflict with getting the climate change message across. They hold a unique and influential position in their system's communication structure; they are at the centre of interpersonal communication networks (Flodgren *et al.,* 2011). Opinion leaders are more gregarious than nonleaders (Loudon & Britta, 1979). Individuals with strong personality traits of confidence,

leadership, and persuasiveness are found to be socially connected to a greater number of other community members and therefore more likely to influence the opinions of others (Weimann, 1994).

Opinion leaders with any of these desirable characteristics can be selected using any of the known and tested methods. Rogers (1995) approves four: the observation, self designating, informant method and sociometric methods whereas Valente (2007) acknowledges ten methods namely the: celebrities, self-selection, self-identification, staff selection, positional approach, judges' ratings, expert identification, snowball method, sample sociometric and sociometric methods. The observation method employs an independent observer to identify opinion leaders amongst a group of professionals interacting with one another in a work context. The informant method relies on asking individuals to identify those individuals who act as principle sources of influence. Via a standardized, self-reported questionnaire, the sociometric method asks members of a network to judge individuals according to the extent to which they are educational, influential, knowledgeable and humanistic. The self-designating method requires that members of a professional network report their own perceptions of their role as an opinion leader. Analyses of impacts of usage of some of these methods have been done by Nisbet and Kotcher (2009) who concluded that although self-designated survey scales are perhaps the least expensive and the easiest way for organizations to identify opinion leaders, their shortcoming is that respondents may overestimate or underestimate the actual degree of influence they have in their communication network.

When assessing the effectiveness of the use of local opinion leaders in improving professional practice and patient outcomes, Flodgren *et al* (2011) searched scientific literature for 18 randomized controlled trials involving more than 296 hospitals and 318 primary care practices and found out that in a majority of studies the sociometric method was used to identify opinion leaders while two studies used the informant method. Due to this disparity, they could not conclude whether the method of identification had any

impact on the effectiveness of interventions. As such, methods used to select opinion leaders have not been consistent across studies and different methods result in different individuals being identified as opinion leaders and therefore the question of whether any one method is more likely to identify opinion leaders that are more effective in promoting knowledge transfer remains open to empirical assessment (Flodgren *et al.*, 2011). Ideally, it is best to use a combination of methods in order to effectively capture a valid sample of the opinion leaders within a particular communication context or targeted population (Nisbet & Kotcher, 2009).

2.3.3 Strategies used by opinion leaders to communicate climate change messages

In climate change opinion leadership campaigns, identification and recruitment are just the first stages of organizing (Nisbet & Kotcher, 2009). Crafting suitable strategies of influencing change form the core of the campaign. These strategies range from methods of message development, framing and packaging; choice of channels and methods that opinion leaders will use to disseminate information; education, training, and support of opinion leaders by key stakeholders; to regular monitoring and evaluation of the processes in use.

For effectiveness, messages need to be tailored to core ideas and values that resonate with the social background of the opinion leader. Moreover, the opinion leader needs to be trained in how to deliver these messages to their social network. This includes introducing opinion leaders to the research that went in to designing the message along with extensive role playing for how that message might be delivered across contacts. In particular, when possible, carefully framed messages should be matched to an opinion leader's demographic using micro-targeting data, cluster analysis, or other market segmentation techniques (Nisbet & Kotcher, 2009). In Kitui County, according to the KCCWG (2013) report, projects by network partners on the ground address adaptation to climate change impacts but the implementers do not quite relate the activities to climate change when communicating to residents.

For many residents of the Kitui Central Constituency, a complex issue such as climate change can be the ultimate ambiguous threat; meaning that depending on how the problem is framed the public will pay more attention to certain dimensions or considerations of climate change over others. These framed messages can lead to very specific attributions about the nature and personal relevance of climate change, who or what might be responsible for the problem, and what should be done in terms of policy, political activity, or personal behavior (Nisbet, 2009; Nisbet & Mooney, 2007; Nisbet & Scheufele, 2007). According to Jones (2010), the key to success in opinion leader campaigns is in the ability to keep things simple and flexible. In this context, 'simple' means two things; firstly, having a learning goal that is not overly ambitious, and then creating an experience that is easy for the opinion leader and target audience to understand and participate.

The communication challenge is to shift climate change from the mental box of "uncertain science," an "unfair economic burden," or a "Pandora's box" of disaster toward a new cognitive reference point that connects to something the specific intended audience already values or understands. As examples, several campaigns recast climate change as an opportunity to grow the economy through the development of clean-energy technology or the creation of "green-collar jobs"; other campaigns redefine climate change as a matter of public health or moral and religious duty. Campaign organizers need to draw on focus groups, in-depth interviews, experiments, and surveys to identify and test different frames across population segments or relative to a targeted specialized audience. These messages can then be placed in climate change media campaigns and matched to opinion leaders for interpersonal dissemination (Maibach, Roser-Renouf & Leiserowitz, 2008; Nisbet, 2009).

According to Nisbet and Kotcher (2009), when surges in communication and public attention are needed, such as surrounding the release of a future Intergovernmental Panel on Climate Change (IPCC) report, opinion leaders can be activated with talking points to

share in conversations with friends and coworkers. They add that networks of opinion leaders can be activated in reaction to major natural disasters and focusing events such as droughts, wildfires, and extreme weather since these events are among the most followed news items of the year, and given the heavy public attention and interest, stand as untapped mobilizing opportunities. Nisbet and Kotcher conclude that a combination of their traits and behaviors, opinion leaders not only help draw the attention of others to a particular issue, product, or behavior but also, perhaps most importantly, signal how others should in turn respond or act. This influence may occur by giving advice and recommendations, by serving as a role model that others can imitate, by persuading or convincing others, or by way of contagion, a process where ideas or behaviors are spread with the initiator and the recipient unaware of any intentional attempt at influence (Weimann, 1994).

Studies show that face-to-face recommendations are still overwhelmingly preferred over digital sources of information (Berry & Keller, 2006; Carl, 2006; Xue & Phelps, 2004) among many publics. Theoretically, opinion leaders use a range of interpersonal skills in order to achieve desired behavioural change. However, there is considerable variation in the types of educational initiatives opinion leaders use to implement best practice. Informal one to one teaching, community outreach education visits, small group teaching, academic detailing and preceptor-ships are examples of strategies used by opinion leaders for disseminating and implementing change (Ryan, 2002; Rogers, 1995). Whilst opinion leaders have also used formal strategies, such as delivering didactic lectures, education delivered informally is regarded as a key ingredient in marketing and innovation diffusion (Rogers, 1976). However, it is unclear whether information delivered by opinion leaders in an informal way is more persuasive compared with formal strategies but Ryan (2002) suggests that opinion leaders may be less influential when their role is formalized through mail-outs, workshops or teaching rounds.

According to Nisbet and Kotcher (2009), another strategy used by climate change Opinion leaders is to sponsor civic voice through engaging in activities that communicate to policy makers, institutions, corporations, and other citizens' their concern and policy preferences. Examples include contacting an elected official such as a governor or senator, writing a letter to the editor of a newspaper, calling in to a radio/television show, posting on a blog or any other social network, signing a petition, or attempting to persuade peers on the issue. Also, very importantly, Nisbet and Kotcher caution that questions of ethics and norms arise in opinion leadership campaigns and therefore, as a general rule, opinion leaders should disclose their efforts on the part of a campaign and organizers should follow closely.

In a series of studies evaluating the use of opinion leaders in HIV prevention programs, Kelly and his colleagues (Kelly, 2004; Kelly *et al.,* 1991) used key informants to identify influentials among gay men. He found it necessary to train and support opinion leaders for them to be effective. Nisbet and Kotcher (2009) found Kelly's methods for training and retention directly applicable to climate change opinion leader campaigns.

> First, Kelly emphasizes that the activities of opinion leaders need to be programmatically reviewed, supported, and sustained over time. Specifically, regular reunions or booster sessions of opinion leader cohorts should be used to reinforce training... Second, opinion leaders should be trained not as educators disseminating information about climate change, but as communication strategists initiating conversations with friends and acquaintances, deliberately framing messages in ways that make them more meaningful and persuasive…Third, during training, opinion leaders should be introduced to audience research that informs successful messages about climate change; be provided examples of these conversational messages; shown by trainers models of how conversations might play out; and be asked to extensively role play different types of conversational situations…(Nisbet & Kotcher, 2009:339).

2.3.4 Moderating factors on communication of adaptive climate change information

Despite the international significance attached to climate change adaptation, there remains a lack of understanding of the key barriers that impede the effective implementation of adaptation strategies by households across SSA. Using case studies from northeast Ghana and a systematic literature review to assess the barriers that restrict effective implementation of climate adaptations in sub-Saharan Africa, Antwi-Agyei *et al* (2013) found that SSA households are constrained by a range of barriers including lack of financial resources (economic barriers), institutional barriers, lack of information on climate change characteristics, social-cultural barriers such as belief systems and local norms, technological barriers and a lack of infrastructural development. The risks presented by climate change to the livelihoods of these households are set to increase, yet the mechanisms needed to reduce this risk are not fully supported (IPCC, 2007a).

In addition, the belief systems of a particular group of people can constitute one of the greatest barriers to the implementation of climate adaptation strategies by households (IPCC, 2007a). Strongly held beliefs, cultural practices and value systems and the worldviews of individuals or groups, greatly influence the way they perceive climate change and thereby their subsequent adaptation strategies (Jones & Boyd, 2011). Culture is central to the decision to adapt and thus, the identification of risks and the subsequent implementation of appropriate adaptation strategies (Adger, Barnett, Brown, Marshall & O'brien, 2012). Within the same geographical region, different cultural groups may act differently in their response to risks including the adverse impacts of climate change (Adger *et al.*, 2012), and such responses may be greatly influenced by the pre-existing belief systems and values and norms of the group (Moser & Ekstrom, 2010). For example:

> Cultural practices prevented the Fulbe in northern Burkina Faso from embracing livelihood diversification adaptations strategies such as development work, labour migration and gardening to reduce their

> vulnerability to drought. Contrary, their counterparts, the Rimaiibe, have used labour migration and diversification of livelihoods as adaptation strategies (Nielsen and Reenberg, 2010). With regard to migration, Rademacher-Schulz and Mahama (2012) observed that social and cultural norms constrain female migration compared to male migration in the Nadowli district of Ghana. This potentially limits the adaptation options available to such female farmers (Antwi-Agyei et al, 2013:19).

Similarly, other research suggests that individuals view incoming information through a 'cultural' lens meaning that they understand and evaluate information through a filter that is coloured by their general beliefs about society, the world, and right or wrong (Moser & Dilling, 2012). Culture is prior to facts in the cognitive sense that what citizens believe about the empirical consequences of [certain actions or] policies derives from their cultural worldviews (Kahan & Braman, 2006). Incoming information may be rejected upon very quick (intuitive) judgment if it evokes some kind of threat to the listener's sense of self i.e. if it challenges his or her deeply held beliefs or those of the group s/he most identifies with (Kahan *et al.,* 2007). Therefore, people tend to selectively hear and collect evidence that supports their beliefs and underlying values (CRED, 2009; Kahan & Braman, 2008).

Jones and Boyd (2011) observed that societal norms and values act as major barrier to successful climate adaptation in Western Nepal and found that social barriers may be cognitive, normative or institutional governance and structure. Cognitive barriers involve psychological and thought processes that influence individuals' reactions to risks including climate change (Swim et al., 2011). Normative barriers include cultural norms and values that could influence individuals' responses to environmental (including climate) change. Individuals and groups employ a range of cognitive strategies to avoid accepting the possibility of unpleasant futures and the need to act now (Stafford-Smith, Horrocks, Harvey & Hamilton, 2011). These strategies include active and casual denials,

blame shifting, as well as reinterpreting the threat. In this regard, the appreciation of the local context within which climate adaptation takes place is quite critical. Indeed, there is increasing demand for adaptation strategies that acknowledge local context such as belief systems and indigenous knowledge (Jennings & Magrath, 2009).

In Kenya, according to KCCWG (2013), these factors include: language barrier, technicality of climate change information, lack of necessary infrastructure and resources, use of inappropriate mode of communication, and lack of prioritizing of climate change information. It is definitely not an easy task to for instance communicate adaptive climate change information when dealing with the socio-economically marginalized ASALs audiences who have high illiteracy and poverty levels. Over 60% of ASALs inhabitants live below the poverty line subsisting on <1 USD per day and literacy levels in ASALs are as low as 3% compared with a national average of 79.3% (UNDP, 2007). Individuals of Kitui County have a 63% poverty level (Ogara & Ongoro, 2013) and the average household comprising of a family of six has an average of Ksh.4,000= per month (Kitui Outlook, 2012). Low levels of education and poorly developed communication and marketing infrastructures further complicates the task of developing location-specific responses that effectively address the impacts of climate change (Farauta, Egbule, Idrisa & Agu, 2011).

Therefore, it cannot be disputed that there are serious barriers that need to be addressed for effective application of acquired adaptive climate change information to be possible. As Farauta *et al* (2011) point out, though the impacts of climate change are being felt by both developed and developing countries, these impacts are likely to be felt more by developing countries not necessarily because they are the highest contributors to climate variations but because they lack economic, social and political infrastructures to respond adequately to the effects of climate change. Notwithstanding all moderating factors, the role of information in moving forward the climate change agenda and communicating relevant information to the public is very crucial if there should be appropriate utilization

of the abundant knowledge and information on the effects of climate change on agricultural production systems and human survival (CTA, 2008).

2.3.5 Effective communication of adaptive climate change information

Media can enhance or distort the intended message (Axley, 2000; Lengel & Daft, 1988) and in this regard it has been established that interpersonal communication is the richest media in communicating complex and non-routine messages (Axley, 2000). Research suggests that specific kinds of barriers to adoption can be softened by interpersonal influence and the strategic use of opinion leaders (Robertson, Zielinski & Ward, 1984). Opinion leaders, who usually employ interpersonal communication strategies, are very influential in shaping public preferences, informing fellow citizens and altering climate change behavior (Nisbet & Kotcher, 2009). Such opinion leaders are being used in climate change campaigns among Kenyan ASALs residents. However, the effectiveness of their messages can only be ascertained if there is evidence of change and improved livelihood resulting from application of the information they share (Nderitu & Ayamga, 2013). This change and improvement mainly comes through adaptation which primarily benefits local communities, the level where the costs are usually incurred and the benefits largely felt, through targeted responses to local climate change issues (Simpson, Gössling, Scott, Hall, & Gladin, 2008).

According to Leiserowitz (2007), communication on climate change has been spectacularly successful because across nations, nearly everyone in surveyed populations has at least heard of the issue and many can identify at least some important climate change impacts. However, upon deeper exploration that understanding is superficial (Moser, 2010). Moser and Dilling say that one of the reasons why communicators have failed is because they try to reach the masses through traditional communication channels, while disregarding the power and advantages of different channels especially the interpersonal ones. As such, communicators who seek effectiveness have realized that raising awareness and discussing an issue does not directly result in behavior change

because there are other factors such as barriers that come into play. Thus, according to Moser and Dilling, for communication to be effective in leading to active engagement, first, it must be supported by policy, economic and infrastructure changes that allow concerns and good intentions to be realized. Second, a better understanding of the audience will help identify the most appropriate framings, messengers and messages that will most powerfully resonate with different people. Third, forums for direct dialogue and other audience-specific use of communication channels, rather than use of mass communication that speaks to no one really, can take advantage of persuasive power and social capital to ensure achievement of communication goals. Fourth, effective communication is one that serves two-way engagement because people in a democratic society are best served by actively engaging with an issue, making their voices and values heard and contributing to the formulation of societal responses. Opinion leaders are well able to fulfill these four requirements for effective adaptive climate change communication.

According to Hulme (2009), one of the reasons why climate change communication is not effective is because people do not understand climate change as they receive multiple and conflicting messages which they interpret them in different ways. In view of this, Campbell (2011) explored the understanding climate change communication as one of science's uncertain messages. He established that although much work has been done by scientists in developing communications to lay audiences, much less attention has been given by them to the ways in which those messages are interpreted. Campbell concluded that scientists communicating with the public need to develop their methods deliberatively, involving their target audiences; and that they need to avoid undue dependence on mass media and public authorities for such communication but instead develop multiple channels especially the traditional social networks [opinion leaders]. Also, Campell established that an effective approach to communicating uncertainty should depend on the context. For instance, the experience of impacts of climate change from previous events play a role in recipients' interpretation uncertainty and risk

messages because experience of an event greatly amplifies people's awareness of what the risks entailed.

From these scholars, it is evident that effectiveness of climate change communication depends on the audience experience and characteristics, the attributes of communicators, the communication methods used and the context within which communication occurs. These are four factors that informed the objectives of this study and it is the harmonious and successful interplay of these factors that will ensure effective communication of adaptive climate change information to residents of Kitui Central Constituency.

2.4 Critique of the existing empirical literature relevant to the study

Opinion leaders remain an overlooked yet necessary resource when it comes to catalyzing collective action on climate change (Nisbet & Kotcher, 2009). Indeed, according to Nisbet and Kotcher, until only very recently, public communication initiatives have ignored the special individuals across communities and social groups that can serve as vital go-betweens and information brokers, passing on messages about climate change that speak directly to their otherwise inattentive peers, co-workers and friends. This informal leadership is not a function of the individual's formal position or status in the system but it is rather earned and maintained by the individual's technical competence, social accessibility and conformity to the system's norms (Rogers, 1995).

In view of this, Nisbet (2009) in his study dubbed *Communicating Climate Change: Why Frames Matter for Public Engagement* reviews several typology of frames and suggests that a deductive set of mental boxes and interpretive storylines can be used to bring diverse audiences together on common ground, shape personal behavior, or mobilize collective action on climate change among the Americans. While Nisbet recommends that additional research using in-depth interviews, focus groups, and sophisticated survey and experimental techniques needs to further explore, identify, and test these frames across audiences, he says it is also important not to overlook interpersonal sources of information. He concludes that despite various unified

objectives, public engagement with climate change is still missing and therefore if major policy change is to be achieved, new meaning and messengers for climate change are needed. Persons with influential attributes and ability to use effective interpersonal communication strategies could be these new messengers.

In Kenya, opinion leaders have started being appreciated in cascading of climate change information among the vulnerable ASALs communities. In his study about *The Value of Climate Forecast Information to Mbeere Farmers in Kenya,* Njuki (2013) observed that farmer groups who are poor, rural producers with limited farm sizes in semiarid Mbeere District, Eastern Kenya, faced challenges including ability to adapt to the changing climate and adopt new farming techniques**,** better knowledge and skills to access inputs, business support and market information. In response, according to Njuki, the Sustainable Agricultural Livelihoods Innovations Project (SALI) linked small scale farmers to localized climate forecast information, through the Kenya Meteorological Department (KMD), and provided marketing intelligence and opportunities for increased and diversified agricultural production. KMD localized and repackaged the weather information into user-friendly products and seasonal weather forecast information was disseminated through workshops where advice was given on possible crop varieties considering the projected rainfall patterns. Following a qualitative assessment of the impact of this, farmers were asked to judge the link between changes in yields and their use of forecast information. 94% of them attributed increases in crop output to timely decisions and action for on-farm operations they had made differently as a result of improved access to forecast information. More important to this study, Njuki observed that twenty groups of the farmers rated face-to-face access as their preferred communication method, with radio and mobile phones next. However, Njuki did not investigate why these farmers preferred face-to-face over other communication channels or who it was that did the face-to-face communications with these farmers.

Similarly, Nderitu (2013) studied the *Impacts of Early Warning Systems in Garissa, Kenya* and found that there was positive impact of communication of adaptive climate change information by opinion leaders such as chiefs and district livestock production officers among residents of the arid Garissa County. For instance, Nderitu reported that:

> Losses were minimized as the community members acted on the information by removing all their assets from the river banks. When the area Chief received a phone call about the impending floods due to excessive rainfall in areas upstream of River Tana, he informed the community about it. The community members did not ignore the early warning as they used to do before. They have now realized that climate information is useful in dealing with risks and seemingly bad situations (Nderitu, 2013:6).

It would be interesting to know why the community members did not ignore the warning when the Chief told them as they used to do before. Was it because of the attributes of the Chief who shared the information with them or was it because of the communication strategies that the Chief used? These questions were not answered by Nderitu.

Ogara and Ongoro (2013) in their study on *Access and Use of Climate Change Information in the Kitui Central and Kitui South Constituencies* found out that community leaders, religious leaders, government officers and NGO officials in their line of duty were engaging residents on adaptive climate change topics such as livelihood diversification when they reported that:

> Most of the information on climate change was dispensed through government officers (27.4%) while 22.6% said that they had accessed the information through community leaders. Another 17.7% had learnt from local community farmers and herders, while 9.7% learnt from Oxfam and

> other NGOs. Others had got information from religious leaders (3.2%)… (Ogara & Ongoro, 2013: 17).

However, this study did not establish the attributes that made the mentioned opinion leaders disseminators of most of the climate change information in their community. Also, Ogara and Ongoro concluded that the efforts of these opinion leaders were not as successful as they should be at increasing access to and use of adaptive climate change information and recommended that monitoring and evaluation of their efforts be done.

2.5 Research gaps

In as much as improving development outcomes such as literacy, social networks and access to information is critical to building the country's adaptive capacity to climate change (GoRK, 2012), lack of proper mechanisms of communicating has led to inadequate climate change adaptation (KCCWG, 2013). According to NCCAP (GoRK, 2012), adaptive climate change information in Kenya that is consolidated or scattered at various levels of its management has evident challenges to its access by relevant stakeholders. Methods of handling this predicament therefore need to be studied.

Although mass media have been used to aggressively disseminate adaptive climate change information (NEMA, 2005; HBF, 2010; GoRK, 2012; Ogolla, 2011; KCCWG, 2013) as well as other methods like mobile phones, workshops, and use of opinion leaders (KCCWG, 2013; Nderitu, 2013; Shaka, 2013), adaptive climate change information remains scanty or totally absent at community level in ASALs of Kenya (UNDP, 2007; FAO, 2013; KCCWG 2013). The reasons behind this should be investigated for only then can the situation be changed.

Efforts of opinion leaders such as community leaders and NGO officials to enhance communication of adaptive climate change information among ASALs' residents are fragmented and disjointed and the process requires a monitoring and evaluation component (Ogara & Ongoro, 2013; KCCCWG, 2013). This study sought to fill this

particular gap by evaluating opinion leadership strategies used to communicate adaptive climate change information to residents of Kitui Central Constituency.

However, there are additional research gaps from this literature review that other researchers can take up. Methods used to select opinion leaders have not been consistent across studies and the question of whether any one method is more likely to identify opinion leaders that are more effective in promoting knowledge transfer remains open to empirical assessment (Flodgren *et al.*, 2011). Researchers and practitioners need to work together to develop scalable methods and strategies for assessing opinion leader campaign impact regularly (Nisbet & Kotcher, 2009).

2.6 Summary

Opinion leaders have been used in Kitui Central Constituency to boost the public's cognitive engagement on the issue of climate change; increasing their knowledge of the topic; discussing and promoting ways of enhancing their adaptive capacity; and increasing the frequency of community discussion on the topic. However, it is reported that the efforts of these opinion leaders are fragmented and disjointed and they do not come out clear on the subject of climate change and a monitoring and evaluation component is recommended (KCCWG, 2013). It is in line with this recommendation that this study was formulated and although Nisbet and Kotcher (2009) recommend that researchers and practitioners need to work together to develop scalable methods and strategies for assessing opinion leader campaign impact regularly, researchers such as Flodgren *et al* (2011) have been able to evaluate opinion leader campaigns. Therefore, as much as sophistication of evaluation depends on budget lines, time allocated, and availability of other vital resources, it was possible to carry out this evaluation study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter addresses the research design, study population, sampling frame, sample size, sampling techniques, data collection instruments, data collection methods and procedures, pilot test, data processing, analysis and presentation methods that were used to investigate the opinion leadership strategies for communicating adaptive climate change information to residents of Kitui Central Constituency.

3.2 Research design

In evaluating opinion leadership strategies used to communicate adaptive climate change information to residents of Kitui Central Constituency, the *mixed research design* was adopted. Wimmer and Dominick (2011), who also call this design triangulation, explain that it entails use of both qualitative and quantitative methods so as to fully understand the nature of a research problem. Johnson, Onwuegbuzie and Turner (2007) justified the use of mixed method research design by arguing that such combinations are used to enable confirmation or corroboration of each other through triangulation. According to Creswell (2009) the problems addressed by social science researchers are complex, and the use of either quantitative or qualitative approaches by themselves is inadequate. Thus, the mixed research design offers a powerful third paradigm choice that often will provide the most informative, complete, balanced and useful research results (Johnson *et al.*, 2007).

According to Creswell (2011), in this design, the researcher collects and analyzes persuasively and rigorously both qualitative and quantitative data (based on research questions); mixes (or integrates or links) the two forms of data concurrently by combining them (or merging them), or sequentially by having one build on the other, and in a way that gives priority to one or to both. Creswell further notes that this design

focuses on research questions that call for real-life contextual understandings, multi-level perspectives, and cultural influences; employs rigorous quantitative research assessing magnitude and frequency of constructs and rigorous qualitative research exploring the meaning and understanding of constructs; utilizes multiple [data collection] methods (e.g. questionnaires and interviews); and intentionally integrates or combines these methods to draw on the strengths of each.

Through use of the mixed design, quantitative and qualitative data collected during the study complemented each other. For instance, qualitative research which is criticized for making it extremely difficult to create any type of solid statistics and its findings cannot be generalized, was complemented by quantitative research that yielded statistics which could be generalized. In addition, the method was advantageous because while the numbers yielded from quantitative methods allowed greater precision in reporting results, qualitative engagements enabled extraction of in-depth narratives from information rich subjects that enhanced interpretation of the numbers thereby meeting the study objectives much better.

3.3 Study site and population

The study was done in Kitui Central Constituency, constituency number 072 of Kenya, which covers 636.20 Km^2 (IEBC, 2012). The researcher determined the size of Kitui Central Constituency population from among whom evaluation of opinion leadership strategies used in communicating adaptive climate change information was done.

The constituency is found in Kitui County which covers approximately 30,496.5 Km^2 in the Eastern part of Kenya with a population of 1,012,709 (Kitui County, 2012). Its major town and administrative headquarters is Kitui. The County has eight constituencies: Mwingi North with a total population of 139,967; Mwingi Central with a total population 141,207; Mwingi West with a total population of 103774; Kitui West with a total population of 102,314; Kitui Central with a total population of 131,715; Kitui Rural

with a total population of 104,443; Kitui East with a total population of 123,239; and Kitui South with a total population of 166,050 (IEBC, 2012).

Kitui Central Constituency was purposively chosen as the study site from among other ASALs because of its anthropological details and other factors that influence climate change adaptation. Whereas residents of most ASALs in Kenya are largely pastoralists, Kitui's residents are agro-pastoralists (KCCWG, 2013). In addition, availability of substantial empirical data of Kitui County (KCCWG, 2013; Ogara & Ongoro, 2013) that greatly informed this study influenced its choice. Kitui Central Constituency was purposively chosen from among the eight constituencies of Kitui County because whereas it depicts the anthropological details of the county, it was more accessible to the researcher than the other constituencies. Also, whereas most ASALs have chronic water shortage, water is available in Kitui Central (Ogara & Ongoro, 2013). This means more agropastoralism is done there. Therefore, the choice of Kitui Central Constituency for this study helped gather data that related to both agriculturalists and pastoralists, the two main climate-based economic activities of residents of Kenyan ASALs (UNDP, 2007).

The **target population** therefore consisted of the 131,715 residents of Kitui Central Constituency spread among 38,377 households according to the 2009 National Census, and key stakeholders in climate change issues found in the Constituency. The stakeholders included individuals from government institutions such as Agricultural Sector Development Support Programme (ASDSP), non-governmental organizations (NGOs) and community based organizations (CBOs) working in the constituency. The Constituency is divided into five wards and each ward is subdivided into several sub-locations.

3.4 Sampling frame

The sampling frame for the study was the 2009 National Census Report which was retrieved from the Kenya National Bureau of Statistics (KNBS). The units of analysis in the report were individuals and households (KNBS, 2011). Therefore the report showed

all the 38,377 households and persons within each household of Kitui Central Constituency. The IEBC Annual Report 2012/2013, Website and Map of Kitui County which show the boundaries of the constituency, wards, and sub-locations as well as the area and population densities of each of these were also used. The KNBS and IEBC documents complemented each other to ensure accuracy of sampling which largely depends on the adequacy of the sampling frame, or the complete list of members in the population (Wimmer & Dominick, 2011). Sampling frames of key informants for interviews were employee registers or human resource records that were available in respective offices such as ASDSP. Such records showed the ranks and job titles or descriptions of the stakeholders and as such sampling of representative key informants was well founded.

3.5 Sample and sampling techniques

3.5.1 Sample size

In this study, the quantitative sample size was determined according to Fischer *et al* (1991) and Cochran (1977) formulae designed for large populations.

In Fischer's formula, any population of more than ten thousand (10,000) people is considered infinite, and the sample size is calculated using the formula:

$$\mathbf{n = Z^2 . p . q/d^2}$$

where, n = sample size, z = the value at the chosen confidence interval (1.96 for a confidence interval of 95%), p = estimated population with attributes of interest which if infinite p = 0.5, q = 1 - p, and d = degree of desired precision (0.05 will be used in this study). Therefore, the sample size n for this study was: $\mathbf{(1.96^2) \times 0.5 \times (1 - 0.5)/ (0.05)^2 = 384.16.}$

Similarly, the formula proposed by Cochran (1977) resulted to the same sample size. According to Cochran:

$$\mathbf{n = [(Z/2 . \delta) /(E)]^2}$$

where, n is the sample size, E is the margin error, Z is the critical value from the Z distribution, δ is the population standard deviation. A simpler version of Cochran's equation as presented by Smith (2013) is: **Sample Size = (Z-score)² – StdDev*(1-StdDev) / (margin of error)².** In this study, one of the most common confidence levels of 95% which usually corresponds to a Z-score of 1.96 will be used, the standard deviation will be chosen as 0.5 as it is the most forgiving number, and the most common margin of error of +/- 0.05 will be used. The sample size was therefore: **(1.96)² x .5(.5)) / (.05)² = 384.16.** As such **a minimum quantitative sample of 384 respondents** from Kitui Central Constituency was required.

However, it was important to do oversampling to cater for non response rate (NRR) which was determined using response rates from previous studies of the same or a similar population (Bartlett et al, 2001). NRR accounted for households that could be either absent, not accessible, refuse to be surveyed, or any other reason that prevent survey teams from surveying a selected household (SMART methodology, 2012). Ogara and Ongoro (2013) in their empirical study on *Access and Use of Climate Change Information in Kitui County* attained a **response rate of 67%**. Using this rate, the sample size for this study was increased to 573 respondents calculated using Bartlett et al (2001) as follows:

$$\mathbf{n_2 = \frac{\text{Minimum Sample Size}}{\text{Anticipated Return Rate}}}$$

Where n_2 = sample size adjusted for response rate, minimum sample size = 384, anticipated return rate = 67%. Therefore, $\mathbf{n_2 = 384/.67 = 573.}$

SMART Methodology formula that uses non response rate (NRR) gave similar results:

$$\mathbf{\text{Final N} = \frac{\text{Number of Households Needed}}{\text{1-NRR}}}$$

Therefore, **Final N=384/1-0.33 = 384/.67 = 573** and as such **573 respondents** were surveyed. These were sampled from four representative sub-locations of the Constituency as explained in *section 3.5.2.1*.

In addition, **32 informants** were selected as the qualitative sample; 24 as participants in four focus group discussions (FGDs) and 8 as key informant interviewees as further explained in *section 3.5.2.2.* This qualitative sample size was sufficient as supported by Mason (2010) who found a mean sample size of 31 after studying 560 PhD qualitative studies, Creswell (1998) who advocates a qualitative sample size of 20 to 30 informants as sufficient and Green and Thorogood (2009) who state that the experience of most qualitative researchers is that in qualitative studies little that is 'new' comes out of transcripts after one has interviewed 20 or so people.

3.5.2 Sampling techniques

Multistage sampling in which simple random sampling was used at stages one and two, stratified random sampling at stage three, and purposive sampling at stage four was used to select the quantitative sample of 573 respondents. Purposive sampling was used to select the 32 key informants.

3.5.2.1 Multistage sampling

The population of Kitui Central Constituency was divided into its five Wards *(clusters):* Miambini, Kyangwithya East, Township, Kyangwithya West, and Mulango (IEBC, 2012) and two (40%) of these wards *(first stage),* kyangwithya East and Mulango, were selected by *simple random sampling*. Each of the two selected wards were then divided into sub-locations as shown in Table 3.1, and two sub-locations (about 30%) were chosen by *simple random sampling* from each ward *(second stage).* Hence, a total of four sub-locations were selected viz. Kaveta and Mutune of Kyangwithya East Ward and Wii and Wiikililye of Mulango Ward.

Table 3.1: Population Distribution in Wards of Kitui Central Constituency

S/N	IEBC ward no.	Name of ward	Population (2009 National Census)	Area (Km^2)	Description in relation to Kitui County
1	**354**	Miambani	22,164	215.10	Kamandio/Malili, Munganga, Mutula, Nzaaya and Usiani Sub–locations
2	**355**	Township	26,016	17.90	Kalundu, Manyengo, Township and Kaveta Sub–locations
3	**356**	Kyangwithya West	22,121	142.50	Itoleka, Mbusyani, Mulutu, Tungutu, Ndumoni and Utooni Sub–locations
4	**357**	Mulango	28,573	155.70	Kathungi, Katulani, Kwa-Muli, Kyangunga, Kyambiti, Wii and Wikililye Sub–locations
5	**358**	Kyangwithya East	32,841	105.00	Mulundi, Misewani, Mutune, Kaveta, Museve and Ivaini Sub–locations

Source: Independent Electoral and Boundaries Commission website (www.iebc.or.ke)

From each of the selected sub-locations, 143 households (143 households x 2 sub-locations x 2wards = the required 573) were selected using *systematic random sampling* where every 8^{th}- 13^{th} household were selected to ensure fair distribution *(third stage).* The 8^{th}-13^{th} interval was achieved using Mugenda and Mugenda (1999) rule of interval calculation which is to divide the total population by the sample size. To apply this formula, first the distribution of the 131,715 residents within households in each of the five wards, if the constituency has 38,377 households, was estimated using a mathematical proportionality formula as follows:

$$\textbf{Households per ward} = \frac{\textbf{Total constituency households x ward population}}{\textbf{Total constituency population}}$$

The results are shown in Table 3.2.

Table 3.2: Distribution of Households per Ward

Name of ward	Population (2009 National Census)	Approximate no. of households per ward
Miambani	22,164	6,458
Township	26,016	7,580
Kyangwithya West	22,121	6,445
Mulango	28,573	8,325
Kyangwithya East	32,841	9,569
Total	**131,715**	**38,377**

Assuming that these households are evenly distributed in the sub-locations (SL) in each of the five Wards, the approximate number of households to sample from every sub-location was as shown in column 4 of Table 3.3. By dividing the approximate total households in each sub-location by the required sample size of 143 per sub-location, every K^{th} household was as shown in the last column of Table 3.3.

$$K^{th} \text{ household per sub-location} = \frac{\text{Total sub-location households}}{\text{Sub-location sample size}}$$

Table 3.3: Sampling Interval for the Households per Sub-Location

Name of ward	No. of households per ward	No. of SL per ward	Approximate No. of households per SL	Sampling interval (K^{th}) per SL
Miambani	6,458	5	1,292	9.03
Township	7,580	4	1,895	13.25
Kyangwithya West	6,445	6	1,074	7.51
Mulango	8,325	7	1,189	8.32
Kyangwithya East	9,569	6	1,595	11.15

Thus by rounding of the sampling interval to the nearest whole number, every 8^{th} to 13^{th} household in each of the four sub-locations was sampled. The selection criterion was based on either ownership of livestock or engagement in crop farming. Ogara and Ongoro (2013) similarly sampled every 10^{th}-17^{th} household along transects in their empirical study in Kitui County. From each selected household, a literate male or female adult was purposively selected to fill in the questionnaire *(stage four).*

The multistage sampling technique was advantageous because it made it unnecessary to use a list (Patterson, 2009) of every household in the constituency. This is because at stage three to implement systematic random sampling that allowed fair distribution of the sample to be achieved and thus more representativeness, the researcher chose a starting point e.g. a public primary school in each sub-location and walked to every other 8^{th} to 13^{th} household along existing roads/footpaths. Secondly, simple random sampling in stage one and two ensured bias was minimized in the sample so that there was more representation. Systematic random sampling in stage three ensured that there was fair distribution of the questionnaires among the households of each selected sub-location. Finally, selection of a literate individual from each selected household to complete the questionnaire ensured that data was collected from subjects who best helped meet the study objectives.

3.5.2.2 Purposive sampling

The sample of 32 key informants was chosen for in-depth interviewing and participation in focus group discussions based on characteristics which best enabled the researcher meet the study objectives. Individuals who possessed attributes of opinion leaders in the community were selected based on considerations such as recognition by Kitui Central Constituency residents as resourceful in communication of adaptive climate change information, activeness in communicating adaptive climate change information, years spent communicating adaptive climate change information, level of education, location of operation and availability for participation. Most of them were identified following

feedback given by residents on Section B Part II of the Household Survey Questionnaire *(Appendix 2)*. As such, informants were mostly drawn to represent the following six categories that depicted social status, occupation or type of employer and position held.

1. Community administrators e.g. chiefs, sub-chiefs.
2. Agriculture/livestock extension officers.
3. NGO and CBO officers e.g. from KDC, KCCWG.
4. Relevant Government Departments e.g. ASDSP, KARI.
5. Successful local farmers, herders and businessmen.
6. Prominent social group leaders e.g. FFS leaders, women groups' leaders.

This is because previous empirical research found these categories of individuals to provide opinion leadership in climate change issues among ASALs' residents in Kenya (KCCWG, 2013). Leaders from these groups have their own scheduled activities in the community that make them interact with the rest of the community on one to one or through such forums as barazas and workshops from time to time (KCCWG, 2013). In view of this, it was prudent to ensure that a person from each of these categories participated in focus group discussions or was interviewed so as to have diversity of opinions and assure that most or all of the perceptions that might be important to meet study objectives were uncovered (Mason, 2010).

However, participants in two focus group discussions were Kitui Central Constituency residents who were keen in seeking and using adaptive climate change information to improve their livelihoods. By so doing both opinion followers/seekers and opinion leaders, the two main components of the two step flow of communication, helped gather qualitative data for the study.

3.6 Data collection instruments

Three instruments were used to collect data for the study. While a questionnaire was used to do the survey for quantitative data collection, two interview guides were used to collect qualitative data from key informant interviews and focus group discussions.

3.6.1 Self-administrated questionnaire

A questionnaire was developed and administered by the researcher and three trained assistants to sampled households. The questionnaire was semi-structured with two sections (A and B) for respondents to complete; Section A focused on demographic information of the respondents and section B was divided into Parts I to IV with each catering for the four objectives of the study respectively *(See Appendix 2).* Questions were as brief as possible yet exhaustive, unambiguous, logically ordered, and had clear instructions to ensure delivery of necessary data. An introduction letter *(See Appendix 1)* was attached to each questionnaire and this enhanced the rapport that was created by the researcher and research assistants during the door to door administration of the questionnaire.

3.6.2 Interview guide for key informant interviews

This was very instrumental in interviewing key informants. The interview guide was prepared in advance so as to ensure it was comprehensive enough. This instrument ensured quick purposive conversations that were focused towards collection of qualitative data to meet study objectives. The guide helped in probing, clarifications, and keeping the informants focused in case they wandered during interviews. A copy of this instrument is available as *Appendix 3.*

3.6.3 Interview guide for focus group discussions

This instrument was used to gather qualitative data from focus group discussions by providing the researcher with carefully thought guiding questions to elicit focused debate (*See Appendix 6*). The guide was designed in a way that helped obtain maximum information on the participants' views. It was accompanied by a one page demographic details questionnaire (*See Appendix 4*) that was given to every focus group discussion (FGD) participant to complete.

3.7 Data collection methods and procedures

3.7.1 Survey

A *survey* of **564** households was done by the researcher and three trained assistants using a self-administered questionnaire so as to collect quantitative data. This included data on knowledge levels, attributes of opinion leaders, opinion leadership strategies and socio-cultural factors influencing success. Self-administrated questionnaires were cheap to administer and provided a chance to create rapport with respondents so as to increase the response rate. They were completed within the respondent's home and without the influence of the researcher or assistant. Each respondent was allowed ample time to complete and return the questionnaire before moving into the next household. However, following request, some were left with the questionnaires to be collected at a later time or day. Stationery to complete the questionnaire such as pens was provided.

3.7.2 Key informant interviews

Interviews were conducted with **eight** key informants to collect more qualitative data for assessing opinion leadership strategies and determining mediating effects of socio-cultural factors influencing success of communication of adaptive climate change information among residents of Kitui Central Constituency. The key informants were purposively selected using criteria outlined in section 3.5.2.2 but were mainly prominent persons who were in one way or another interested or involved in diffusion of adaptive climate change information among residents of the constituency. These were: A senior staff of the Agricultural Sector Development Support Programme (ASDSP) Kitui County Coordination Office, an executive leader in two national climate change NGOs both with branches in Kitui County, an agricultural extension supervisor based in Kitui Central Constituency, a field officer working for a development CBO based in Kitui Central Constituency, a trainer of trainers (TOT) working under the Kitui Department of Forestry, a chairman of a Farmers Field School (FFS), a founder of a local Self Help

Group (SHG), and a successful farmer who had various climate change adaptation projects in his farm.

These interviews, which were conversational in style, proved very advantageous by generating greater detail of information and giving the researcher an opportunity to share and understand the viewpoints of informants (Ndati, 2013) as they narrated how their beliefs, aspirations, roles and experiences related to diffusion of adaptive climate change information in the Constituency.

3.7.3 Focus group discussions

Four *focus group discussions* with individuals who possessed characteristics that were relevant for the study (Kombo and Tromp, 2006) were used to gather qualitative data that enhanced understanding of attributes of opinion leaders, assessment of opinion leadership strategies and determination of the mediating effects of socio-cultural factors on opinion leadership strategies used to communicate adaptive climate change information among residents of Kitui Central Constituency. Participants from each of the four sampled sub-locations were selected purposively following criteria outlined in *section 3.4.2.2* but also ensuring gender and age inclusivity. Three FGDs had six participants each (three male and three female) and the fourth one had five participants (three male and two female) who according to Wimmer & Dominick (2012) were a good number per focus group discussion. In total, **twenty three** Kitui Central Constituency residents participated in the focus group discussions.

Each focus group discussion began with an introduction of the researcher to assistants to the group followed by an outline of the research goals and request for permission to tape record discussions. The researcher then proposed some ground rules (e.g. only one person should speak at a time) to enable a smooth discussion and a free atmosphere for participants to freely express themselves so as to exploit group dynamics and enhance the quality of data (Ndati, 2013). To kick off discussions, participants were asked to

introduce themselves briefly and fill in a short personal details questionnaire. Discussions in each focus group discussion lasted about two hours and were tape recorded by a research assistant. The researcher used the interview guide to monitor focus of discussions and only acted as the moderator of discussions (Wimmer & Dominick, 2011) but also made field notes.

The advantage of these focus group discussions was the greater breath of ideas, opinions and experiences that were expressed by the participants (Ndati, 2013). To achieve this, care was taken to ensure that the participants were familiar with each other and that they were as homogeneous as possible in terms of social status, sub-location of residence and educational background. In this regard, two focus group discussions were mainly comprised of opinion leaders whereas the other two were of opinion seekers/followers. Familiarity had advantages such as reducing initial tension (Ndati, 2013). Homogeneity reduced the danger of the discussions being inhibited by considerations of status or hierarchy (Campbell, et al., 1999).

3.7.4 General procedures and ethical considerations

A request to carry out the study was made by the researcher from Kitui Central Constituency governing authorities and stakeholder organizations through an introduction letter of the researcher as a PhD student in the Department of Media Technology and Applied Communication (MTAC) of the Jomo Kenyatta University of Agriculture and Technology (JKUAT) and the research permit obtained from the National Council for Science and Technology (NCST) on 25th August, 2014. These were very useful in seeking authorization to carry out interviews, have focus group discussions and administer the survey questionnaires among residents of Kitui Central Constituency.

Key informant interviews and focus group discussions were done following booked appointments and adherence to given times and dates was done by the researcher without

fail. Recording of conversations and discussions was done with permission of interviewees and participants of focus group discussions respectively. Note taking that was done to provide backup for tape recorders was also done with permission.

Three research assistants were recruited and trained on the purpose, objectives and expectations of the study, methods of administering questionnaires, key terminologies of the study, effective interpersonal communication, health and safety measures, and research protocol. Data collection only started after this training so as to ensure that they understood the assignment. This minimized errors.

Confidentiality of survey data provided on questionnaires as well as of interview conversations and focus group discussions was guaranteed to the study subjects and the same was strictly observed by the researcher. The researcher thanked respondents and informants for their willingness to provide data for the study. No money was paid to anyone to provide any type of data during the study. However, during focus group discussions, the researcher offered a facilitation allowance not exceeding Kes.200= for transport to and fro the venue because KCC was vast and motorbike rides were unavoidable if time was to be observed.

Out of the three advocated procedures for mixed methods strategies of inquiry (sequential, concurrent and transformative) advocated by Creswell (2011), the sequential procedures were used to collect data for the study. This involved beginning with the quantitative method in which the study concepts were tested on a large sample (564 respondents) followed by the qualitative method where detailed exploration with a few individuals (31 informants) was done. In this regard the researcher sought to elaborate on or expand the findings of the quantitative method with the qualitative method.

3.8 Pilot test

A pilot test of the survey questionnaire was carried out using a small sample of residents of Kaveta sub-location of Kitui Central Constituency. These were not part of the final

sample. Isaac and Michael (1995) suggest 10 to 30 participants for pilots in survey research whereas Julious (2005) and Belle (2002) suggest 12. It is in line with this that a sample size of 20 respondents was found appropriate for the pilot test. The purpose for the pilot test was to check appropriateness of questions in generating important data, precision and clarity of questions and whether the order of questions would influence responses. After piloting, changes were made in the order of some questions and ambiguity was removed from others.

Scholars indicate that that the analysis of any type of pilot study should be mainly descriptive (Carfoot, Dickson & Williamson, 2002) or should focus on confidence interval estimation (Burrows, Gan, Gallus, Wallace, & Burrows, 2001). There is a question as to whether it should be analyzed using hypothesis testing and as Lancaster, Dodd, and Williamson (2004) says it would not be appropriate to place undue significance on results from hypothesis tests as no formal power calculations have been carried out and that with such small numbers there is likely to be imbalance in pre-randomization covariates which would need adjustment in the analysis and also the confidence interval is likely to be imprecise even when there are significant differences. In view of this, the researcher did not find the need to do chi-square goodness of fit test, the inferential statistics that was later used, on the pilot test results.

3.8.1 Reliability analysis

Results of the pilot test were subjected to a reliability test. Reliability is an assessment of the degree of consistency between multiple measurements of a variable (Hair *et al.*, 2010). The test for reliability was done using the Cronbach's Alpha test which has been the most common tool for measuring reliability. The main reason for this test was to measure the internal consistency of the study components in the survey questionnaire, i.e. how closely related a set of components were as a group. The results were as shown in Table 3.4.

Table 3.4: Cronbach Alpha Values

Variable Construct	Number of Items	Cronbach's Alpha
Knowledge levels	21	.602
Attributes of individuals	34	.830
Strategies used by opinion leaders	38	.882
Factors intervening	14	.742

George and Mallery (2003) provide the following rules of thumb for Cronbach Alpha values: _ > .9 – Excellent, _ > .8 – Good, _ > .7 – Acceptable, _ > .6 – Questionable, _ > .5 – Poor, and _ < .5 – Unacceptable. Thus a Cronbach Alpha value above 0.6 is acceptable. The findings, as indicated in Table 3.4, showed that most of the components had relatively high internal consistency as their Cronbach's Alpha coefficients were above 0.6. The survey questionnaire was therefore deemed reliable

Establishing validity and reliability in qualitative research can be less precise, though participant/informant checks, peer evaluation where another researcher checks the researcher's inferences based on the instrument (Denzin & Lincoln, 2005), and multiple methods (triangulation), are convincingly used. This study adopted triangulation of the quantitative and qualitative data that was collected and as such enhanced validity and reliability of the study instruments and results (Creswell, 2011).

3.9 Data processing, analysis and presentation

Since in this research, both quantitative and qualitative data were collected, integration of these different types of data was done. From the three approaches advanced by Creswell *et al* (2011) to integrate mixed research data (merging data, connecting data, and embedding data), merging was used. This integration consisted of combining the qualitative data in the form of texts (narratives) with the quantitative data in the form of numeric information. It was achieved by first reporting the quantitative statistical results followed by qualitative texts or themes that supported or refuted the quantitative results as advocated by Creswell *et al.*

However, before processing the responses, for quantitative data completed questionnaires were serialized and checked for completeness and consistency. They were then be coded to enable responses to be grouped into various categories for easy analyses. Data collected was then entered into the computer using Statistical Package for Social Scientists (SPSS) version 20.0 after which data cleaning using both syntax and manual scrutiny was done. This quantitative data was then analyzed using descriptive statistics (mainly percentiles) and the chi-square goodness of fit test as the inferential statistics. Quantitative reports were then generated and presented using tables and bar graphs.

For qualitative data, written and recorded discussions from interviews and FGDs were transcribed and coded according to emerging themes in view of the study objectives and research questions. Key themes and texts were then isolated and merged with quantitative data accordingly, where they were presented in form of narratives. Overall, triangulation of quantitative and qualitative data was done.

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSION

4.1 Introduction

This chapter analyses and interprets data that was collected to enable evaluation of opinion leadership strategies used in communicating adaptive climate change information (ACCI) to residents of Kitui Central Constituency (KCC) in relation to the specific objectives of the study. Clear communication of the collected data and detailed examination of the findings in view of the four research objectives was done so as to provide answers to the research questions. Tables, bar graphs and notes were used to present data. Quantitative and qualitative data were triangulated to enhance the validity and reliability of the study results.

4.2 Response rate

To begin with it is important to understand the source of the data dealt with in this chapter. Out of the targeted quantitative sample of 573 (100%) individuals, 564 survey questionnaires were completed and returned from households in the four sampled sub-locations, as shown in Table 4.1. This represented 98.4% response rate which the study considered sufficient for analysis. Hand delivery and collection of the questionnaires by the researcher greatly improved the response rate.

Table 4.1: Distribution of Survey Respondents

Ward	Sub-location	Frequency(n)	Percentage (%)
Kyangwithya East	Kaveta	143	25.35
	Mutune	143	25.35
Mulango	Wikililye	143	25.35
	Wii	135	23.95
	Total	**564**	**100.00**

Each sub-location contributed at least 25% of the sample size except Wii. This was due to the sparse distribution of households in Wii that made the researcher and assistants unable to reach the targeted 143 respondents within the days that the Chief of the location had granted access permission.

Qualitative data was collected from 31 of the targeted 32 informants and the study considered this sufficient for analysis. Eight of these were key informants who were interviewed and 23 were participants in four focus group discussions (FGDs). They were distributed as follows:

Table 4.2: Distribution of Study Informants

Type	Targeted	Actual
Interview Key Informants	8	8
FGDs Participants	24	23
Total	**32**	**31**

All the targeted eight key informants granted interviews and all the targeted FGDs, one in each sub-location, were conducted; three had six participants each (three male and three female) and the fourth had five (three male and two female) as one of the invited participants did not turn up due to personal emergency.

4.3 Socio-demographic profiles of survey respondents

The following were the socio-demographic profiles (age, gender, duration residence in KCC, education level, occupation and duration of practicing the occupation) of the 564 survey respondents.

4.3.1 Age of Respondents

Table 4.3: Age of Respondents

Age in Years	Frequency (n)	Percentage (%)
21-30	78	13.8
31-40	147	26.1
41-50	133	23.6
51-60	104	18.4
> 60	88	15.6
No Response	14	2.5
Total	**564**	**100.0**

The study found out that a majority of the respondents were between 30 and 60 years of age while no respondent was below 20 years. Therefore, the respondents were adults and were generally well spread over the age profile as shown in Table 4.3.

4.3.2 Gender of respondents

Table 4.4: Gender of Respondents

Gender	Frequency (n)	Percentage (%)
Female	363	64.4
Male	72	30.5
No Response	29	5.1
Total	**564**	**100.0**

Though the study intended to have an equal representation of men and women it was not possible because as indicated in Table 4.4 a majority (64.4%) of respondents were female. Men were less than half (30.5%) the female. This was partly explained by socio-cultural reasons where traditionally Akamba women raised children and tended to the farms (http://www.kenya-information-guide.com/kitui-county.html) while men went out in search for money. Therefore, women were found in most homesteads that were visited to administer the household survey questionnaire. Unfortunately, 5.1% were unwilling to disclose their gender for reasons that could not be established by the study.

4.3.3 Duration of residence in Kitui Central Constituency

Table 4.5: Respondents' Years of Residence in KCC

Years lived in one's sub-location	Frequency (n)	Percentage (%)
> 20	325	57.6
11-20	149	26.4
6-10	57	10.1
1-5	24	4.3
< 1	4	0.7
No Response	5	0.9
Total	**564**	**100.0**

The study found out that a majority (94.1%) of respondents had worked or lived in their respective sub-locations for more than 5 years while only 0.7% had lived there for less than one year. In fact more than half (57.6%) attested to having lived in their respective sub-locations for more than 20 years. This implied that the respondents were locals and could therefore be relied on to engage productively in the adaptive climate change discourse as experienced in KCC.

4.3.4 Education level of respondents

Table 4.6: Respondents' Level of Education

Level of education	Frequency (n)	Percentage (%)
Never been to school	0	0.0
Ngumbaru (informal adult education)	26	4.6
Primary education	333	59.1
Secondary education	145	25.7
College education	45	8.0
University education	12	2.1
No response	3	0.5
Total	**564**	**100.0**

A majority (59.7%) of respondents were found to have attained primary school education whereas 25.7% had secondary school education. 8% were college graduates

and 2.1% university graduates. Few (4.6%) respondents were found to have attained literacy through the informal Kenyan adult education programme known as *Ngumbaru*. These literacy levels are congruent to the KCCWG (2013) study that observed that education in Kitui County was embraced well when compared to other ASALs counties mainly because the Akamba community was more sedentary than nomadic and therefore their cultural practice did not hinder education development. These literacy levels enabled respondents to understand and answer the survey questions.

4.3.5 Occupation of Respondents

Table 4.7: Respondents' Occupation

Occupation	Frequency (n)	Percentage (%)
Farmer	349	61.9
Livestock keeper	6	1.1
Livestock and farming	114	20.2
Business	58	10.3
Other	33	5.8
No response	4	0.7
Total	**564**	**100.0**

Most (61.9%) of respondents were found to be farmers while 20.2% were agro-pastoralists. About 10.3% of respondents were business people. This was congruent to the Kenya Information Guide (Kitui County, 2014) that observes that agriculture is the backbone of Kitui County where farmers in the highlands are involved in subsistence agriculture (mainly growing cotton, tobacco, sisal, mangoes, maize, beans, cassava, sorghum, millet and pigeon peas) and those in the lowlands keep livestock (mainly cattle, sheep, goats and chicken) as a means of supplementing income from crop farming. When asked for how long they had practiced their occupations the responses were as indicated in Table 4.8.

Table 4.8: Respondents' Duration in Occupation

Years in one's occupation	Frequency (n)	Percentage (%)
>20 years	317	56.2
11-20 years	145	25.7
6-10 years	60	10.6
1-5 years	22	3.9
<1 year	15	2.7
No Response	5	0.9
Total	**564**	**100.0**

Majority (56.2%) of the respondents were found to have practiced their respective occupations for over 20 years. When combined, up to 92.5% had practiced their occupations for over five years and this was deemed sufficient time for one to observe changing climatic conditions and decide on reasonable adaptation. As such, these respondents were able to help achieve the study objectives.

4.4 Analyses of study variables

This section entails the use of descriptive and inferential statistics to present and analyze quantitative data collected in regard to study variables and triangulation of the same with emerging narratives from qualitative data for the purpose of interpretation of study results and findings. The study objectives were used to organize the section.

4.4.1 Residents' knowledge levels on adaptive climate change information

The first objective of this study was *to investigate knowledge levels on ACCI among residents of KCC that would be useful in evaluation of opinion leadership strategies*. This was founded on the premise that in order to assess opinion leadership strategies used to communicate ACCI among KCC residents, it was necessary to first understand the general levels of awareness of climate change among the residents and any steps taken to adapt to changing climatic conditions. To achieve this, the survey respondents

were asked a set of questions. First, they were asked to state whether or not they had ever heard about climate change. Their responses were tallied and recorded as follows:

Table 4.9: Awareness of Climate Change

Ever heard of climate change	Frequency (n)	Percentage (%)
Yes	550	97.5
No	6	1.1
No Response	8	1.4
Total	**564**	**100.0**

97.5% of residents acknowledged having heard about climate change while 1.1% opined that they have never heard about climate change as shown in Table 4.9. However, to check whether they really knew what climate change meant, the 97.5% (550 respondents) were asked to briefly describe 'climate change' in their own words.

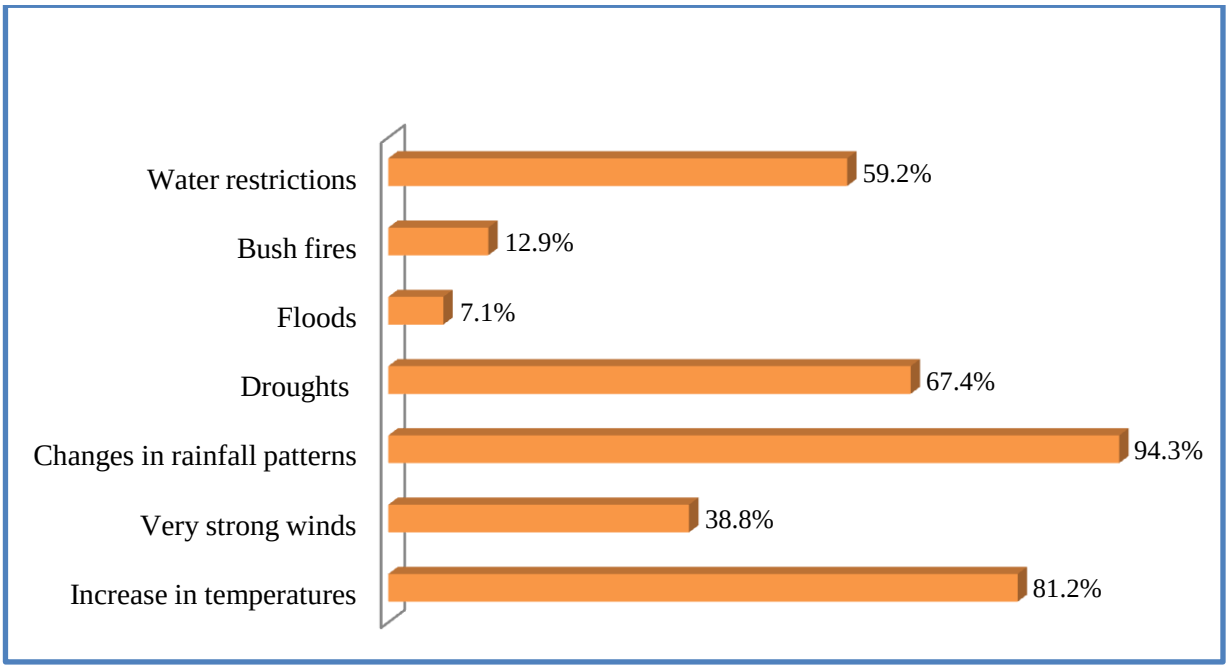
Table 4.10: Definitions of Climate Change

Definition	Frequency (n)	Percentage (%)
No answer	150	27.2
Change in expected weather	142	25.8
Lack of rains	126	22.9
Change of rainfall pattern/season	106	19.2
Change of environment	6	1.1
Change in the atmospheric condition	5	0.9
Change in weather and environment	4	0.7
Change in rainfall and temperature	3	0.6
Change in rainfall and winds	2	0.4
Change in temperature	2	0.4
Change of wind	1	0.2
Global warming	1	0.2
Change in planting season	1	0.2
Cause of diseases from weather	1	0.2
Total	**550**	**100.0**

The study found out that although 27.2% of the respondents could not define climate change majority (72.8%) were able to correctly relate the phenomenon to one or more

indicators of climate change as shown in Table 4.10. Therefore, as much as the definitions were not scientific, there was general awareness among KCC residents of the fact that climate in their locality was changing. This was a commendable level of awareness of the rather complex phenomenon of climate change whose awareness levels are still low in the country (NEMA, 2005; GoRK, 2012; KCCWG, 2013).

To investigate the residents' knowledge levels specifically on adaptive climate change information, respondents were asked if they had ever experienced indicators of climate change in their locality. Their responses were as indicated in Figure 4.1.



**All the above responses were multiple responses*

Figure 4.1: Climate Change Indicators in KCC

Results indicated that most (94.3%) respondents had experienced changes in rainfall patterns whereas 81.2% had experienced increase in temperatures, 67.4% droughts and 59.2% water restrictions. Notable percentages had also experienced very strong winds,

bush fires and floods as shown in Figure 4.1. According to the NCCAP (GoRK, 2012) shifts in the start or end of the rainfall season, the length of the season, the number of rainy days, the number, length and intensity of dry spells, or changes in the total seasonal rainfall, among others, can signify climate change which can also exhibit itself as a change in the intensity and frequency of extreme climate events, such as drought, floods, storms, and strong winds among others. To further ascertain the respondents' claims, they were asked the last time they experienced or saw the identified indicators of climate change in their locality. The results were tallied and recorded as follows.

Table 4.11: Experience of Climate Change

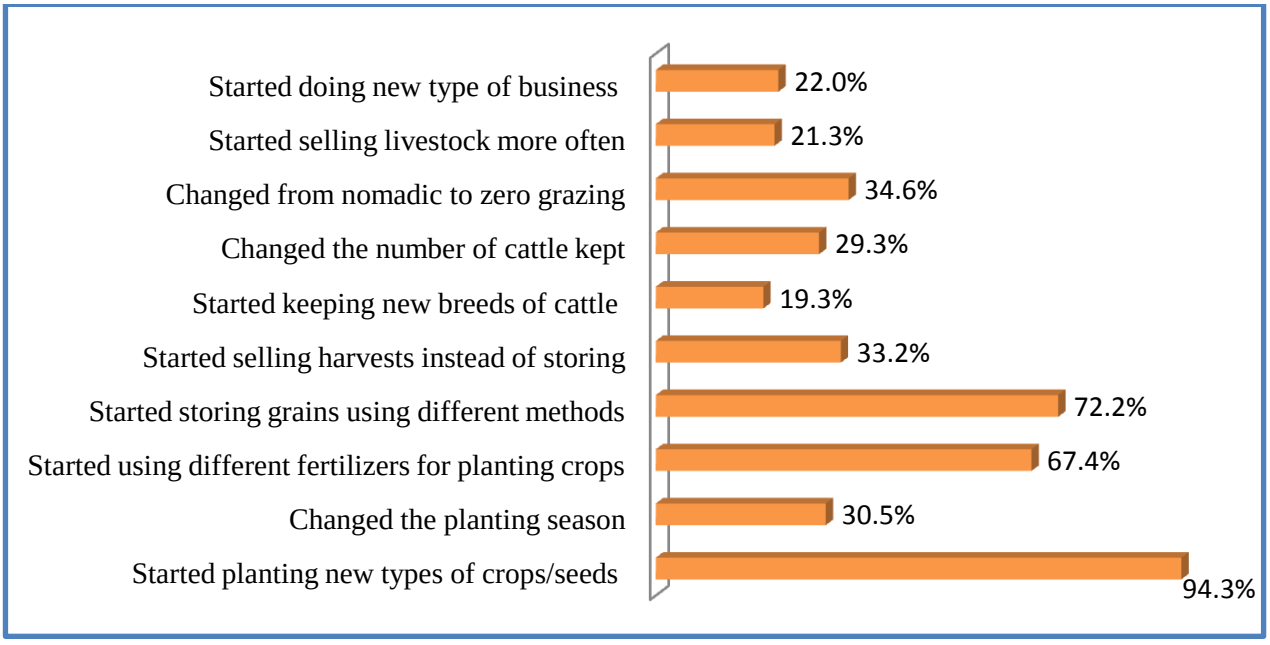
Last time of experience of climate change	Frequency (n)	Percentage (%)
More than 5 years ago	384	68.1
2-5 years ago	84	14.9
Last year	65	11.5
This year	26	4.6
No response	5	0.9
Total	**564**	**100.0**

A majority (68.1%) of them experienced indicators of climate change more than 5 years ago while 14.9% experienced the indicators between 2-5 years ago. Only 4.6% of the respondents said they experienced the same within the year of this study as shown in Table 4.11. This showed that respondents understood that climate change was different from the more frequent weather changes because climate change is experienced when the climatic conditions permanently shift either upwards or downwards of the average (GoRK, 2012) and this can take several years to be concluded. Since respondents had experienced climate change, they were asked to state whether or not they ever changed their activities or lifestyles so as to cope with climate change. The results were tallied and recorded as shown in Table 4.12.

Table 4.12: Adaptation to Climate Change

Change of activity or lifestyle	Frequency (n)	Percentage (%)
Yes	526	93.3
No	20	3.5
No response	18	3.2
Total	**564**	**100.0**

93.3% of the respondents acknowledged having altered something to help them cope with climate change while 3.5% of the respondents denied this. Therefore, KCC residents had knowledge on adaption to climate change. However, a further step was taken to investigate specifics of such adaptation knowledge by asking them to name areas of agricultural/livestock production, the two main activities in the area, which they had ever changed so as to adapt to climate change. Results were as shown in Figure 4.2.



**All the above responses were multiple responses*

Figure 4.2: Adaptive Measures for Climate Change

Most (94.3%) of them stated that they had started planting new types of crops/seeds so as to cope with climate change, 72.2% started storing grains using different methods, 67.4% started using different fertilizers for planting crops, 34.6% changed from nomadic to zero grazing and so on as shown in Figure 4.2. This confirmed that the residents of KCC were aware that climate had been changing, how it had been changing and had therefore started adapting to it in various ways. Discussions with key informants at start of interviews as well as with FGDs participants confirmed the above survey findings by corroborating how residents of KCC were aware of the adverse effects of climate change and the need to adapt to the same. Below is an example of how conversations went on in FGDs:

Q: For how long have you lived here?

P1: Everyone here today has lived here for more than 30 years.

P6: Yes, even those of us women who were married here from other places have lived here for more than 30 years now….

Q: So for those years you have lived here would you say there has been climate change?

All: Yes! (Unanimously)

Q: So what is this climate change?

P1: Climate change, *kulingana na vile naielewa na nimeisikia ni* (according to what I understand and what I have heard is) change of climate. For example there might be excess drought, excess sunshine….

P3: …in Kitui Central Constituency… the rain pattern has changed so drastically so that you can't predict which month it will rain….

P5: Rain used to start very early but nowadays it comes late. Sometimes it rains heavily but for a short period ….

Q: Is there anything else that shows climate change besides rainfall patterns?

P3: Oh yes…our rivers are drying up. Some years back water came from those hills over there (pointing) but now this has dried up.

P2: There are times it is very cold or very hot, both day and night, and it was not like that in the 60s and 70s...there is a very big change.

P3: … if we plant crops especially maize it dries very fast before it matures. Some years back we used to plant many things like sugarcane, bananas and sweet potatoes but nowadays when we plant these crops they dry without producing anything.

Q: Has climate change affected your day to day lives in any way?

P4: Climate change has pushed us into poverty so that we have turned into activities like sand harvesting, which unfortunately has other negative effects on the rivers and wells.

P1: A lot. It has affected our harvests. We get very little from our farms nowadays. There is not enough food for many seasons.

P3: Yes and so nowadays some of us have turned into charcoal burning to raise money to buy food. We have also started planting trees, eucalyptus, as we were advised by some NGO ….

P5: Yes, now we have joined groups like FFS and women groups so that we get some donor funding to improve our farming. Like the other time my group got a *'Piga Njaa Marufuku'* cheque from the government.

These above conversations showed that KCC residents had good knowledge on climate change and had started adapting to the same. They were also able to clearly describe and illustrate the effects of climate change and some adaptive measures that they had started taking. Key informants echoed the same during interviews. For example during the key informant interview the founder of a local Self Help Group remarked that:

> *"I formed the group to mobilize locals to do something because [X] river, the key source of water in our sub-location, was drying up due to climatic changes. Due to reduced farm yields locals had turned into charcoal burning that made deforestation of the area worsen the effects of climate change. As such in addition to rehabilitating the river other objectives of the group are to plant trees and control sand harvesting from the river by unscrupulous traders…. From our meetings, the group has built some wayers on the river to enhance water collection so as to enable adaptation to the climatic change effects. One time a local university sponsored us but they have since left and now we have written to the County Government seeking financial help so that we can continue rehabilitating the river…."*

In addition, the key informant interview with the Executive Leader in two national climate change NGOs both with branches in Kitui County, confirmed that KCC residents were aware of climate change and its implications. He said:

> *"We have been in Kitui for 14 years and have had several projects in our NGO and the Ministry of Environment which came here for the purposes of capacity building, to educate people about climate change and to mainstream national policies to the county level…. We also do advocacy programmes, renewable energy programmes…tree production programmes…alternative livelihoods…and the goal of all these is to*

mainstream climate change and improve adaptive capacity of the people…. Although locals keep confusing climate change with environmental information I can't blame them because even academicians do the same…. Of course climate change is a new phenomenon that will take time to sink…. Engagements previously have been going on as issues of disaster risk reduction but now we are looking at them with the lens of climate change and because of the impacts that are there in Kitui, people have been welcoming any methods that would assist them in improving their resilience and adaptive capacities…."

Following the details of the discussions and interviews as well as the survey responses, overall, residents of KCC had good knowledge on the subject of adaptation to climate change that enabled opinion leaders (OLs) to engage them further on the issue and this enabled evaluation of opinion leadership strategies used in communication of the same. It was therefore possible to move on to the other objectives of the study and to transit seamlessly to the second objective of the study, respondents were asked to state whether or not they required climate change information to help them make decisions in some of the areas they said they were changing due to climate change effects.

Table 4.13: The Need for Climate Change Information

Need for ACCI	Frequency (n)	Percentage (%)
Yes	553	98.0
No	6	1.1
No response	5	0.9
Total	**564**	**100.0**

98% of them opined that they needed the information to make such decisions while 1.1% opined to the contrary as shown in Table 4.13. KCCWG (2013) noted that although majority of the people across ASALs counties in Kenya were aware of the fact that something was happening to their climate, they lacked access to climate change

information. This could as such explain their dire need (98%) for this information that they so much need to be able to successfully implement climate adaptation strategies (Lee, 2007). However, the 98% could also mean that there was a continuous demand for ACCI because climate change is dynamic. During the interview with the Agricultural Extension Supervisor, who had worked in the County for over four years, he observed this and remarked that:

> *"In Kitui Central…people have information but because climate change is dynamic they still need more information. For example any new research findings on crop and animal varieties should continually be given to them…. There is always something new to tell farmers ... Every season is usually very different from the previous. So they still need continuous flow of information…."*

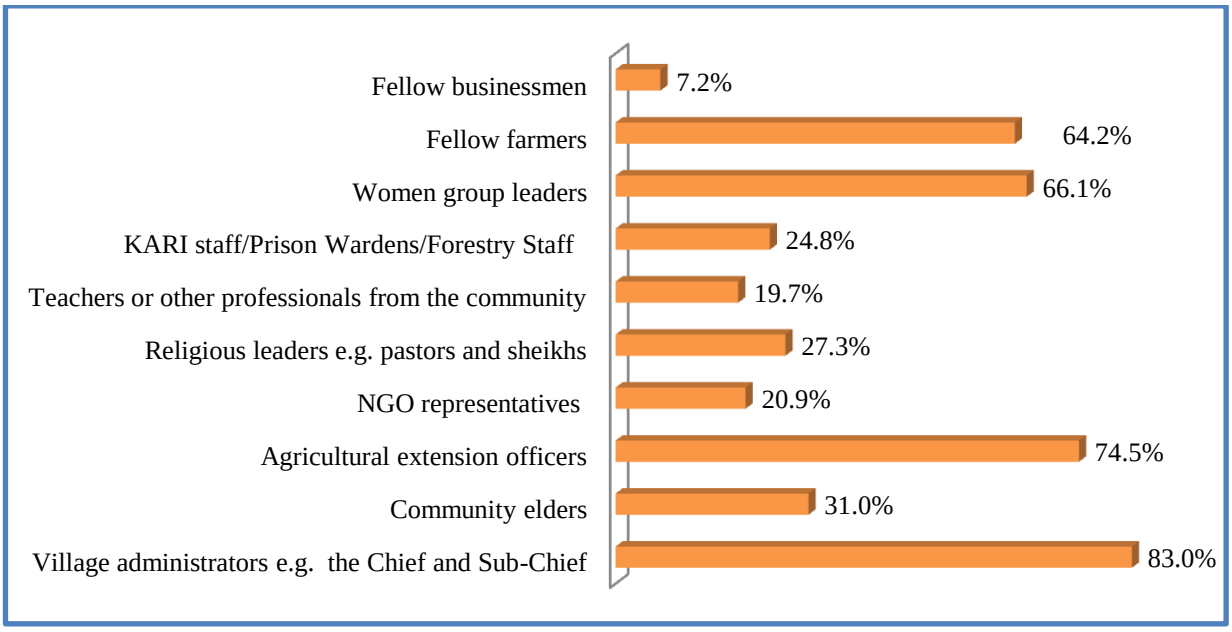
4.4.2 Attributes of opinion leaders communicating climate change information

The second objective of the study was *to evaluate attributes of individuals who use opinion leadership strategies to communicate adaptive climate change information to residents of KCC.* To achieve this, a number of questions were asked to help identify, rate and assess OLs who were instrumental in aiding diffusion of ACCI among residents of KCC. To start with, in order to know who the opinion leaders who communicated ACCI really were, the respondents were asked whether there were any people in their community who informed them about adapting to climate change. Their responses were tallied and recorded as shown in Table 4.14.

Table 4.14: Presence of Opinion Leaders

Presence of opinion leaders	Frequency (n)	Percentage (%)
Yes	482	85.5
No	61	10.8
No response	21	3.7
Total	**564**	**100.0**

A majority (85.5%) of respondents acknowledged that there were people in the community who informed them about adapting to climate change while only 10.8% of respondents did not recognize whether there were such people in the community. Therefore, there were OLs who communicated ACCI to residents of KCC. So as to ascertain the presence of OLs in KCC, the 85.5% respondents who agreed that there were people diffusing ACCI in their community were asked to identify such persons.



**All the above responses were multiple responses*

Figure 4.3: Types of ACCI Opinion Leaders

Results indicated that village administrator's such as chiefs were the OLs that most (83%) informed the community about adapting to climate change while fellow businessmen least (7.2%) informed the community about adapting to climate change. Other OLs who informed the KCC residents about adapting to climate change included: agricultural extension officers (74.5%), women group leaders (66.1%), fellow farmers (64.2%), community elders (31%) as well as religious leaders, government officials such as prison wardens, NGO representatives and professionals such as teachers. As Rodgers

(2003) says, sometimes the task of identifying OLs in a social system is fairly straightforward in that highly influential persons can be named by members of the social system in a social survey. These results were similar to the KCCWG (2013) empirical study findings that stated that most of the information on climate change in Kitui County was dispensed through government officers (27.4%), community leaders (22.6%), local community farmers and herders (17.7%) and NGO representatives (9.7%).

FGDs' participants confirmed the findings. They identified similar OLs particularly village administrators, local groups' leaders and officers working with departments/ministries of government agencies that deal with environment or climate change issues. Some of those who were mentioned during the FGD conversations included chiefs, officers from KARI- Katumani, agriculture extension officers, chairpersons of FFS (Farmers Field Study), staff of the Meteorological Department and officers from the Ministry of Forestry. Some participants mentioned that radio and newspapers were also sources of climate change information for them but on further interrogation they showed preference for OLs over these mass media channels as evidenced in the following conversation.

Q: When do you understand more about climate change? When you hear from radio, read from newspapers or when these people tell you about it?

P6: From these people, the officers and chiefs.

P1: When the officers and other such people come and explain to us.

P5: Of course, from officers like those from KARI-Katumani. (Others echoed unanimously, "Yes").

Q: Why is this so?

P1: Because our education is of low level when I read advisories and such materials I do not understand some English in it. But when they come in

person, I can ask questions and they even demonstrate some things practically.

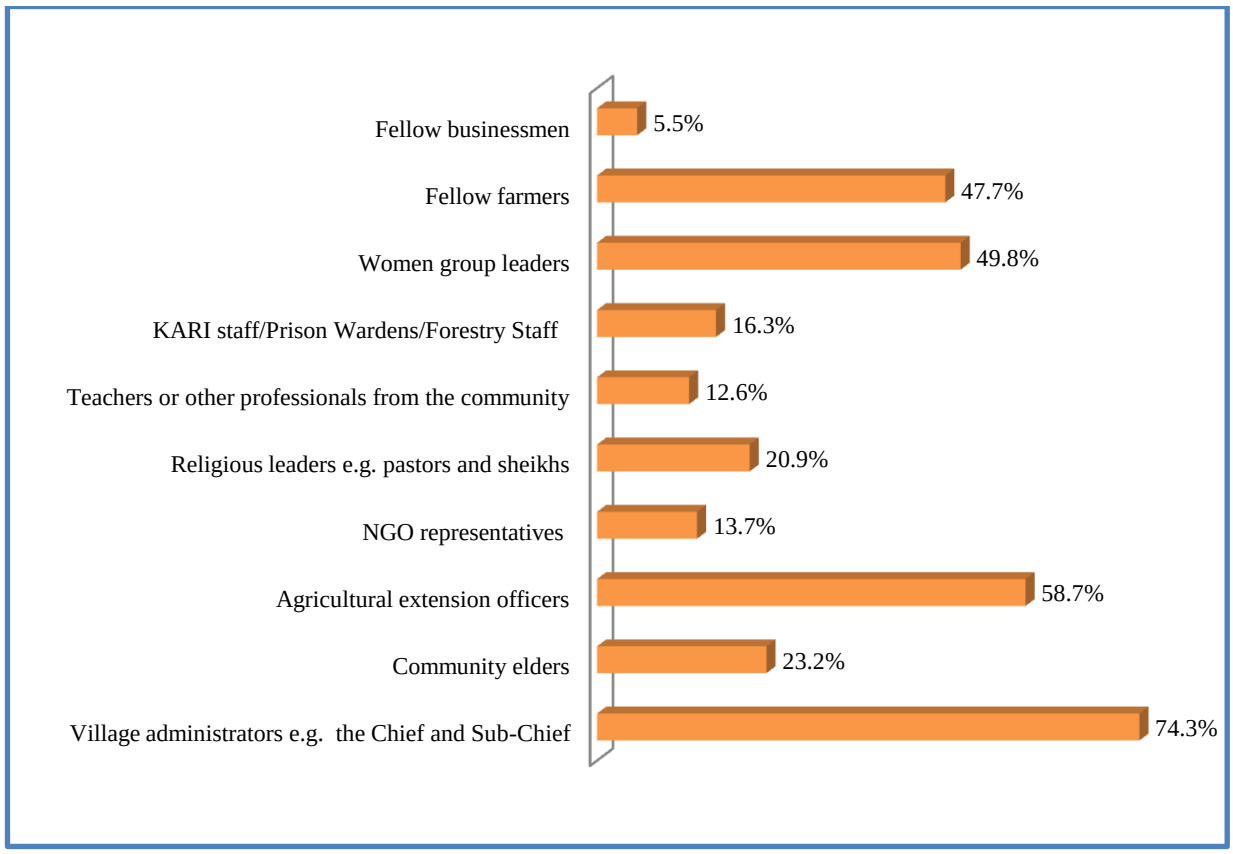
P5: They come again or we can see them again, *sana sana machifu na hii watu wa* FFS (especially the chiefs and FFS members) and ask what we did not understand.

P2: They take time to explain some things in *Kikamba* (the local language) and they seem to know more than radio.

P3: *Unajua wao hawatuuzii* (you know these people do not sell to us) information. Nation (the newspaper) we have to buy. So they are good. Like [Officer X] from KDC, *anakuja kwa shamba langu, ananionyesha vile nitachunga nursery ya matunda na siku hizi nauza matunda mingi* (he comes to my farm, shows me how to tend my fruits' nursery and nowadays I sell many fruits).

It was obvious from these findings that like many other publics, residents of KCC were increasingly distrustful of information from mass media, preferring instead recommendations from friends, family, coworkers, and peers (Keller & Berry, 2003). In fact, no one mentioned the TV as a source of ACCI. The results further confirmed that to increase the low knowledge levels, ACCI should be communicated in ways that are understandable, accessible and acceptable to the end users (Nderitu, 2013) who in this case have long been marginalized politically, socially and economically (FAO, 2013) so that very few can afford or have literacy skills to benefit from ACCI carried in newspapers, magazines and other publications like farmer advisory leaflets.

Next, in order to evaluate effectiveness of OLs in terms of information needs' fulfillment, respondents were asked to rate the identified OLs based on how best they met their ACCI needs. The results were tallied and present in Figure 4.4.

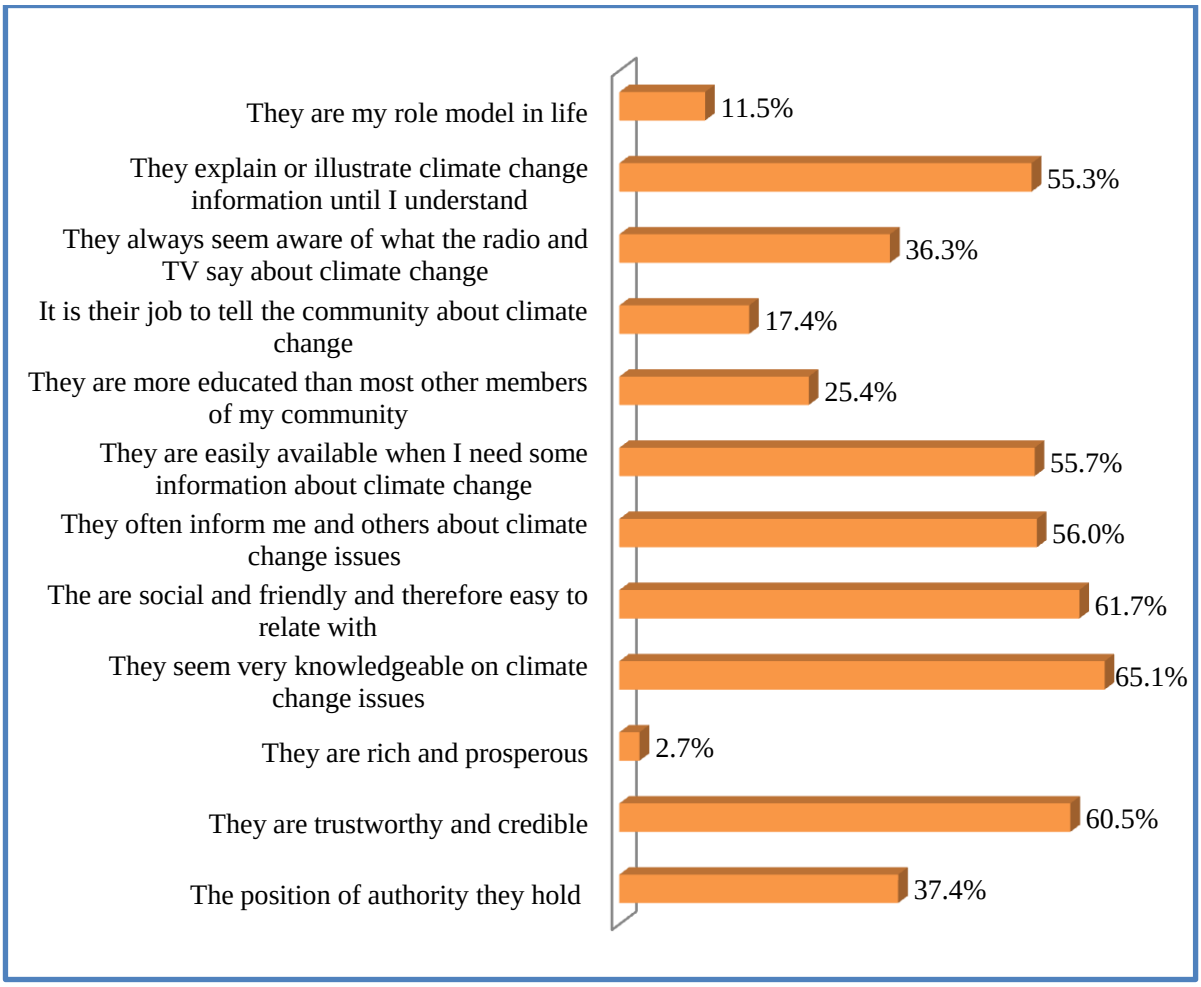


**All the above responses were multiple responses*

Figure 4.4: Rating of Effectiveness of the Opinion Leaders

The study indicated that from among the various ACCI OLs, village administrators such as the chief and sub-chief best (74.3%) met the respondents ACCI needs while fellow businessmen least (5.5%) met the respondents' ACCI needs. Others who best met the respondents' information needs and in that order included: agricultural extension officers (58.7%), women group leaders (49.8%), and fellow farmers (47.7%) among others as shown in Figure 4.4. According to Rodgers (2003) the defining characteristic of OLs is that they are well respected in their social system which respect can be associated with higher socio-economic status (i.e. education, occupation, income) but does not require it;

OLs, for whatever reason, sway adoption decisions through their influence (i.e. informal persuasion), not power (i.e. use or threat of using force). This could explain why fellow farmers were found among the most preferred OLs. However, the study sought to understand from respondents what qualities of OLs made them be rated as more effective (especially the top four - village administrators, agricultural extension officers, women group leaders and fellow farmers) than others in communicating ACCI. Results were as shown in Figure 4.5.



**All the above responses were multiple responses*

Figure 4.5: Attributes Enhancing Effectiveness of Opinion Leaders

Findings indicated that more than 50 percent of respondents rated climate change OLs highest if they thought the OL was highly knowledgeable on climate change issues (65.1%), social and friendly (61.7%), trustworthy and credible (60.5%), discussed the issue more frequently (56%), more accessible (55.7%) and had communication prowess (55.3%). It was also notable that more effective OLs were deemed to have position of authority (37.4%), higher consumption of mass media (36.3%) and more education (25.4%). On the other hand, OLs were rated dismally if they seemed rich and prosperous (2.7%), were role models (11.5%) or because it was their job to tell the community about ACCI (17.4%).

The six attributes of highly influential OLs that were observed by more than 50% of the respondents were subjected to the **chi-square goodness of fit** statistical test to determine their level of significance. To do this, the first hypothesis of the study (*Ho1: There is no significant difference in effectiveness of the opinion leaders who possess highly rated attributes and those who do not in communicating adaptive climate change information to residents of Kitui Central Constituency*) was split six times ($Ho1_a$, $Ho1_b$, $Ho1_c$, $Ho1_d$, $Ho1_e$ and $Ho1_f$) using the six highly rated attributes and tested at 0.05 level of significance (95% confidence interval). The following results were obtained:

$Ho1_a$: There is no significant difference in effectiveness of OLs who are highly knowledgeable and those who are not in communicating ACCI to residents of KCC.

Table 4.15: Chi-Square for Highly Knowledgeable

	Observed N	Expected N	Residual
Yes	367	282	85
No	197	282	-85
Total	**564**		

Since *Chi-Square = 51.241, p-value < 0.001*, which is way far below 0.05, the null hypothesis was rejected and it was concluded that the proportion of respondents identifying with the attribute (highly knowledgeable) was *significantly* greater than 50%.

Therefore, OLs who were deemed as highly knowledgeable on climate change issues were more effective in communication of ACCI among KCC residents than those with lower knowledge levels.

$Ho1_b$: There is no significant difference in effectiveness of OLs who are social and friendly and those who are not in communicating ACCI to residents of KCC.

Table 4.16: Chi-Square for Sociable and Friendly

	Observed N	Expected N	Residual
Yes	348	282	66
No	216	282	-66
Total	564		

Since *Chi-Square = 30.894, p-value < 0.001*, which is way far below 0.05, the null hypothesis was rejected and it was concluded that the proportion of respondents identifying with the attribute (social and friendly) was *significantly* greater than 50%. Therefore, OLs who were deemed as gregarious were more effective in communicating ACCI to KCC residents compared to those who were not.

$Ho1_c$: There is no significant difference in effectiveness of OLs who are trustworthy and credible and those who are not in communicating ACCI to residents of KCC.

Table 4.17: Chi-Square for Trustworthy and Credible

	Observed N	**Expected N**	**Residual**
Yes	341	282	59
No	223	282	-59
Total	**564**		

Since *Chi-Square = 24.688, p-value < 0.001*, which is way far below 0.05, the null hypothesis was rejected and it was concluded that the proportion of respondents identifying with the attribute (trustworthy and credible) was *significantly* greater than

50%. Therefore, OLs who were trustworthy and credible were more effective in communicating ACCI to KCC residents than those who were not.

$Ho1_d$: There is no significant difference in effectiveness of OLs who frequently discuss the issue and those who do not in communicating ACCI to residents of KCC.

Table 4.18: Chi-Square for Frequency of Discussion

	Observed N	Expected N	Residual
Yes	316	282	34
No	248	282	-34
Total	**564**		

Since *Chi-Square = 8.199, p-value = 0.004,* which is < 0.05, the null hypothesis was rejected and it was concluded that the proportion of respondents identifying with the attribute (frequent communication) was *significantly* greater than 50%. Therefore, OLs who were deemed as frequent communicators were more effective in communication of ACCI to KCC residents compared to those who rarely discussed the issue.

$Ho1_e$: There is no significant difference in effectiveness of OLs who are easily accessible and those who are not in communicating ACCI to residents of KCC.

Table 4.19: Chi-Square for Ease of Accessibility

	Observed N	Expected N	Residual
Yes	314	282	32
No	250	282	-32
Total	**564**		

Since *Chi-Square = 7.262, p-value = 0.007,* which is < 0.05, the null hypothesis was rejected and it was concluded that the proportion of respondents identifying with greater accessibility was *significantly* greater than 50%. Therefore, OLs who were easily accessible were more effective in communicating ACCI to KCC residents compared to those who were not.

$Ho1_f$: There is no significant difference in effectiveness of OLs who have communication prowess and those who do not have in communicating ACCI to residents of KCC.

Table 4.20: Chi-Square for Communication Prowess

	Observed N	Expected N	Residual
Yes	312	282	30
No	252	282	-30
Total	**564**		

Since *Chi-Square = 6.383, p-value = 0.012,* which is < 0.05, the null hypothesis was rejected and it was concluded that the proportion of respondents identifying with the communication prowess was *significantly* greater than 50%. Therefore, OLs who were deemed as competent communicators were more effective in communicating ACCI to KCC residents compared to those who were not.

Table 4.21: Summary of Chi-Square Goodness of Fit Test for Ho1

	Very Knowledgeable	Social & Friendly	Trustworthy & Credible	Frequently Inform	Easily Accessible	Communication Prowess
Chi-Square	51.241	30.894	24.688	8.199	7.262	6.383
Df	1	1	1	1	1	1
Asymp. Sig.	.000	.000	.000	.004	.007	.012

As observed, all the six attributes had significant impact on the effectiveness of OLs in communication of ACCI to the residents of KCC. The results were further supported by the findings from qualitative data where interviews and FGDs with some OLs confirmed the possession of these attributes and thus their influence as opinion leaders. The following extract from conversation with FGDs participants is a good example:

Q: After you attended the seminar or heard about climate change from the other sources, did you tell others about coping with climate change?

P6: Yes

P1: Yes, indeed we have been telling our neighbours, friends, our sons and daughters and whoever we visit. We share and explain what we learnt.

P3: Yes, we have had to. All of us….

Q: But why have you been telling them about coping with climate change?

P1: We tell them out of free will but also you know for some seminars, some of us are sponsored and go...learn on behalf of groups. So when we return we must teach the group members but we also teach our neighbours.

P4: We find it very important to tell others. For example, four of us attended a seminar organized by the Meteorological department about weather and climate change. We were taught things like change in rainfall patterns… planting crops that mature quickly… planting early or at onset of rains, water harvesting and other things to help us get better yields…it is very important I share with my friends and neighbours such important things.

P6: You know, when you plant your *shamba*, harvest and get food you cannot eat alone.… So we realized it is good that we tell others how they can plant to improve their yields and so have plenty of food. If we have and others do not have and some are our friends or brothers, we cannot eat and watch them starve. So it is only good we tell them what we learn….

Q: Oh, so you learn, practise and them tell others what you have tested?

P1: *Eeeeh tumefanya hivyo na tunapata manufaa* (Yes, we do practise and get benefits).

P2: And…we get good harvests and…others in the community admire us and our farms and ask the secret behind our success and we tell them.

P3: Oh yes, they ask a lot. They ask and start doing like us or even better.

Q: So does that mean people know and recognize you as opinion leader in climate change?

P1: Yes, *tena sana* (even so much).

P2: Everybody asks me what they should do every planting season.

P5: They… ask me what seed variety they should plant. When they see me make compost manure and use it to improve yields they ask. I show them.

P4: In fact they call some of us the 'climate people'.

Undoubtedly, these OLs who participated in the FGD were social and friendly and were passionate to make a difference in the lives of the people around them. They were also more knowledgeable than their followers on adaptation measures to climate change because of the seminars and other learning forums that they attended as well as from informed consumption of mass media content. Additionally, when interviewed, the NGO Executive Leader revealed that they also used OLs who possess similar attributes to what the survey respondents rated highly:

> *"We have a strategy of using chiefs and liaison officers who are within the county…in appointing them mostly we were looking at who they are… because their role is more of coordinating and to be our link with the community…. We also do partnerships…for example using KFS [Kenya Forestry Service] officers who are trained…who give us mileage in terms of being accepted by the community…and these people are working with the government and so they are honest, credible… trusted and so when we lapse they continue the work in the community."*

When asked what motivated him to pursue communication of ACCI as he was a well recognized influential among KCC residents, the NGO Executive Leader said:

"First is passion and two it is part of the projects we have in our NGO … so it is a duty and it's a call and so the two are intertwined … from my background my Dad was a florist and so it sort of embedded on how I grew up… I studied education but further on did other courses on climate change and environmental studies…with my training in education I find it easy to pass information…"

The above findings agreed with scholars who have established that OLs are people who are seen as likeable, trustworthy and influential and when compared to their peers, OLs tend to be more exposed to all forms of external communication and are active media users (and as such are more knowledgeable on the issue of concern) who interpret the meaning of media content for lower-end media users (Flodgren *et al.*, 2011). OLs are more gregarious than non-leaders and have approximately the same social-class position as non-leaders, although they may have higher social status within the class (Loudon & Britta, 1979). Individuals with strong personality traits of confidence, leadership, and persuasiveness are found to be socially connected to a greater number of other community members and more likely to influence the opinions of others (Weimann, 1994). OLs are better educated than the average person and it is their interest and belief that they can make a difference in the world around them that makes them influential (Nisbet & Kotcher, 2009).

The study then sought to establish how often the identified OLs informed KCC residents about adapting to climate change. Results were tallied and recorded in Figure 4.6.

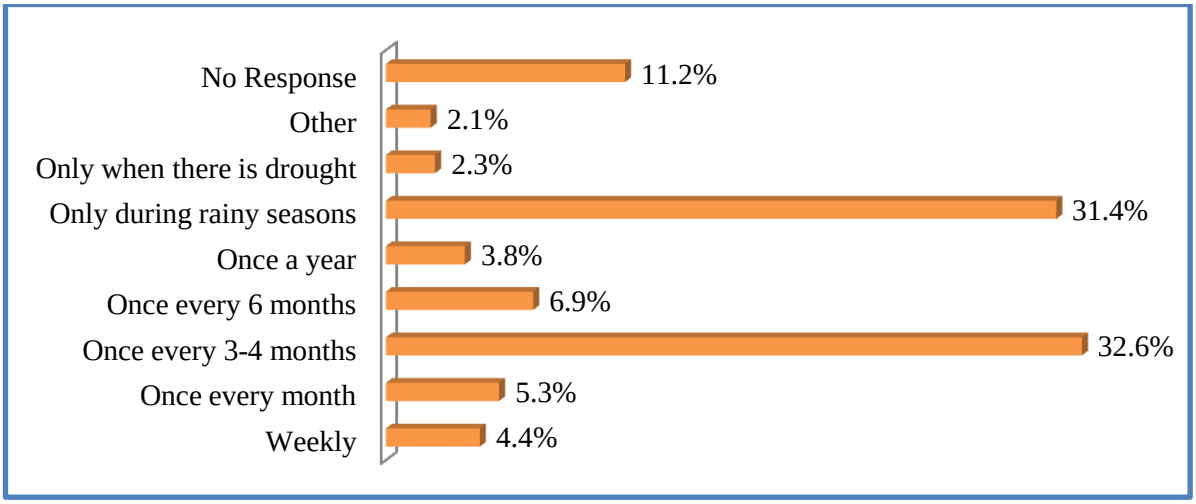


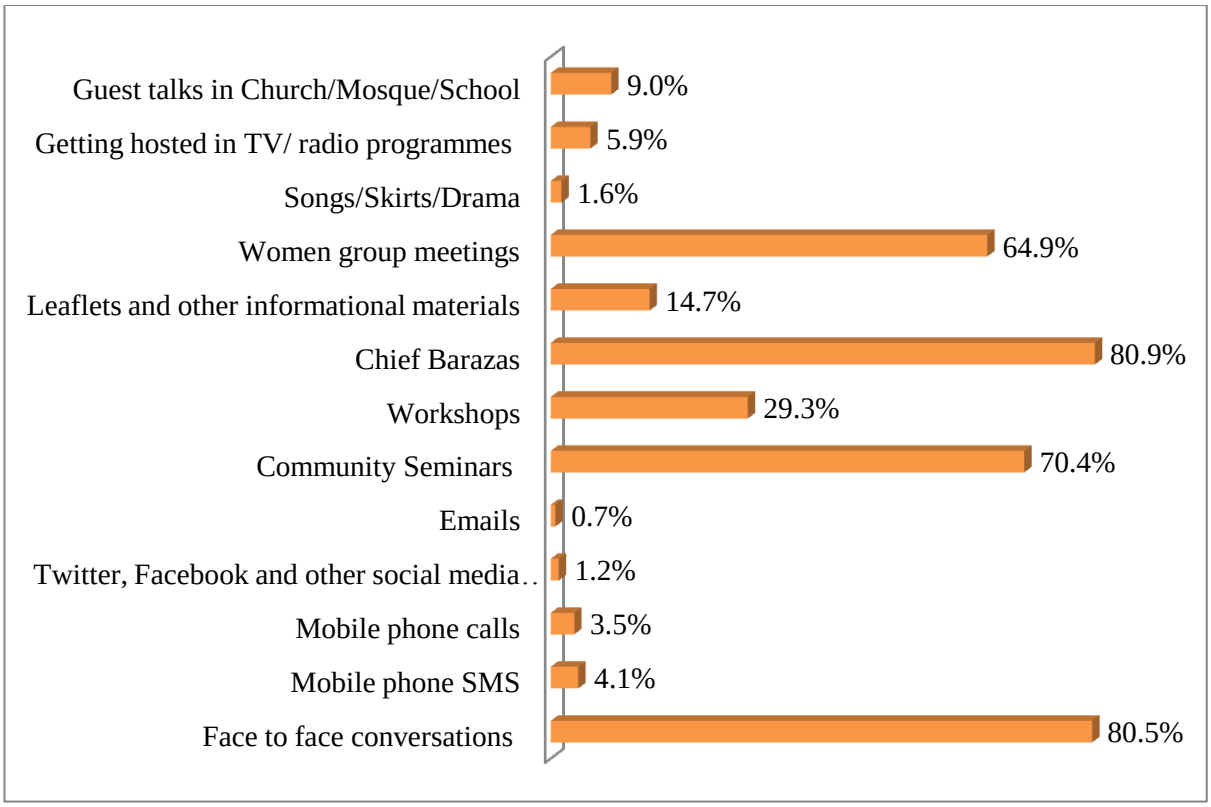
Figure 4.6: Opinion Leaders' Frequency of Diffusing ACCI

The findings indicated that a majority (32.6%) of respondents were informed about climate change once every 3-4 months and 31.4% of the respondents only during rainy season. The 6.9% who said they were informed once every six months could as well have meant only during the rainy seasons because the April and October rains in Kenya are six months apart. The rest of the findings were as shown in Figure 4.6.

According to Nisbet & Kotcher (2009) among other scholars, OLs are individuals who pay close attention to an issue and frequently discuss the issue. Frequency of discussion undoubtedly increases effectiveness of persuading someone to adopt an opinion. The OLs in KCC do not seem to frequently discuss their issue since the monthly (5.3%) and weekly (4.4%) ratings were quite low. This could mean that enough ACCI did not trickle down to the residents and no wonder, as highlighted earlier, 98% of the residents felt that they still needed ACCI. This lack of frequent communication, therefore, greatly tainted the OLs' effectiveness in disseminating ACCI to KCC residents.

4.4.3 Opinion leadership strategies used to communicate ACCI to KCC residents

The third objective of the study was *to examine ways in which opinion leaders communicated ACCI to residents of KCC.* To achieve this, questions were asked to establish and rate the various interpersonal communication methods used by OLs, the language used, understandability of communicated messages and availability of feedback mechanisms. As such, the study first sought to establish the interpersonal communication methods used by OLs to communicate ACCI to residents of KCC. Results were as indicated in the Figure 4.7.



**All the above responses were multiple responses*

Figure 4.7: Interpersonal Communication Methods used by Opinion Leaders

Results indicated that chief barazas (80.9%), face to face conversations (80.5%), community seminars (70.4%) and women group meetings (64.9%) were the most used methods by OLs when communicating ACCI to residents of KCC. Conversely digital methods including emails (0.7%), social media (1.2%), mobile phone calls (3.5%) and mobile phone short text messages (4.1%) were the least used methods. The findings agree with Doumit *et al* (2007) who say that informal one to one teaching, community outreach education visits and small group teaching are examples of strategies used by OLs for disseminating and implementing change. However, Doumit *et al* also say that OLs also use formal strategies, such as delivering didactic lectures. Ryan (2002) says that whereas it is unclear whether information delivered by OLs in an informal way is more persuasive compared with formal strategies, it has been suggested that OLs may be less influential when their role is formalized through mail-outs, workshops or teaching rounds. No wonder the leaflets (14.7%) and workshops (29.3%) were found to be less popular compared to the more informal methods.

The interview with a successful farmer who was also a professional working with a government ministry and was recognized as an ACCI opinion leader in his sub-location confirmed that interpersonal communication methods such as seminars and face to face conversations were key in passing ACCI to the community. He said:

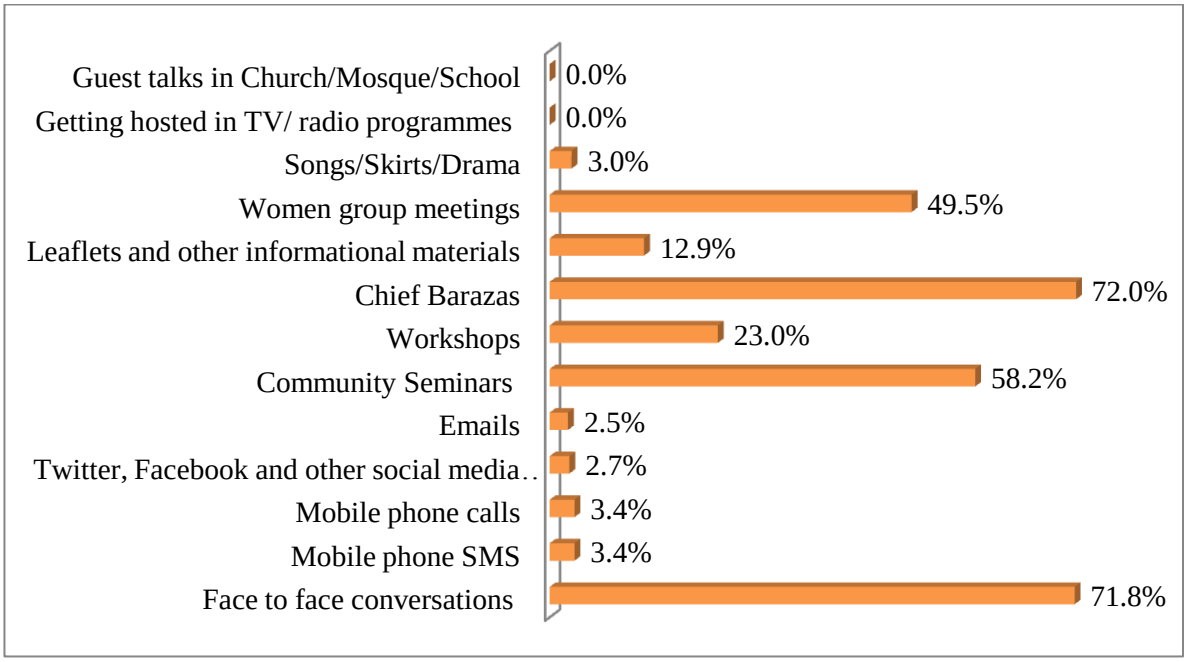
> *"I have attended climate change seminars about five times…. In one of these with an NGO called KCCWG, whose Chairman is very influential, we were taught how to prevent more climate change by planting trees, avoiding overgrazing, using alternative fuel such as biogas…. Also how to adapt by harvesting water, practicing crop rotation, planting drought resistant crops like cassava, sorghum and millet. We were then sent to go and share with others, become ambassadors and I have been influencing others. Now in my farm I have…a water tank and many varieties of trees. I talk to my neighbours and show them some things like good trees for*

planting and even give them seedlings. People here are ignorant and do not seem worried about climate change and so they need someone to tell them. Frequent barazas, church meetings and seminars like those of KCCWG should be planned to preach more about climate change. The youth should be empowered and involved because they have more time."

A different interview with the chairman of one FFS in KCC confirmed the use of informal one-to-many face-to-face interactions when he remarked that:

"When I receive an SMS like this one (the sms read: Rainfall forecast for March April & May 2013 Kitui Mwingi Mutomo Mwala Machakos Makindu-near normal to below normal [depressed rainfall] onset 3-4 Week of March Cessation 1 Week of May) which used to be sent to me by a MET officer so that I distribute to others, I explain to other people in the community whenever I get a chance…. During gatherings like FFS meetings, church services, weddings, funerals and such events I ask for a chance and explain the message to them and also share other things I have learnt or have been told about adapting to climate change."

Therefore one-to-one and one-to- many face to face interactions were found to be popularly used and deemed quite helpful in passing on ACCI. However, the study further sought to establish effectiveness of the identified interpersonal communication methods. To do this, survey respondents were asked to rate the methods they felt were the best in disseminating ACCI to them. Results were as indicted in Figure 4.8.



**All the above responses were multiple responses*

Figure 4.8: Rating of Effectiveness of Interpersonal Communication Methods

Results indicated that chief barazas (72%), face to face conversations (71.8%) and community seminars (58.2%) were the most effective methods of communicating ACCI to KCC residents. This was because KCC residents felt these methods were the best in disseminating ACCI to them which in essence meant that they best understood ACCI that was passed to them through these three methods. The narrow missing of a rating higher than 50% for the women group meetings was most probably because it was only rated by women and not men who due to gender had no membership into these groups and therefore never benefited from ACCI disseminated through such meetings.

To ascertain if the ratings by the residents were significant, the three methods that were rated as most effective by more than 50% of the respondents were subjected to the **chi-square goodness of fit** statistical test. To do this, the second hypothesis of the study *(Ho2:There is no significant effect of the highly rated opinion leadership strategies on*

effectiveness of communicating adaptive climate change information to residents of Kitui Central Constituency) was split thrice (*$Ho2_a$, $Ho2_b$ and $Ho2_c$*), tested at the significance level of 0.05 and the following results were obtained:

$Ho2_a$: There is no significant effect of using chief barazas on effectiveness of communicating ACCI to residents of KCC.

Table 4.22: Chi-Square for Chiefs Barazas

	Observed N	Expected N	Residual
Yes	406	282	124
No	158	282	-124
Total	**564**		

Since *Chi-Square = 109.050, p-value < 0.001*, which is way far below 0.05, the null hypothesis was rejected and it was concluded that the proportion of respondents rating chief barazas as effective was *significantly* greater than 50%. Therefore, use of chief barazas by OLs to diffuse information greatly improved effectiveness of communicating ACCI to residents of KCC.

$Ho2_b$: There is no significant effect of using face to face conversations on effectiveness of communicating ACCI to residents of KCC.

Table 4.23: Chi-Square for Face to Face Conversations

	Observed N	Expected N	Residual
Yes	405	282.0	123.0
No	159	282.0	-123.0
Total	**564**		

Since *Chi-Square = 107.298, p-value < 0.001*, which is way far below 0.05, the null hypothesis was rejected and it was concluded that the proportion of respondents rating face to face conversations as effective was *significant.* Therefore, use of face to face

conversations by OLs to diffuse information greatly improved effectiveness of communicating ACCI to residents of KCC.

$Ho2_c$: There is no significant effect of using community seminars on effectiveness of communicating ACCI to residents of KCC.

Table 4.24: Chi-Square for Community Seminars

	Observed N	Expected N	Residual
Yes	328	282.0	46.0
No	236	282.0	-46.0
Total	**564**		

Since *Chi-Square = 15.007, p-value < 0.001*, which is way far below 0.05, the null hypothesis was rejected and it was concluded that the proportion of respondents rating community seminars as effective was *significantly* greater than 50%. Therefore, use of community seminars by OLs to diffuse information greatly improved effectiveness of communicating ACCI to residents of KCC.

Table 4.25: Summary of Chi-Square Goodness of Fit Test for Ho2

	Chief Barazas	Face to face conversations	Community Seminars
Chi-Square	109.050	107.298	15.007
Df	1	1	1
Asymp. Sig.	.000	.000	.000

The study concluded that all the three most highly rated methods of communication were of significant impact on effectiveness of communication of ACCI and triangulation of the results with qualitative data agreed with these findings. From FGDs, almost the same communication methods were more preferred as seen in the following conversation:

Q: Which method do you prefer?

P4: Seminar to me is the best.

P5: Talking with someone is good. You take them to your *shamba*. And then you show him or her anything new you have learnt. The person sees how you do it and when they go to their *shamba* they do the same.

P3: In fact, social interaction is good….

P1: As for me I prefer just talking with friends on the road, in the market or any other social places. I tell them what I learnt and urge them to try it….

P2: Chiefs' *barazas*, FFS or women group seminars can be the best. Then they invite guests from NGOs or other places to talk to people because you know for us *wametuzoea (they have become used to us)*. Some are sarcastic and disrespectful whenever one of us speaks to them.

However, the interview with the Agricultural Extension Supervisor showed preference of an integration of interpersonal communication with radio. He explained:

> *"I find it more effective to use radio. Local FM channels like Musyi FM, Syokimau FM, County FM are very effective. This is because in the local FM we use local opinion leaders to discuss a topic. Like last time we went with one Chair of FFS, a Livestock Officer, an Agricultural Officer and a Farmer Representative at prime hours i.e. immediately after news. When we miss the most prime hour, we first do introductions by announcing severally to farmers that on a particular date there will be an informative radio programme so that many can tune in. I also once hosted a livestock (goats) sensitization programme for six days…and because it was at prime hours, many listened."*

The same opinion seemed to be held by the NGO Executive Leader who when asked how the NGOs he was involved with reached out to residents with ACCI he said that:

"We use workshops, seminars and projects like in the charcoal project our main purpose is to unpack the charcoal rules and regulations of 2005/2009 so that the community can understand them…. We also use media, radio, TV, newspapers... We invite them in our workshops so that they cover our events…. We also use twitter and Facebook but not mobile phones…. On effectiveness of media, if you want to reach masses, use radio…."

Generally, the findings agreed with scholars who established that although OLs use a range of interpersonal communication methods to achieve desired behavioural change, face-to-face recommendations are still overwhelmingly preferred over digital sources of information among many publics (Berry & Keller, 2006; Carl, 2006; Xue & Phelps, 2004). A study from ASALs of Kenya among the Mbeere farmers, rated face to face access as their preferred method for accessing weather forecast information that enabled timely decisions and action for on-farm operations (Njuki, 2013:5). However, as advocated by the Agricultural Extension Supervisor and NGO Executive Leader, the word of mouth can be passed over through mass media channels so as to reach more people simultaneously. In this case, instead of journalists who are not known to the community airing the content, OLs who are known and respected in the community can use FM stations to diffuse critical ACCI to more people faster.

In order to further examine ways in which opinion leaders communicated ACCI to residents of KCC, the study sought to establish the language most used by OLs to communicate ACCI and the findings were as shown in the Table 4.26.

Table 4.26: The Language Used Most by Opinion Leaders

Language	Frequency (n)	Percentage (%)
Kikamba	389	68.9
Kiswahili	99	17.6
English	5	0.9
Other	8	1.4
No Response	63	11.2
Total	**564**	**100.0**

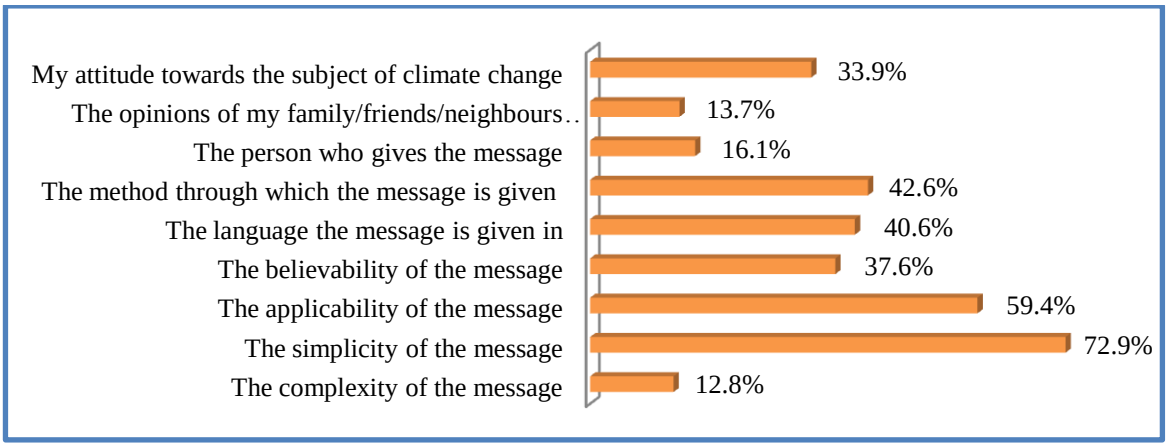
Results showed that Kikamba (68.9%), the vernacular language of KCC residents, was the most used language by OLs while Kiswahili (17.6%), the national language of Kenya, came second and the other languages took up the remaining 13.5%. Therefore, the OLs used the most common language in the community and this was good in view of the literacy levels of most ASALs' residents in Kenya. The usage was in tandem with the findings of KCCWG (2013) where local language was the most preferred to communicate climate change information at 58.3% followed by Kiswahili at 44% and English at 33% by residents living in ASALs. KCCWG established that most government officers and NGO workers chose to communicate climate change information in English and Kiswahili but most of the information was not accessed by the people due to language barrier and therefore the studied communities preferred their local language to be used for them to comprehend the rather complex ACCI.

Respondents were then asked whether or not they understood the ACCI shared by OLs. Their responses were as present in Table 4.27.

Table 4.27: Understandability of Diffused ACCI

Understands shared information	Frequency (n)	Percentage (%)
Yes	499	88.5
No	4	0.7
No Response	61	10.8
Total	**564**	**100.0**

88.5% of respondents acknowledged as understanding the information while 0.7% opined that they did not understand the information. The rest of the findings are as shown in Table 4.27. According to Nisbet (2010), for many members of the public, climate change is likely to be the ultimate ambiguous situation given its complexity and perceived uncertainty. That is why one cannot assess effectiveness of strategies used by OLs to communicate ACCI without finding out whether the audience understands the shared messages or not. To further assess understandability, the study sought to find out features of communicated messages that enhanced understandability. Results were as indicated in Figure 4.9.



**All the above responses were multiple responses*

Figure 4.9: Features Influencing Understandability of Messages

Results indicated that simplicity of the message (72.9%), applicability of the message (59.4%) and the method through which the message was given (42.6%) were the features that most influenced understandability. On simplifying the message and method of communication, Nisbet (2009), when exploring framing of climate change messages argues that to break through the communication barriers of human nature, partisan identity and media fragmentation, messages need to be tailored to a specific medium and audience, using carefully researched metaphors, allusions and examples that trigger a new way of thinking about the personal relevance of climate change. On message

applicability, Nisbet adds that one way to reach audiences is to recruit their influential peers to pass on selectively framed information about climate change that resonates with the background of the targeted audience and that addresses their personal information needs. When interviewed, the Trainer of Trainers (TOT) corroborated these findings.

> *"Having worked for about ten years as a TOT under the Department of Forestry where I train farmers on Agro-forestry, I would recommend that only trained people should cascade climate change information. To me, no chiefs or sub-chiefs can train intermediaries because although their level of education is ok, their duties are more on security and peace keeping. Instead, it should be done by primary intermediaries like agricultural extension officers and secondary intermediaries like farmers who have undertaken FFS trainings…. Only trained people will accurately understand and transfer the jargon of climate change…. The language is technical. For example message coding from MET is technical ... for example not everyone can interpret what rainfall "above normal" means. Therefore, I recommend that we have more TOTs to act as trainers of locals who can then train others better."*

In the same regard, a field officer working for a development CBO based in KCC in his interview observed that:

> *"One of the areas we focus on is climate change where we help locals to adapt to the adverse effects of climate change…. the technicality and vocabulary of the language needs repackaging and paper work needs to be simplified to ensure local communities understand…in our organization we realize that the level of engagement matters and therefore we use existing social groups to implement projects…. From each group we select three people who we develop into trainer of trainers*

[TOTs]…and then empower them…so that they do sensitization of the projects to others…. As a result…participants gain knowledge and confidence…and local leaders emerge... who diffuse new knowledge that is repackaged into everyday language and the community develops…"

When probed on how they frame complex ACCI, the NGO Executive Leader said:

"First of all by not using those big terms and adapting the language in terms of simplifying the language and involving locals…whenever we go for workshops we try and involve the local people…. We also give their scenarios because…they have knowledge that they can share with us…. We use the local language, local examples and historical examples that they have so that we domesticate it to the level that they can appreciate because climate change is something they have also been tackling… though by calling it another name or looking at it from another lens…."

The three key informants' sentiments were congruent with what scholars have propagated on enhancing effectives of OL campaigns. Kelly *et al* (2004) found it necessary to train and support OLs for them to be effective influentials in HIV prevention programmers and Nisbet and Kotcher (2009) found Kelly's methods for training and retention directly applicable to climate change-related OL campaigns. NEMA (2005) concluded that major effort was required to educate, train and inform the public about climate issues in a responsible and effective way. To effectively use opinion leadership to enhance engagement on adaptation to climate change, crafting and packaging this rather complex issue into simpler specific messages that connect to the day to day activities of the recipients is important (Nisbet & Kotcher, 2009). Therefore, to reach audiences more effectively it is important to recruit their influential peers to pass on selectively framed information about climate change that resonates with the background of the targeted audience (Nisbet, 2011).

To further assess effectiveness of the opinion leadership strategies, respondents were asked to state whether or not OLs were willing and available to explain communicated ACCI further or clarify any arising issues. Their responses were tallied and recorded.

Table 4.28: Opinion Leaders' Availability for Feedback

OL's availability	Frequency (n)	Percentage (%)
Yes	438	77.7
No	66	11.7
No response	60	10.6
Total	**564**	**100.0**

77.7% acknowledged that most OLs were willing and available to clarify any issues further while 11.7% felt that this was not the case as shown in Table 4.29. This was triangulated with qualitative data. During FGDs with opinion leaders, follow up and feedback mechanisms were found to be in place as evidenced by the following conversation:

Q: Do you follow up on your neighbours and others after you show or teach them something?

P2: Yes, we do. We even visit their homes to check on progress.

P3: We have to. Otherwise, how else can we be sure they understand?

P4: Yes, I do. Some actually visit me to find out more or to clarify something.

When interviewed on this, the Agricultural Extension Supervisor confirmed that his office sought feedback. He said:

"When giving advisories, farmers are asked to complete some forms where they give their names, phone numbers and other details. After some

time, we call them at random and ask some questions to check if they understood the information and whether they have been doing as advised."

During a key informant interview, the senior staff of Agricultural Sector Development Support Programme, Kitui Office, said that his office was keen on tracking effectiveness of their efforts when he reported that:

"To promote the three potential value chains in Kitui County - indigenous poultry, gadam sorghum and green grams - we hold regular stakeholder forums…. To cascade information from these forums and other important sources we have to know who is who in each of the three value chains… We chose 25 farmers representatives for each value chain as 'Value Chain Platform Members' to help cascade information…. We meet them in workshops for discussions and they go and preach…. We keep contact and vital details of all platform members…. We communicate with them to call for meetings and track progress via email and confirm with sms…. Although it's difficult to measure change, more people have been exposed to new information in the three value chains…we have been able to link farmers to input suppliers, processors and consumers…they have more market outlets…and insurance information is now known to them…although we don't train we have been able to link farmers with key stakeholders who then take up from there."

From these findings, it was apparent that OLs had established two way communication interactions with their followers and were therefore able to evaluate effectiveness of their communication strategies. Some, like the Agricultural Sector Development Support Programme staff, could tell the outcome of their efforts and others were able to clarify issues or adjust accordingly to improve the outcome. Feedback provision was done

interpersonally through continued face to face interactions, mobile phone conversations, sms, and email and was initiated by either the sender or the recipient of initial communication. In so doing, OLs and residents not only kept the dynamic adaptive climate change discourse flowing but they also made the communication process interactive and therefore more fruitful.

4.4.4 Moderating effects of socio-cultural factors on effectiveness of communication

The fourth objective for the study was *to determine the moderating effects of socio-cultural factors on effectiveness of opinion leadership strategies used in communicating ACCI to residents of KCC.* Under this objective, the study sought to determine how socio-cultural factors moderated the effectiveness of opinion leadership strategies as OLs tried to enhance KCC residents' adaptive capacity to climate change. To do this, the survey respondents were asked whether certain socio-cultural factors influenced how they used or responded to the ACCI received from OLs and the results were as indicated in Table 4.29 that follows.

Table 4.29: Socio-cultural Factors Affecting Usage of ACCI

Socio-cultural factor	Frequency (n)	Percentage (%)
Education level and technical know-how	357	63.3
Contradiction with social norms and values	36	6.4
Contradiction with cultural practices	42	7.4
Contradiction with religious beliefs	36	6.4
Others (poor communication networks & transport infrastructure)	91	16.1
Others (lack of money to buy necessary resources)	459	81.4
No answer	22	3.9

**The above were multiple responses*

On the one hand, the study observed that KCC residents' social status was characterized by low income and low literacy levels. As earlier indicated (Table 4.6), majority of the respondents 63.7% had primary education and only 10.1% had gone beyond secondary education. This closely agreed with the 63.3% respondents who pointed out that their

low education and lack of necessary technical skills hindered the use of received ACCI. Of course, due to low literacy levels, majority of the KCC residents had no formal jobs or established businesses to attract a steady source of income and this could explain why income level (81.4%) was highlighted as the biggest social challenge facing them in their endeavour to use received ACCI. This implied that although OLs communicated effectively and KCC residents understood the messages, many of them (residents) could not adapt to climate change effectively because they were poor and could not afford to purchase necessary resources such as new types of seeds, water tanks and new breeds of cattle among others. On the other hand, while contradiction of communicated messages with social norms and values (6.4%), contradiction with cultural practices (7.4%) and contradiction with religious beliefs (6.4%) posed lesser challenges in using received ACCI, it was notable that 16.1% identified other moderating factors that were of technological and infrastructural nature as influential factors in their usage of received ACCI; two outstanding ones were the poor communication networks and poor transport infrastructure in KCC.

During key informant interviews, similar factors were found to affect the effectiveness of OLs in communicating ACCI effectively. The successful farmer who was interviewed as an OL remarked that:

> *"To be an ambassador is not easy because there are no resources given to facilitate the same. I cannot keep using my family's income to move up and down telling others what I learnt in seminars and so I tell them only when convenient. Majority of my followers also need to be empowered financially because for instance when you tell them that importance of water harvesting, they understand but cannot afford money to put up water tanks. Digging boreholes is also expensive and many cannot afford. There are no irrigation schemes in the area. So they understand that they*

need to adapt to changing rainfall but how do they purchase the new varieties of seeds from KARI for example?"

His sentiments pointed out financial constraints as a key impediment to not only to the KCC residents but also to OLs who really want to share ACCI with their peers. These findings were further supported by the Agricultural Extension Supervisor who when interviewed on the challenges he faced when communicating ACCI to KCC residents revealed that:

"Because of poverty, whenever we teach people about the best seed to plant, fertilizers to use … in view of changing climate, they start asking us to supply them with the seed and fertilizers because of course majority of them cannot afford. But we also do not have budgetary allocation that can provide enough free seed to everyone. We however, supply some to the very need families that are identified through the chiefs' offices. Then also religious beliefs. Sometimes you give someone vital information about rain forecast and they answer back that rain belongs to the Almighty God and ask 'who is man to predict its outcome?' …and finally many people here do not do farming for business purposes. They just farm for subsistence use. If they would take farming seriously … they would follow our advice."

On the same, the senior staff of Agricultural Sector Development Support Programme said that:

"The county is vast and covering it is not easy. Physical visits are expensive. The mobile phone network coverage is also not good and so communicating … is difficult…therefore we have identified farmer representatives who we train and use to cascade information to the

communities.… They however report that they face challenges such as cultural barriers where for instance, there are locals who do not believe in using fertilizer… to improve their farm's productivity, they say it will destroy their ancestral land and that could lead to curses."

The findings were further corroborated from FGDs. Participants mentioned that they faced financial challenges. They felt that culture was not a barrier except among the elderly. However, social norms and gender roles had influence as seen in the following conversation.

Q: Does culture in any way interfere with acceptance of communicated information about adapting to climate change?

P2: No, and if there is any cultural problem, then not among our generation. May be with the very old.

P3: I would say not culture but rather some practices. For example when we tell people that rain will be short and we advise them not to plant maize but other crops like *mtama* (sorghum) and *mawele (millet)*, they go ahead and plant maize which is their practice…. And this is because *mkamba amejifanya mzungu na hataki kula vyakula vingele ilihali hivi ndivyo vilikuwa vyakula vyake vya zamani* (the Kamba person has become westernized and no longer wants to eat his/her traditional foods).

P6: Another reason is that in this community as a practice, men will hardly do anything unless they are being paid. Therefore, if it is in their own *shambas*, work is left for women because no direct cash is received.

These study findings agreed with Antwi-Agyei *et al* (2013) who in assessing the barriers that restrict effective implementation of climate adaptations in Sub-Saharan Africa, found that SSA households are constrained by a range of barriers including

economic barriers, institutional barriers, social-cultural barriers such as belief systems and local norms, technological barriers and a lack of infrastructural development.

However, to further ascertain these findings, background information collected from the study was used to perform chi-square goodness of fit test to determine whether specific socio-cultural factors (gender, age and literacy levels) moderated the effectiveness of opinion leadership strategies used to communicate ACCI to KCC residents. To do this, the third hypothesis of the study *(Ho3: There is no significant effect of socio-cultural factors on the effectiveness of the highly rated opinion leadership strategies used in communicating adaptive climate change information to residents of Kitui Central Constituency)* was split nine times (*$Ho3_a$, $Ho3_b$, $Ho3_c$, $Ho3_d$, $Ho3_e$, $Ho3_f$, $Ho3_g$, $Ho3_h$, and $Ho3_i$*) because each of the three factors was tested against each of the three highly rated opinion leadership strategies. The nine were tested at the significance level of 0.05 and the following results were obtained:

Moderating effects of gender

$Ho3_a$: There is no significant effect of gender on the effectiveness of face to face conversations in communicating ACCI to residents of KCC.

Table 4.30a: Chi Square for Gender and Face to Face conversations

Gender of Respondents		Observed N	Expected N	Residual
	Yes	125	86.0	39.0
Male	No	47	86.0	-39.0
	Total	172		
	Yes	266	181.5	84.5
Female	No	97	181.5	-84.5
	Total	363		

Table 4.30b: Chi Square for Gender and Face to Face conversations

Gender of Respondents		Face to face conversations
Male	Chi-Square	35.372
	df	1
	Asymp. Sig.	.000
Female	Chi-Square	78.680
	df	1
	Asymp. Sig.	.000

From Tables 4.30a and 4.30b, since *Chi-Square for male = 35.372, p-value < 0.001 and Chi-Square for female = 78.680, P-value <0.001* are both way far below 0.05, the null hypothesis *that 'there is no significant effect of gender on the effectiveness of face to face conversations in communicating ACCI to residents of KCC'* was rejected for both males and females. Thus there was similar rating of effectiveness of face to face conversations in communicating ACCI to KCC residents by both gender. Therefore, gender did not have moderating effect on this opinion leadership strategy.

$Ho3_b$: There is no significant effect of gender on the effectiveness of chief barazas in communicating ACCI to residents of KCC.

Table 4.31a: Chi-Square for Gender and Chief Barazas

Gender of Respondents		Observed N	Expected N	Residual
Male	Yes	118	86.0	32.0
	No	54	86.0	-32.0
	Total	172		
Female	Yes	272	181.5	90.5
	No	91	181.5	-90.5
	Total	363		

Table 4.31b: Chi-Square for Gender and Chief Barazas

Gender of Respondents		Chief Barazas
Male	Chi-Square	23.814
	df	1
	Asymp. Sig.	.000
Female	Chi-Square	90.251
	df	1
	Asymp. Sig.	.000

From Tables 4.31a and 4.31b, since *Chi-Square for male = 23.814, p-value < 0.001 and Chi-Square for female = 90.251, P-value <0.001,* are both far way below 0.05, the null hypothesis *that 'there is no significant effect of gender on the effectiveness of chief barazas in communicating ACCI to residents of KCC'* was rejected for both males and females. Thus there was similar rating of effectiveness of chief barazas in communicating ACCI to KCC residents by both gender. Therefore, gender did not have moderating effect on this opinion leadership strategy.

$Ho3_c$: There is no significant effect of gender on the effectiveness of community seminars in communicating ACCI to residents of KCC.

Table 4.32a: Chi-Square for Gender and Community Seminars

Gender of Respondents		Observed N	Expected N	Residual
Male	Yes	98	86.0	12.0
	No	74	86.0	-12.0
	Total	172		
Female	Yes	219	181.5	37.5
	No	144	181.5	-37.5
	Total	363		

Table 4.32b: Chi-Square for Gender and Community Seminars

Gender of Respondents		Community Seminars
Male	Chi-Square	3.349
	df	1
	Asymp. Sig.	.067
Female	Chi-Square	15.496
	df	1
	Asymp. Sig.	.000

From Tables 4.32a and 4.32b, since *Chi-Square for male = 3.349, p-value = 0.067 and Chi-Square for female = 15.496, P-value <0.001,* the null hypothesis *that 'there is no significant effect of gender on the effectiveness of community seminars in communicating ACCI to residents of KCC'* failed to be rejected for males but was rejected for females. Thus there was no preference by males on use of community seminars to communicate ACCI to KCC residents whereas there was preference by females on use of community seminars by opinion leaders to communicate ACCI to KCC residents. Therefore, gender had moderating effects on this opinion leadership strategy.

The study concluded therefore that gender had moderating effects on some opinion leadership strategies (community seminars) but not on others. This could be confirmed by Antwi-Agyei et al (2013) who found out that there was a relationship among female farmers and adaptation options to climate change in Ghana but more closely it was supported by and attributed to what KCCWG (2013) found out among residents of ASALs of Kenya:

> Men and women accessed climate change information at different times in different forums as they naturally set out to their activities and engagements as an everyday practice. It came out strongly that women unlike men across the four counties [Kajiado, Kitui, Turkana and Wajir] received more information in social forums such as churches, women

groups, community workshops and other undefined outdoor social networks. Men did not seem to be keen with information contrary to their way of life. They were a little slow and often sent out their wives to workshops to get the information which mostly they never followed up on or never implemented (KCCWG, 2013: 59).

Moderating effects of Age

$Ho3_d$: There is no significant effect of age on the effectiveness of face to face conversations in communicating ACCI to residents of KCC.

Table 4.33a: Chi-Square for Age and Face to Face Conversations

Age of Respondent		Observed N	Expected N	Residual
	Yes	48	39.0	9.0
21-30	No	30	39.0	-9.0
	Total	78		
	Yes	108	73.5	34.5
31-40	No	39	73.5	-34.5
	Total	147		
	Yes	104	66.5	37.5
41-50	No	29	66.5	-37.5
	Total	133		
	Yes	78	52.0	26.0
51-60	No	26	52.0	-26.0
	Total	104		
	Yes	60	44.0	16.0
Above 60	No	28	44.0	-16.0
	Total	88		

Table 4.33b: Chi-Square for Age and Face to Face Conversations

Age of Respondent		Face to face conversations
21-30	Chi-Square	4.154
	df	1
	Asymp. Sig.	.042
31-40	Chi-Square	32.388
	df	1
	Asymp. Sig.	.000
41-50	Chi-Square	42.293
	df	1
	Asymp. Sig.	.000
51-60	Chi-Square	26.000
	df	1
	Asymp. Sig.	.000
Above 60	Chi-Square	11.636
	df	1
	Asymp. Sig.	.001

From Tables 4.33a and 4.33b, since following the chi-square goodness of fit test the *P-value was <0.05* for all age categories, the null hypothesis that *'there is no significant effect of age on the effectiveness of face to face conversations in communicating ACCI to residents of KCC'* was rejected for all age strata. Thus there was similar rating by all age groups on the effectiveness of face to face conversations as used by OLS to communicate ACCI to KCC residents. Therefore, age did not have moderating effect on this opinion leadership strategy.

$Ho3_e$: There is no significant effect of age on the effectiveness of chief barazas in communicating ACCI to residents of KCC.

Table 4.34a: Chi-Square for Age and Chief Barazas

Age of Respondent		Observed N	Expected N	Residual
21-30	Yes	53	39.0	14.0
	No	25	39.0	-14.0
	Total	78		
31-40	Yes	107	73.5	33.5
	No	40	73.5	-33.5
	Total	147		
41-50	Yes	103	66.5	36.5
	No	30	66.5	-36.5
	Total	133		
51-60	Yes	75	52.0	23.0
	No	29	52.0	-23.0
	Total	104		
Above 60	Yes	58	44.0	14.0
	No	30	44.0	-14.0
	Total	88		

Table 4.34b: Chi-Square for Age and Chief Barazas

Age of Respondent		Chief Barazas
21-30	Chi-Square	10.051
	df	1
	Asymp. Sig.	.002
31-40	Chi-Square	30.537
	df	1
	Asymp. Sig.	.000
41-50	Chi-Square	40.068
	df	1
	Asymp. Sig.	.000
51-60	Chi-Square	20.346
	df	1
	Asymp. Sig.	.000
Above 60	Chi-Square	8.909
	df	1
	Asymp. Sig.	.003

From Tables 4.34a and 4.34b, since following the chi-square goodness of fit test the *P-value was <0.05* for all age categories, the null hypothesis that *'there is no significant effect of age on the effectiveness of chief barazas in communicating ACCI to residents of KCC'* was rejected for all age strata. Thus there was similar rating by all age groups on the effectiveness of chief barazas as used by OLs to communicate ACCI to KCC residents. Therefore, age did not have moderating effect on this opinion leadership strategy.

$Ho3_f$: There is no significant effect of age on the effectiveness of community seminars in communicating ACCI to residents of KCC.

Table 4.35a: Chi-Square for Age and Community Seminars

Age of Respondent		Observed N	Expected N	Residual
21-30	Yes	31	39.0	-8.0
	No	47	39.0	8.0
	Total	78		
31-40	Yes	95	73.5	21.5
	No	52	73.5	-21.5
	Total	147		
41-50	Yes	89	66.5	22.5
	No	44	66.5	-22.5
	Total	133		
51-60	Yes	66	52.0	14.0
	No	38	52.0	-14.0
	Total	104		
Above 60	Yes	44	44.0	.0
	No	44	44.0	.0
	Total	88		

Table 4.35b: Chi-Square for Age and Community Seminars

Age of Respondent		Community Seminars
21-30	Chi-Square	3.282
	df	1
	Asymp. Sig.	.070
31-40	Chi-Square	12.578
	df	1
	Asymp. Sig.	.000
41-50	Chi-Square	15.226
	df	1
	Asymp. Sig.	.000
51-60	Chi-Square	7.538
	df	1
	Asymp. Sig.	.006
Above 60	Chi-Square	.000
	df	1
	Asymp. Sig.	1.000

From Tables 4.35a and 4.35b, since following the chi-square goodness of fit test the *P-value for the youngest group (21-30 years) and the elderly (above 60 years) was >0.05 (0.070 and 1.00 respectively),* the null hypothesis that *'there is no significant effect of age on the effectiveness of community seminars in communicating ACCI to residents of KCC'* failed to be rejected for these two age strata whereas it was rejected for the other three age strata viz 31-40, 41-50 and 51-60 as the *P-value for three categories was <0.05*. Thus there was no preference by the youthful and the elderly on the use of community seminars to communicate ACCI but there was preference by those aged between 31 and 60 years on use of community seminars by opinion leaders to communicate ACCI to KCC residents. Therefore, age had moderating effects on this opinion leadership strategy.

Therefore age just like gender had moderating effects on some opinion leadership strategies (community seminars) but not on others. This was supported by KCCWG (2013) that established that there were differences among the youth and the elderly in the

ASALs communities of Kenya when it came to access and usage of climate change information because of the mode used to communicate climate change information and financial power to adapt to climate change.

Moderating effects of Literacy Level

$Ho3_g$: There is no significant effect of literacy level on the effectiveness of face to face conversations in communicating ACCI to residents of KCC.

Table 4.36a: Chi-Square for Literacy Level and Face to Face Conversations

Highest level of education		Observed N	Expected N	Residual
Never been to school	Yes	21	20.0	1.0
	No	19	20.0	-1.0
	Total	40		
Ngumbaru	Yes	13	13.0	.0
	No	13	13.0	.0
	Total	26		
Primary education	Yes	230	146.5	83.5
	No	63	146.5	-83.5
	Total	293		
Secondary education	Yes	107	72.5	34.5
	No	38	72.5	-34.5
	Total	145		
College education	Yes	25	22.5	2.5
	No	20	22.5	-2.5
	Total	45		
University education	Yes	7	6.0	1.0
	No	5	6.0	-1.0
	Total	12		

Table 4.36b: Chi-Square for Literacy Level and Face to Face Conversations

Highest level of education		Face to face conversations
Never been to school	Chi-Square	.100
	df	1
	Asymp. Sig.	.752
Ngumbaru	Chi-Square	.000
	df	1
	Asymp. Sig.	1.000
Primary education	Chi-Square	95.184
	df	1
	Asymp. Sig.	.000
Secondary education	Chi-Square	32.834
	df	1
	Asymp. Sig.	.000
College education	Chi-Square	.556
	df	1
	Asymp. Sig.	.456
University education	Chi-Square	.333
	df	1
	Asymp. Sig.	.564

From Tables 4.36a and 4.36b, since following the chi-square goodness of fit test the *P-value for the least literate groups (never been to school and ngumbaru) and the most literate groups (college and university education) was >0.05 (0.752, 1.00, 0.456 and 0.564 respectively),* the null hypothesis that *'there is no significant effect of literacy level on the effectiveness of face to face conversations in communicating ACCI to residents of KCC'* failed to be rejected for these four literacy levels whereas it was rejected for the primary and secondary education levels who both had the *P-value <0.001*. Thus there was no preference by the least and most educated on the use of face to face conversations to communicate ACCI but there was preference by those with primary and secondary level education on the use of face to face conversations by opinion leaders to communicate ACCI to KCC residents. Therefore, literacy level had moderating effects on this opinion leadership strategy.

$Ho3_h$: There is no significant effect of literacy level on the effectiveness of chief barazas in communicating ACCI to residents of KCC.

Table 4.37a: Chi-Square for Literacy Level and Chiefs Barazas

Highest level of education		Observed N	Expected N	Residual
Never been to school	Yes	24	20.0	4.0
	No	16	20.0	-4.0
	Total	40		
Ngumbaru	Yes	21	13.0	8.0
	No	5	13.0	-8.0
	Total	26		
Primary education	Yes	228	146.5	81.5
	No	65	146.5	-81.5
	Total	293		
Secondary education	Yes	103	72.5	30.5
	No	42	72.5	-30.5
	Total	145		
College education	Yes	18	22.5	-4.5
	No	27	22.5	4.5
	Total	45		
University education	Yes	9	6.0	3.0
	No	3	6.0	-3.0
	Total	12		

Table 4.37b: Chi-Square for Literacy Level and Chiefs Barazas

Highest level of education		Chief Barazas
Never been to school	Chi-Square	1.600
	df	1
	Asymp. Sig.	.206
Ngumbaru	Chi-Square	9.846
	df	1
	Asymp. Sig.	.002
Primary education	Chi-Square	90.679
	df	1
	Asymp. Sig.	.000
Secondary education	Chi-Square	25.662
	df	1
	Asymp. Sig.	.000
College education	Chi-Square	1.800
	df	1
	Asymp. Sig.	.180
University education	Chi-Square	3.000
	df	1
	Asymp. Sig.	.083

From Tables 4.37a and 4.37b, since following the chi-square goodness of fit test the *P-value for the least literate group and the two most literate groups was 0.206, 0.180 and 0.083 respectively,,* the null hypothesis that *'there is no significant effect of literacy level on the effectiveness of chief barazas in communicating ACCI to residents of KCC'* failed to *be* rejected whereas it was rejected for the ngumbaru (*P-value = 0.002*), primary (*P-value < 0.001*) and secondary (*P-value < 0.001*) levels. Thus there was no preference by the least and most educated on the use of chief barazas but there was preference by those with some education on the use of chief barazas by opinion leaders to communicate ACCI to KCC residents. Therefore, literacy level had moderating effects here.

$Ho3_i$: There is no significant effect of literacy level on the effectiveness of community seminars in communicating ACCI to residents of KCC.

Table 4.38a: Chi-Square for Literacy Level and Community Seminars

Highest level of education		Observed N	Expected N	Residual
	Yes	15	20.0	-5.0
Never been to school	No	25	20.0	5.0
	Total	40		
	Yes	10	13.0	-3.0
Ngumbaru	No	16	13.0	3.0
	Total	26		
	Yes	187	146.5	40.5
Primary education	No	106	146.5	-40.5
	Total	293		
	Yes	83	72.5	10.5
Secondary education	No	62	72.5	-10.5
	Total	145		
	Yes	23	22.5	.5
College education	No	22	22.5	-.5
	Total	45		
	Yes	9	6.0	3.0
University education	No	3	6.0	-3.0
	Total	12		

Table 4.38b: Chi-Square for Literacy Level and Community Seminars

Highest level of education		Community Seminars
Never been to school	Chi-Square	2.500
	df	1
	Asymp. Sig.	.114
Ngumbaru	Chi-Square	1.385
	df	1
	Asymp. Sig.	.239
Primary education	Chi-Square	22.392
	df	1
	Asymp. Sig.	.000
Secondary education	Chi-Square	3.041
	df	1
	Asymp. Sig.	.081
College education	Chi-Square	.022
	df	1
	Asymp. Sig.	.881
University education	Chi-Square	3.000
	df	1
	Asymp. Sig.	.083

From Tables 4.38a and 4.38b, since following the chi-square goodness of fit test the *P-value for the all literacy groups except primary education level was >0.05,* the null hypothesis that *'there is no significant effect of literacy level on the effectiveness of community seminars in communicating ACCI to residents of KCC'* failed to be rejected for five literacy levels (never been to school, ngumbaru, secondary education, college education and university education) whereas it was rejected for those of primary level education as *P-value < 0.001*. Thus there was no preference by the five groups on the use of community seminars to communicate ACCI but there was preference by those of primary level of education on the use of community seminars by opinion leaders to

communicate ACCI to KCC residents. Therefore, literacy level had effects on this opinion leadership strategy.

The study established therefore that literacy level influenced the effectiveness of opinion leadership strategies used by OLs to communicate ACCI to residents of KCC. This is confirmed by Farauta *et al* (2011) who found out levels of education complicate the task of developing location-specific responses that effectively address the impacts of climate change. This could also be attributed to the differences in cognitive abilities and as Jones and Boyd (2011) observed social barriers may be cognitive, normative or institutional. The cognitive barriers involve psychological and thought processes that influence individuals' reactions to risks including climate change (Swim *et al.*, 2011).

4.5 Revised conceptual framework

Analyses of the study findings of the study led to a revised conceptual framework. This followed the isolation of six attributes of effective opinion leaders, realization that certain opinion leadership strategies were more effective in communication of ACCI than others, the finding that only some of the earlier proposed socio-cultural factors had moderating effects on the effectiveness of opinion leadership strategies and the finding that even economic factors had moderating effects effectiveness of opinion leadership strategies used to communicate ACCI to residents of KCC.

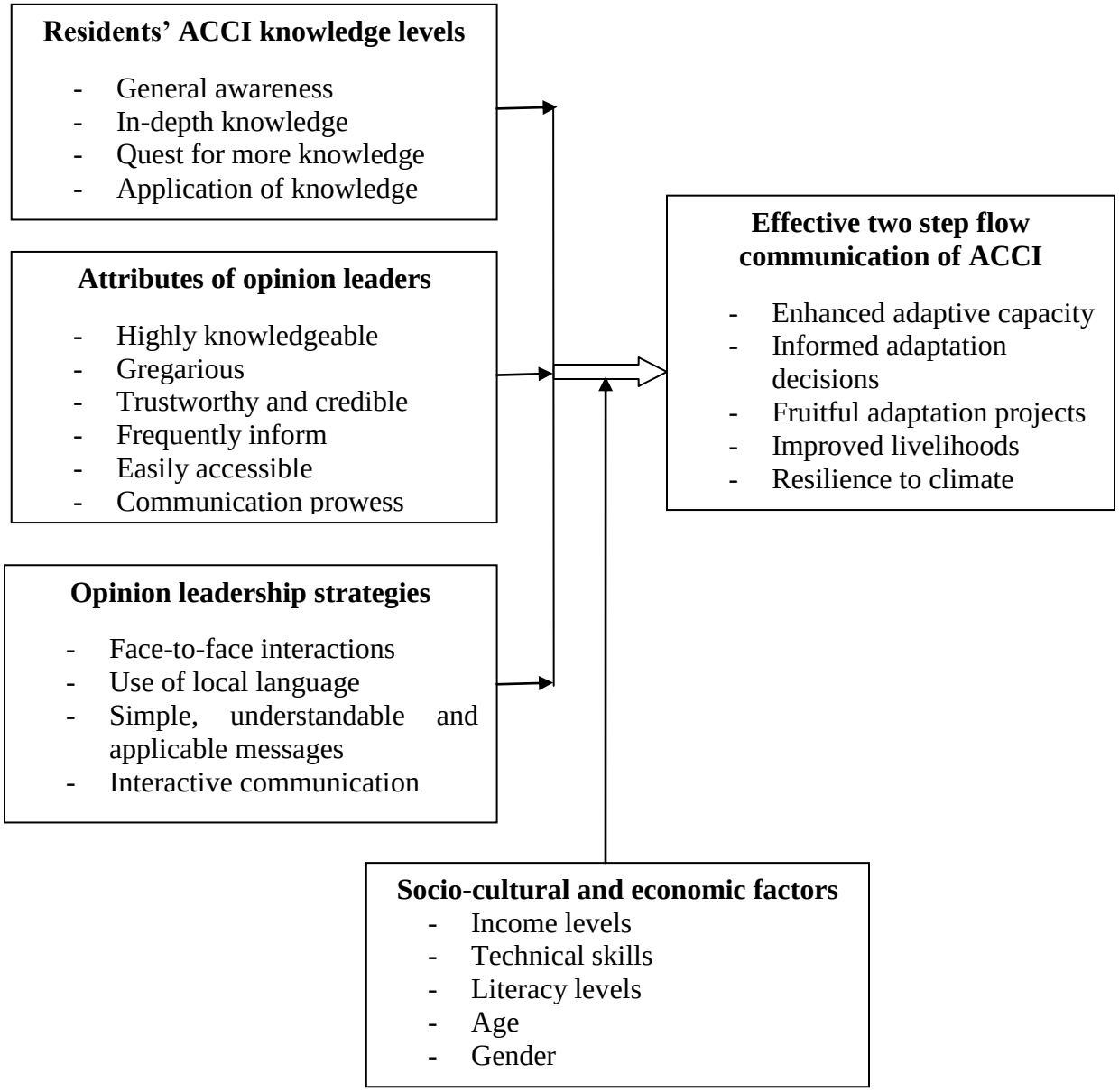


Figure 4.10: Revised Conceptual Framework

As indicated in the revised conceptual framework, the study revealed important aspects of each variable that are necessary for effective communication of ACCI to KCC residents using opinion leadership strategies. For instance, only six attributes of opinion leaders mattered most for them to be effective influentials among the KCC residents. Similarly, the evaluation revealed that key aspects of opinion leadership strategies were very vital if effectiveness of adaptive climate change campaigns by opinion leaders were to be effective among the KCC residents. The residents through the survey played a key role in this evaluation. Key informants through focus group discussions and interviews added striking perspectives to the survey findings. These were measured against what local and international scholars have found out over the years on the subject of effectiveness of opinion leadership communication and more so effectiveness of opinion leaders' climate change campaigns. These revelations were summarized in the ensuing chapter and relevant conclusions drawn.

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of major findings of the study, relevant discussions and conclusions, and outlines the recommendations derived from the findings. The study sought to evaluate effectiveness of opinion leadership strategies used to communicate adaptive climate change information to residents of Kitui Central Constituency. Specific objectives of the study included investigation of residents' knowledge levels on adaptive climate change information that would be useful in evaluation of opinion leadership strategies, evaluation of attributes of individuals who use opinion leadership strategies to communicate adaptive climate change information, examination of ways used by opinion leaders to communicate adaptive climate change information and determination of the moderating effects of socio-cultural factors on effectiveness of the opinion leadership strategies used to communicate adaptive climate change information to residents of Kitui Central Constituency. As is practice, each recommendation traces directly to each conclusion.

5.2 Summary of findings

Findings from the four objectives of the study were summarized as follows based on the output of quantitative and qualitative data analyses so as to test the research questions.

5.2.1 What are the knowledge levels on adaptive climate change information among residents of Kitui Central Constituency that would be useful in evaluating opinion leadership strategies?

Research findings indicated that most (97.5%) residents of Kitui Central Constituency were aware of occurrence of climate change in their locality as well as its adverse effects

and had started doing something about it. Most (72.8%) residents could define 'climate change' using climate change indicators such as changes in rainfall patterns, increase in temperatures, droughts, water restrictions, winds, bush fires and floods. Most residents knew there was need to adapt to the changing climate and majority (93.3%) had ever changed their lifestyles so as to cope with it. However, when residents were asked to state whether or not they required adaptive climate change information to help them make decisions in some of the areas they were changing due to climate change effects, 98% of them opined that they needed such information. This meant that although Kitui Central Constituency residents had general awareness that something was happening to the climate that their daily livelihoods were very much dependent on and had started taking steps to cope with it, they still desperately needed relevant adaptive climate change information to enhance their adaptive capacity.

These findings agree with scholars who claim that in some sense, communication on climate change has been spectacularly successful because across nations, nearly everyone in surveyed populations has at least heard of the issue and many can identify at least some important climate change impacts (Moser & Dilling, 2012; Leiserowitz, 2007). However, upon deeper exploration, it is found that the understanding is superficial, personal concern is relatively low and ever-susceptible to be overwhelmed by more immediate, salient threats and interests (Moser & Dilling, 2012).

Therefore, according to Moser and Dilling (2012), communication which is an essential means to link scientists, politicians and the public can and should play an important and constructive role in enabling public engagement with climate change. This is because the assumed goal of most communication on climate change is not only to reach an audience but also to actively engage people cognitively, affectively and behaviourally so that people can grapple mentally with and gain understanding of the issue, experience an emotional response and actively respond by way of changes in climate-relevant behavior

or political action (Lorenzoni, Nicholson-Cole & Whitmarsh, 2007; Moser, 2009; Moser & Dilling, 2007; NRC, 2002).

5.2.2 What are the attributes of individuals who use opinion leadership strategies to communicate adaptive climate change information to residents of Kitui Central Constituency?

Majority (85.5) % of Kitui Central Constituency residents identified several opinion leaders diffusing adaptive climate change information among them. These largely included village administrator's such as chiefs and sub-chiefs, agricultural extension officers, women group leaders, fellow farmers, community elders, religious leaders, government officials such as KARI staff, NGO representatives, professionals such as teachers and fellow business men. The residents rated village administrators as best (74.3%) in meeting their adaptive climate change information needs followed by agricultural extension officers (58.7%), women group leaders (49.8%) and fellow farmers (47.7%). They rated an opinion leader highly if the opinion leader was very knowledgeable (65.1%) on climate change issues, was social and friendly (61.7%), was trustworthy and credible (60.5%), discussed the issue more frequently (56%), was easily accessible (55.7%) and had communication prowess (55.3%). Though rated lower, it was also notable that more effective opinion leaders were deemed to be those who had positions of authority (37.4%), higher consumption of mass media content (36.3%) and higher education (25.4%). However, the residents indicated that the opinion leaders did not engage them in the rhetoric of adapting to climate change as frequently as they would have wanted with the highest count of 32.6% pointing out that they were informed about adaptive climate change information only once every 3-4 months followed by 31.4% who said for them it was only done during rainy season. This meant that even the opinion leaders who were rated highly because of their attribute of frequently discussing the issue did not discuss adaptive climate change information as often as the residents would have wanted but instead they just did it more times when compared to others.

These findings conform to studies undertaken by other scholars. First, like many other publics, residents of Kitui Central Constituency were found to be increasingly distrustful of both news and advertising from mass media, preferring instead recommendations from opinion leaders who included friends, family, coworkers, and peers (Keller & Berry, 2003). This two-step flow approach enabled tapping into the benefits of face-to-face, a more direct communication, which has been suggested to be more effective in communicating adaptive climate change information (Nisbet & Kotcher, 2009) because climate change opinion leaders serve as influential go-betweens, receiving and passing on to their peers information, news, resources and requests to get involved (Nisbet, 2011).

However, for the opinion leaders to effectively serve as the connective communication tissue they must possess particular characteristics. In this regard, the findings were congruent to findings by scholars who have established that opinion leaders are usually people who are likeable, trustworthy and influential and when compared to their peers, opinion leaders tend to be more exposed to all forms of external communication (Flodgren *et al.*, 2011) and as such are more knowledgeable on the issue of concern. While opinion leaders are more gregarious than non-leaders (Loudon & Britta, 1979), individuals with strong personality traits of confidence, leadership, and persuasiveness are found to be socially connected to a greater number of other community members and more likely to influence the opinions of others (Weimann, 1994). OLs are better educated and more affluent than the average person and it is their interest and belief that they can make a difference in the world around them that makes them influential (Nisbet & Kotcher, 2009). Nisbet (2009), exemplifies this by observing that although climate change is predominantly framed as a scientific issue and has had scientists as the primary sources and voices in media reports, and while scientists working in relevant fields are generally credible and trusted as information sources (NSF, 2008), they are not the most trusted or most appropriate source with every audience or with any message

(Cvetkovich & Lofstedt, 2000). Instead, specific kinds of barriers to adaptation to climate change can be softened by strategic use of opinion leaders from diverse backgrounds who can enhance better framing of this complex phenomenon (Nisbet, 2011). For instance, if climate change is framed as a moral issue, religious leaders may have greater persuasion (Wardekker *et al.,* 2009). If taking action on climate change is seen as an economic issue, it may be most credibly conveyed by a business person who has done it (Arroyo & Preston, 2007). However, these opinion leaders must be trusted because as Moser & Dilling (2012) articulate:

> Trust in the messenger is particularly important in the context of a problem like climate change that is invisible, uncertain, seemingly remote in time and space, scientifically and morally complex, and which may pose significant demands on citizens' scientific literacy and their behaviors. Individuals not inclined or able to systematically process a large amount of (sometimes conflicting) complex or difficult to understand information will use heuristics – mental shortcuts – to make up their minds about it. Thus, for example, trust can be based on a messenger belonging to one's own social or cultural group (Moser & Dilling, 2012: 12-14).

However, whether or not a messenger is persuasive to a certain audience also depends on the type and intensity of interaction between them (Maibach *et al.,* 2008). This intensity is what the well qualified opinion leaders in Kitui Central Constituency lack by not frequently discussing the issue and it is here that their effectiveness was found wanting because as Nisbet and Kotcher (2009) observe, opinion leaders are individuals who pay close attention to an issue and frequently discuss the issue.

5.2.3 How do opinion leaders communicate adaptive climate change information to residents of Kitui Central Constituency?

The study findings indicated that chief barazas (80.9%), face to face conversations (80.5%), community seminars (70.4%) and women group meetings (64.9%) were the most used methods by opinion leaders when communicating adaptive climate change information to residents of Kitui Central Constituency. Conversely digital methods including emails (0.7%), social media (1.2%), mobile phone calls (3.5%) and mobile phone sms (4.1%) were the least used methods. Songs/skits/drama (1.6%) and getting hosted in TV/radio programmes (5.9%) were also unpopular. When asked to rate the methods they felt were the best in disseminating adaptive climate change information to them, Kitui Central Constituency residents indicated that chief barazas (72%), face to face conversations (71.8%) and community seminars (58.2%) as the best methods. Chi-square goodness of fit test confirmed these three methods were of significant preference and triangulation of the results was with qualitative data agreed to the same. Apparently, these three most preferred methods involved face to face interactions.

The findings agree with scholars who have established that although opinion leaders use a range of interpersonal communication skills and methods in order to achieve desired behavioural change, face-to-face recommendations are still overwhelmingly preferred over digital sources of information among many publics (Berry & Keller, 2006; Carl, 2006; Xue & Phelps, 2004). In general, while mass media are important for agenda-setting, face-to-face communication is more persuasive than mass media communication (Lee *et al.,* 2002). Face-to-face is the richest medium because it has the capacity for direct experience, multiple information cues, immediate feedback, personal focus and enables the assimilation of broad cues and deep, emotional understanding of the message (Lengel & Daft, 1988). It allows for dialogue to emerge, and the trust between individuals participating in a two-way exchange goes a long way towards engaging and convincing someone (Moser & Dilling, 2012). Rich media should be used for complex and non-routine messages (Axley, 2000) and communicating change is best done face-

to-face (Quirke, 2000) because interactive communication improves behavior change (Abroms & Maibach, 2008).

In addition, the study found out that Kikamba (68.9%), the local language of Kitui Central Constituency residents, was the most used language in communicating adaptive climate change information by opinion leaders followed by Kiswahili (17.6%), the national language in Kenya. No wonder majority (88.5%) said that they understood communicated information. However, the study established that there were other features that enhanced understandability of the messages including simplicity of the message (72.9%) and applicability of the message (59.4%). It is in this line that key informants observed that adaptive climate change information was technical and its jargon needed repackaging into everyday language that resonate with residents' everyday experiences for them to understand it and appreciate its value. The study also found out that there were feedback mechanisms to check comprehension of communicated messages. Most residents (77.7%) appreciated the fact that opinion leaders were willing and available to explain messages further. Similarly, key informants agreed to availability of two way communicative interactions that made opinion leaders in Kitui Central Constituency able to evaluate effectiveness of their communications and adjust accordingly.

These findings agree with Jones (2010) that the key to success in opinion leader campaigns is in the ability to keep things simple and flexible. The findings are further supported by Nisbet & Kotcher (2009) who say that in order to effectively use opinion leadership to enhance engagement on adaptation to climate change, crafting and packaging this rather complex issue into simpler specific messages that connect to the day to day activities of the recipients is important. Therefore, to reach audiences more effectively it is important to recruit their influential peers to pass on selectively framed information about climate change that resonates with the background of the targeted audience and that addresses their personal information needs (Nisbet, 2011). Good

representation emanating from shared social and physical worlds makes communicated messages applicable and acceptable (Campbell, 2011). This is because the communication challenge has been to shift climate change from the mental box of 'uncertain science' to a new cognitive reference point that connects to something the specific intended audience already understands (Nisbet & Kotcher, 2009).

5.2.4 Do socio-cultural factors moderate effectiveness of opinion leadership strategies used in communicating adaptive climate change information to residents of Kitui Central Constituency?

Whereas on the one hand only less than 10% of Kitui Central Constituency residents felt that their adaptive behavior to climate change was challenged by contradiction received adaptive climate change information with their social norms and values (6.4%), contradiction with cultural practices (7.4%) and contradiction with religious beliefs (6.4%), on the one hand the study observed that Kitui Central Constituency residents' social status was characterized by low income and low literacy levels. Majority (63.7%) of them had primary level education and this closely agreed with the 63.3% who pointed out that their low education and lack of necessary technical skills hindered usage of received adaptive climate change information. 81.4% highlighted lack of finances to buy necessary adaptation resources as the biggest social challenge facing them in their endeavour to use received adaptive climate change information. Due to low literacy levels, majority of the residents had no formal jobs or established businesses to attract steady sources of income and therefore although opinion leaders communicated effectively and the residents understood the adaptive climate change messages, many of them (residents) could not adapt to climate change effectively because they lacked financial power to purchase resources such as water tanks or run projects such as irrigation that were necessary for adaptation to climate change probably. The study further on concluded using chi-square goodness of fit test that gender, age and literacy levels had significant moderating effects on effectiveness of opinion leadership strategies used to communicate to the residents. Therefore, the study established that in

addition to socio-cultural factors, economic challenges also hindered effective public engagement on adaptation to climate change in Kitui Central Constituency by opinion leaders. Key informants agreed with these findings because when interviewed opinion leaders observed that economic challenges hindered their passion of continually engaging the Kitui Central community in the adaptive climate change discourse.

These findings were congruent with what scholars have established. KCCWG (2013) established that age affected communication of adaptive climate change information when they observed differences among the youth and the elderly living in ASALs of Kenya when it came to access and usage of climate change information. KCCWG also observed that men and women accessed climate change information at different times in different forums as they naturally set out to their daily activities and engagements. Low levels of education further complicate the task of developing location-specific responses that effectively address the impacts of climate change (Farauta et al, 2011). Antwi-Agyei et al (2013) found that sub-saharan households are constrained to adapt to climate change by economic barriers, institutional barriers and social-cultural barriers. Social barriers which may be cognitive, normative or institutional influence communities' climate change adaptation strategies (Jones & Boyd, 2011). KCCWG (2013) sighted lack of necessary infrastructure and resources as a key impediment to adaptation. According to Moser and Dilling (2012), many communicators are primarily concerned with the message they want to convey and rush over the critical question of who they are trying to reach with it. However, to close the science-action gap of climate change communication they concluded that:

> Clearly, communication on climate change is only part of the picture. Raising awareness and discussing an issue does not directly result in behavior change or policy action. Other factors, especially policy options, windows and barriers, come into play. Thus, for communication to be effective in leading to active engagement it must be supported by policy, economic, and infrastructure changes that allow concerns and

> good intentions to be realized (Moser & Dilling, 2007; Ockwell, Whitmarsh & O'Neill, 2009). No matter how much communicators may exhort individuals to use less energy, for example, if people have no alternative to heat their homes or get to work in a timely manner, such efforts may fail. Educating about the benefits of energy efficient appliances will not produce results if easy ways to implement these changes are not provided (Dilling & Farhar, 2007). In short, communication for social change must consist of efforts to increase the motivation to make a change and help to lower the barriers to realizing it (Moser & Dilling, 2007: 17).

For them, to reach audiences more effectively, once the relevant audience is identified, communicators must try to understand what the background of their audiences because without solid audience knowledge, outreach campaigns may not generate more than fleeting attention, fail to meet the information needs people have, and generate values and worldview-based resistance to considering the communicated information (Dickinson, 2009; Jost & Hunyady, 2005).

5.3 Conclusions

The study concluded that many Kitui Central Constituency residents are aware that climate is changing and there is need to adapt to it but they lack essential adaptive climate change information to boost their adaptive capacity. The awareness they have is therefore superficial. Consequentially, this means that although there are opinion leaders in the area communicating adaptive climate change information they are yet to diffuse optimal adaptive climate change information that can deepen and broaden residents' knowledge into levels that can cause sufficient climate-relevant behavior response. In view of this, the current opinion leadership strategies are lacking in delivery of intended results. Therefore, opinion leaders should rethink their current strategies and surmount

challenges that hinder delivery of in-depth and comprehensive adaptive climate change information.

Secondly, Kitui Central Constituency residents know and appreciate a number of opinion leaders who over the years have been engaging them in the adaptive climate change discourse. Among these only those opinion leaders who were highly knowledgeable, gregarious, trustworthy and credible, frequent communicators, easily accessible and had communication prowess were rated as highly effective. However, the opinion leaders were found to lack in the intensity in which they engaged with the residents and this could explain the superficial knowledge levels and great quest by these audiences for more adaptive climate change information. Therefore, the opinion leaders should improve their effectiveness by engaging the residents in the adaptive climate change rhetoric more frequently.

Thirdly, for many residents of Kitui Central Constituency, opinion leaders have managed to demystify the complex issues surrounding adaptation to climate change by providing adaptive climate change information that is simple, applicable and understandable through the overwhelmingly preferred face to face recommendations. Opinion leaders understood the need for repackaging the usually complex and technical adaptive climate change information into frames that resonate with everyday lives of their audiences and most opinion leaders used the local language to communicate. Availability of two way communicative interactions not only enabled opinion leaders to evaluate effectiveness of their communication but also kept the dynamic adaptive climate change information flowing. Therefore, the opinion leadership strategies used to communicate adaptive climate change information to Kitui Central Constituency residents were found to be effective in terms of media richness (face to face interactions), effective message coding and decoding (simple messages in common language), meaningful interpretation (understandable and applicable messages), interactivity (feedback mechanisms) and ensuring continuity (cyclic models) of the adaptive climate change discourse.

However, socio-cultural (age, gender, literacy levels and technical skills) and economic (financial resources) factors complicated the task of disseminating adaptive climate change information through opinion leadership strategies and also the hindered the ability to effectively use the received adaptive climate change information. Therefore, if effective opinion leadership of adaptive climate change information is to be achieved, these barriers must be well managed or altogether surmounted. All this notwithstanding, opinion leaders have managed to continue to boost the adaptive capacity of the grassroots Kitui Central Constituency communities to climate change through commendable interpersonal communication strategies and as such their role in moving forward the climate change agenda among ASALs residents cannot be underscored.

5.4 Recommendations

Based on the conclusions of the study, a number of recommendations were made. First, the study recommends that opinion leaders should be supported and trained by climate change stakeholders so that they can diffuse comprehensive adaptive climate change information with the aim of actively causing Kitui Central Constituency residents to gain deeper climate change understanding that is essential for adaptive decision making. In this regard, recognized opinion leaders but who had low ratings can be supported and trained so that they can improve their knowledge levels, social skills, credibility, accessibility and communication prowess attributes. By so doing, their passion and initiatives to diffuse adaptive climate change information can be tapped into to boost the rate of building the climate change adaptive capacity of Kitui Central Constituency residents. Interested governmental and non-governmental climate change stakeholders could offer this essential support and training. The Kitui County government can liaise with development communication trainers and climate change experts from across the country to offer such training.

Second, opinion leaders should engage in audience research so as to clearly understand the socio-cultural and economic contexts of their target audiences so that as they cascade adaptive climate change information. Since the communication contexts within which they operate is critical for effectiveness of their communication strategies, they also should be offered support and training to acquaint them with basic research skills to enable them carry out these audience studies. They can therefore be targeted by relevant governmental and non-governmental agencies with training workshops for this.

Third, opinion leaders who communicate adaptive climate change information should be recognized by government agencies and NGOs that drive the climate change agenda in Kenya and given financial and other incentives to boost the frequency of their voluntary engagements with the marginalized and vulnerable Kitui Central Constituency residents. More development projects should be started in the Kitui Central Constituency so that the socio-cultural and economic challenges facing residents and that rudely impede their adaptive capacity to climate change can continually be minimized. The county and national governments should be at the forefront in this because Kitui Central Constituency is among the marginalized ASALs of Kenya that are still fighting low literacy and high poverty levels. Interested NGOs can sponsor or carry out such worthwhile projects. By heeding to these recommendations, the influence of opinion leadership on climate change adaptation among residents of Kitui Central Constituency will be greatly enhanced and opinion leaders working in other ASALs can borrow a leaf.

5.5 Suggestions for further research

This research was delimited by various factors and as such there is a lot more that needs to be researched on in the subject of interpersonal communication of adaptive climate change information among people living in ASALs of Kenya. Therefore, the following researches can be undertaken in future.

(a) There is need to do a study about possible integration of interpersonal communication (opinion leaders) of adaptive climate change information with

broadcast mass media targeting residents of Kenyan ASALs so as to explore the role of methods that are have great media reach and media richness.

(b) There is need to study how an information database can be developed with various user-friendly frames of the complex climate change messages so that climate change opinion leaders in Kitui Central Constituency and other ASALs in the country can develop their discourses following a uniform base; such a database can also developed for training purposes.

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APPENDIX 1: Letter of Introduction

Idah Gatwiri Muchunku
Jomo Kenyatta University of Agriculture and Technology
Department of Media Technology and Applied Communication
P O Box 62000 – 00200, NAIROBI

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

RE: COLLECTION OF RESEARCH DATA

I am a post graduate student at Jomo Kenyatta University of Agriculture and Technology, School of Communication and Development Studies, Department of Media Technology and Applied Communication pursuing a Doctor of Philosophy degree in Mass Communication. Undertaking a research study is required for award of the doctorate degree.

I am carrying out a research entitled "*Opinion leadership strategies for communicating adaptive climate change information to residents of Kitui Central Constituency."*

I kindly request you to assist me collect necessary data by filling out the attached questionnaire. This will not take more than fifteen minutes of your time. The information you provide will be used exclusively for academic purposes and will be treated with total confidentiality.

Your co-operation is highly appreciated.

Idah Gatwiri Muchunku
Cellphone: 0720380922
Email: idahmwenda@gmail.com

APPENDIX 2: Household Survey Questionnaire

QUESTIONNAIRE SERIAL NO_____

QUESTIONNAIRE FOR ASSESSING OPINION LEADERSHIP STRATEGIES USED IN COMMUNICATING ADAPTIVE CLIMATE CHANGE INFORMATION TO RESIDENTS OF KITUI CENTRAL CONSTITUENCY

NAME OF RESEARCH ASSISTANT _____ WARD _____

SUBLOCATION: _____ HOUSEHOLD S.N._____

DATE_____ TIME_____

FILL IN YOUR ANSWER OR TICK THE APPROPRIATE

SECTION A: DEMOGRAPHIC INFORMATION

PART I: PERSONAL INFORMATION

Name of respondent (optional) _____

Mobile phone number (optional) _____ Place of Birth _____

Age (in years) _____ Gender: [ ] Male [ ] Female

1. **For how many years have you lived in your sub-location?** *(Tick one)*
    1. [ ] Below 1 year
    2. [ ] 1-5 Years
    3. [ ] 6-10 Years
    4. [ ] 11-20 Years
    5. [ ] Above 20 Years
2. **What is your highest level of education?** *(Tick one)*
    1. [ ] Never been to school
    2. [ ] Ngumbaru
    3. [ ] Primary education
    4. [ ] Secondary education
    5. [ ] College education
    6. [ ] University education

3. **What is your occupation?** *(Tick one)*
    1. [ ] Farmer
    2. [ ] Livestock keeper
    3. [ ] Livestock and farming
    4. [ ] Business
    5. [ ] Other (specify)_____
4. **For how many years have you practiced this occupation?** *(Tick one)*
    1. [ ] Below 1 year
    2. [ ] 1-5 Years
    3. [ ] 6-10 Years
    4. [ ] 11-20 Years
    5. [ ] Above 20 Years

SECTION B: COMMUNICATING ADAPTIVE CLIMATE CHANGE INFORMATION

PART 1: KNOWLEDGE LEVELS ON ADAPTATION TO CLIMATE CHANGE

5. **Have you ever heard of climate change?** *(Tick one)*
    1. [ ] Yes
    2. [ ] No
6. **If Yes in Q5, what does climate change mean?** *(Explain in the space provided)*

    _____
7. **Have you ever experienced or seen the following indicators of climate change in this sub-location?** *(Tick as many as appropriate)*
    1. [ ] Increase in temperatures
    2. [ ] Very strong winds
    3. [ ] Changes in rainfall patterns
    4. [ ] Droughts
    5. [ ] Floods
    6. [ ] Bush fires
    7. [ ] Water restrictions
    8. [ ] Other (specify)_____
8. **When was THE LAST TIME you experienced indicators of climate change in this sub-location?** *(Tick one)*
    1. [ ] This year
    2. [ ] Last Year
    3. [ ] 2-5 Years ago
    4. [ ] More than 5 Years ago

9. **Have you ever changed your activities or lifestyle so as to cope with climate change?** *(Tick one)*
    1. [ ] Yes
    2. [ ] No
10. **Which areas of agricultural/livestock production have you ever changed so as to cope with climate change?** *(Tick as many as appropriate)*
    1. [ ] Started planting new types of crops
    2. [ ] Changed the planting season
    3. [ ] Started using different fertilizers for planting crops
    4. [ ] Started storing grains using different methods
    5. [ ] Started selling harvests instead of storing
    6. [ ] Started keeping new breeds of cattle
    7. [ ] Changed the number of cattle kept
    8. [ ] Changed from nomadic to zero grazing
    9. [ ] Started selling livestock more often
    10. [ ] Started doing new type of business
    11. [ ] Other (specify)_____
11. **Do you require climate change information to help you make decisions in some of the areas ticked in Q10?** *(Tick one)*
    1. [ ] Yes
    2. [ ] No

PART 11: ATTRIBUTES OF OPINION LEADERS

12. **Are there people in your community who inform you about adapting to climate change?** *(Tick one)*
    1. [ ] Yes
    2. [ ] No
13. **If Yes in Q12 above, who among these people have been informing you about adapting to climate change?** *(Tick as many as appropriate)*

    1. [ ] Village administrators e.g. the Chief and Sub-Chief
    2. [ ] Community elders
    3. [ ] Agricultural extension officers
    4. [ ] Oxfam staff and other NGOs
    5. [ ] Religious leaders e.g. pastors and sheikhs
    6. [ ] Teachers or other professionals from the community
    7. [ ] KARI staff
    8. [ ] Fellow farmers

9. [ ] Fellow herders
10. [ ] Fellow businessmen
11. [ ] Other (specify)_____

14. Who among them would you say meet your climate change information needs BEST? *(Arrange starting with the most preferred using no.s 1-10 as given in Q13to identify each)*

_____

15. What qualities in the people you have listed in Q14 above makes you rate them as more effective in meeting your climate change information needs? *(Tick as many as appropriate)*

1. [ ] The position of authority they hold
2. [ ] They are trustworthy and credible
3. [ ] They are rich and prosperous
4. [ ] They seem very knowledgeable on climate change issues
5. [ ] The are social and friendly and easy to relate with
6. [ ] They often inform me and others about climate change issues
7. [ ] They are easily available when I need some information
8. [ ] They are more educated than most other community members
9. [ ] It is their job to tell the community about climate change
10. [ ] They always seem aware of what the radio and TV say about
11. [ ]They explain/illustrate climate information until I understand
12. [ ]They are my role model in life
13. [ ] Other (specify)_____

16. How often do they inform you about adapting to climate change? *(Tick one)*

1. [ ] Weekly
2. [ ] Once every month
3. [ ] Once every 3-4 months
4. [ ] Once every 6 months
5. [ ] Once a year
6. [ ] Only during rainy seasons
7. [ ] Only when there is drought
8. [ ] Other (specify)_____

PART III: OPINION LEADERSHIP STRATEGIES

17. **Through what methods do the people you identified in *Section B Part II* communicate adaptive climate change information to you?** *(Tick as many as appropriate)*
    1. [ ] Face to face conversations
    2. [ ] Mobile phone SMS
    3. [ ] Mobile phone calls
    4. [ ] Twitter, Facebook and other social media updates
    5. [ ] Emails
    6. [ ] Community Seminars
    7. [ ] Workshops
    8. [ ] Community Barazas
    9. [ ] Leaflets and other informational materials
    10. [ ] Getting hosted in local radio programmes
    11. [ ] School visits to give climate change lectures
    12. [ ] Other (specify)_____
18. **Which of these methods do you feel are the BEST for communicating adaptive climate change information to your community?** *(Arrange starting with the most preferred using no.s 1-12 as given in Q17to identify each)*

    _____
19. **Which language do they use MOST in communicating this information to you?** *(Tick one)*
    1. [ ] English
    2. [ ] Kiswahili
    3. [ ] Kikamba
    4. [ ] Other (specify)_____
20. **Do you understand the climate change information they share with you?** *(Tick one)*
    1. [ ] Yes
    2. [ ] No
21. **Which of the following features would you say make you either understand or not understand the climate change messages they communicate to you?** *(Tick as many as appropriate)*
    1. [ ] The complexity of the message
    2. [ ] The simplicity of the message
    3. [ ] The applicability of the message
    4. [ ] The believability of the message

5. [ ] The language the message is given in
6. [ ] The method through which the message is given
7. [ ] The person who gives the message
8. [ ] The opinions of my family/friends/neighbours on the message
9. [ ] My attitude towards the subject of climate change
10. [ ] Other (specify)_____

22. Are they willing and AVAILABLE to explain what you do not understand or the messages they share further? *(Tick one)*

1. [ ] Yes
2. [ ] No

PART IV: MODERATING EFFECTS OF SOCIAL-CULTURAL FACTORS

23. Which of the following factors influence how you use or respond to the adaptive climate change information passed to you by the people you identified in *Section B Part II*? *(Tick as many as appropriate)*

1. [ ] My education level and technical know-how
2. [ ] Contradiction with the social norms and values of my community
3. [ ] Contradiction with the cultural practices of my community
4. [ ] Contradiction with my religious beliefs
5. [ ] Others (Specify)_____

24. In your own opinion how do you think the factors you have identified in Q23 above can be managed in order to improve your usage of the received adaptive climate change information? *(Outline in the spaces provided below)*

1. _____
2. _____
3. _____

Thank you once again for your cooperation.

APPENDIX 3: Interview Guide for Key Informant Interviews

1. Probes for knowledge levels of residents on adaptive climate change information

(a) What is the community's perception on adaptation to climate change?
(b) What type of adaptive climate change information do you pass on to the community? Why?
(c) How much adaptive climate change information is at their disposal? Explain
(d) Does the community use the adaptive climate change formation to improve their livelihood?

2. Probes for attributes of opinion leaders who communicate adaptive climate change information

(a) When did you start communicating adaptive climate change information to the community??
(b) What motivates you to be involved in communication of adaptive climate change information?
(c) Which other people, besides you are actively involved in communicating adaptive climate change information to the community?
(d) Did anyone appoint you into this role or is it a personal initiative? Explain.
(e) How often do you communicate adaptive climate change information? What determines this?
(f) Besides adaptive climate change information, are you involved in communicating other types of information to the community? Explain

3. Probes for opinion leadership strategies used in communicating adaptive climate change information

(a) Through what methods do you communicate ACCI to the community? Explain the details of each method.
(b) Do you use any particular method more often compared to others? Why?
(c) Does any of the method stand out as more popular with the community? Explain.
(d) Do you communicate proactively or reactively to the community's needs?
(e) How do you frame adaptive climate change messages to ensure they are understood by the community? Any specific examples?
(f) How do you package adaptive climate change messages to ensure they are understood by the community?
(g) How would you rate the community's comprehension of adaptive climate change messages that you share with them?

(h) Do you receive any support or training to enhance your communication prowess? Explain.

4. Probes for socio-cultural factors impacting on communication of adaptive climate change information

(a) What obstacles do you encounter when communicating ACCI to the community? How can they be managed so that you are more effective in communicating ACCI to the community?

(b) Is there adaptive climate change information you have shared a number of times but whose adoption is yet to take place? What socio-cultural factors do you think influence this?

(c) Any recommendations for improving communication of ACCI to the community?

APPENDIX 4: Demographic Details Questionnaire for Focus Groups

FILL IN YOUR ANSWER OR TICK THE APPROPRIATE

Name _____

Mobile phone _____ Place of Birth_____

Age (in years) _____ Gender: [ ] Male [ ] Female

1. **What is your highest level of education?** *(Tick one)*
    1. [ ] Primary education
    2. [ ] Secondary education
    3. [ ] College education
    4. [ ] University education
    5. [ ] Other (specify)_____
2. **What is your occupation?** _____
3. **Which organization do you work for?** *(If applicable)* _____
4. **For how many years have you worked or lived in Kitui Central Constituency?** *(Tick one)*
    1. [ ] < 1 Year
    2. [ ] 1-2 Years
    3. [ ] 3-5 Years
    4. [ ] 6 -10 Years
    5. [ ] > 10 Years
5. **What type of adaptive climate change information do you commonly share with residents of Kitui Central Constituency?** *(List in the spaces below)*
    1. _____
    2. _____
    3. _____
6. **How many years of experience do you have in communicating adaptive climate change information to local communities?** *(Tick one)*
    1. [ ] < 1 Year
    2. [ ] 1-2 Years
    3. [ ] 3-5 Years
    4. [ ] 6 -10 Years
    5. [ ] > 10 Years

Thank you for taking the time to complete this questionnaire

APPENDIX 5: Facilitator's Introduction for Focus Group Discussions

Welcome and thank you for volunteering to take part in this focus group. You have been asked to participate because your point of view is important. I realize you are busy and I appreciate your time.

Introduction: This focus group discussion is designed to assess your involvement in communicating of adaptive climate change to residents of Kitui Central Constituency. The focus group discussion will not take more than two hours. May I tape the discussion to facilitate its recollection? (If yes, switch on the recorder).

Confidentiality: Despite being taped, I would like to assure you that the discussion will be highly confidential. The tapes will be kept safely in a locked facility until they are transcribed word for word, then they will be destroyed. You should try to answer and comment as accurately and truthfully as possible. I and the other focus group participants would appreciate it if you would refrain from discussing the comments of other group members outside the focus group. If there are any questions or discussions that you do not wish to answer or participate in, you do not have to do so; however please try to answer and be as involved as possible.

Ground rules

- The most important rule is that only one person speaks at a time. There may be a temptation to jump in when someone is talking but please wait until they have finished.
- There are no right or wrong answers. When you do have something to say, please do so. There are many of you in the group and it is important that I obtain the views of each of you. You do not have to agree with the views of other people in the group.
- You do not have to speak in any particular order.
- Does anyone have any questions? (answers).
- OK, let's begin

Warm up

- First, I'd like everyone to introduce themselves. Can you tell us your name?
- As you do that, my colleague will give you personal details questionnaire so that you answer 6 short questions which will help us to know you better. The answers in the questionnaire will be treated as confidential and used for purposes of this study only.

APPENDIX 6: Interview Guide for Focus Group Discussions

Introductory question

(a) I am now going to give you a couple of minutes to think about your experience of communicating adaptive climate change information (ACCI) to residents of Kitui Central Constituency (KCC). I believe everyone will be happy to share his/her experience.

1. Knowledge levels' of residents on adaptive climate change information

(a) What type of adaptive climate change information do you communicate to residents of KCC?
(b) What is the community's perception on adaptation to climate change?
(c) How much adaptive climate change information is at their disposal? Explain.
(d) How many people are using the information? For what purpose?

2. Attributes of opinion leaders

(a) Which people/organizations are active in communicating ACCI to the community?
(b) What motivates you to be involved in this type of communication to the community?
(c) How often do you communicate adaptive climate change information to the community?
(d) Do you communicate as an individual, an organization or a group of organizations?

3. Opinion leadership strategies:

(a) Through what methods do you communicate ACCI to the community? Explain each.
(b) Do any of the methods stand out as more popular with the community? Why?
(c) How do you frame/package adaptive climate change messages to ensure they are understood by the community? Explain details such as language used, complexity etc with examples.
(d) Do you communicate proactively or reactively to the community's needs?
(e) Do you receive any support or training to enhance your communication prowess? Explain.
(f) Do you monitor or evaluate effectiveness of your messages/methods of dissemination? How?

4. **Moderating factors:**

(a) What socio-cultural factors would you say influence the community's comprehension levels of adaptive climate change information?

(b) What obstacles would you say prevent adoption of certain ACCI in the community? Explain.

Concluding question

(a) Give your thoughts on ways of improving communication of adaptive climate change information to the community.

Conclusion

- Thank you for participating. This has been a very successful discussion and we hope you have found the discussion interesting. Your opinions will be a valuable asset to the study
- If there is anything you are unhappy with or wish to complain about, please speak to me after this. I would like to remind you that any comments featuring in this report will be anonymous. Before you leave, please hand in your completed personal details questionnaire.

APPENDIX 7: NACOSTI Research Authorization

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

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Ref: No.

Date:

25th August, 2014

NACOSTI/P/14/6650/2607

Idah Gatwiri Muchunku
Jomo Kenyatta University
P.O. Box 62000-00200
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"Opinion leadership strategies for communicating adaptive climate change information to residents of Kitui Central Constituency,"*** I am pleased to inform you that you have been authorized to undertake research in **Kitui County** for a period ending **31st July, 2015.**

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

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

DR. S. K. LANGAT, OGW
FOR: SECRETARY/CEO

Copy to:

The County Commissioner
The County Director of Education
Kitui County.