EFFECTIVENESS OF VIDEO MEDIATED LEARNING AND FARMER FIELD SCHOOL ON STRIGA WEED MANAGEMENT AMONG MAIZE FARMERS OF RACHUONYO SOUTH SUB-COUNTY, KENYA

By

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DECLARATION

I declare that this research thesis is my original work and has not been presented for a degree or any award in any other University.

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ABSTRACT

Agricultural extension services are key in providing knowledge and information on various agricultural interventions. Farmer education is the most critical input geared towards this endeavor. Maize is one of the principal cereal crops grown in Kenya. However, maize farmers in western Kenya have experienced yield losses due to striga weed infestation. The emerging striga control technologies such as *Imazapyr* resistant maize (IR), push pull have been lowly adopted due to past communication approaches.

Video Mediated Learning (VML) is currently promoted as a communication approach to disseminate agricultural information. Since it is an emerging tool, an evaluation to reveal effectiveness is crucial. Farmer Field School (FFS) is one of the most active extension methods used in Kenya and this study sought to compare and provide evidence on the effectiveness of video mediated learning. Specifically, the study sought to evaluate farmers perception, attitude and knowledge and compare uptake of striga management technologies disseminated via Video mediated learning and Farmer Field School approaches.

Rachounyo South sub-county in Homa-Bay was purposively selected because it is one of the regions highly infested by striga weed resulting in huge yield losses. A sample of 120 maize farmers was selected through Systematic random sampling procedure. Three farmer groups were established then trained on Striga weed management using video-(G1), FFS-(G2) and a combination of video and FFS (G3) approaches. A survey was conducted where both quantitative and qualitative data were gathered through interview guide using semi-structured questionnaire. Data was analyzed using SPSS and presented using frequency tables, percentages, charts, graphs, and correlation analysis.

Results indicated that a majority of G1 participants (72.5 per cent) as compared to 57.5 per cent of G2 participants, perceived messages disseminated relevant, informative and had positive attitude towards such messages. The study also found adoption rates of striga control technologies among participants of both G3 at 46.2 per cent, G1 at 42.5 per cent and G2 at 35 per cent. Further, regression analysis revealed that socio-economic factors such as age, gender had little influence on uptake of agricultural messages. Based on these findings, the study concludes that Video Mediated Learning alone is a viable tool which is greatly appreciated; viewed as an effective tool to communicate agricultural message and could be better than FFS. However, efforts to promote learning and disseminate agricultural information should target the use of combination of video and FFS to scale up uptake as the two approaches complement each other.

Key Words: Striga, Video Mediated Learning, perception, agricultural information, Rachuonyo sub-county and uptake

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ACRONYMS AND ABBREVIATIONS

AATF	Africa Agricultural Technology Foundation
AGRA	Alliance for a Green Revolution in Africa
DVD	Digital Video Disc
ESPs	Extension Service Providers
FAA	Focal Area Approach
FAO	Food and Agriculture Organization
FFS	Farmer Field School
G.o.K	Government of Kenya
ICIPE	International Center of Insect Physiology and Ecology
ICT	Information Communication Technologies
IR	*Imazapyr* Resistant maize
MOA	Ministry of Agriculture, Kenya
NGOs	Non-governmental Organizations
PPT	Push Pull Technology
PRA	Participatory Rural Appraisal
SDGs	Sustainable Development Goals
SRA	Strategy for Revitalizing Agriculture
T&V	Training and Visit
TV	Television
VCDs	Video Compact Discs
VVC	Video Viewing Clubs

CHAPTER ONE

INTRODUCTION

1.1 Background Information

Cereal crops are mainly grown for food and cash in Kenya. Major cereal crops cultivated include: maize, millet, wheat and sorghum. They are considered as necessities among Kenyan households (Nzuma, 2008). Maize consumption is greatly complemented by wheat and rice while sorghum and millet remain substitutes (Nzuma, 2008). This implies that maize is the most important cereal crop in Kenya. The importance of maize has been recognized by the government of Kenya (GoK), where it is estimated that over 90 percent of Kenyans depend on maize as a source of food and employment (Republic of Kenya, 2007).

However, maize production faces a number of challenges that hamper increase in its yields and availability of quality grain. These challenges include unfavorable weather conditions, pest and diseases, weeds, poor farming methods, increased cost of farm inputs and weak agricultural institutions which are responsible for disseminating relevant information on improved technologies. For instance, small scale maize farmers in Western Kenya have faced a problem of witch weed, *Striga hermonthica* (Namabafu *et al.* 2014). Striga weed is considered as a major threat in cereal production because it causes huge losses in grain yield (Kazuyuki *et al.*, 2011). Farms infested by this weed usually show yield losses ranging between 65 percent to 100 percent and this depends on the level of infestation (Esilaba, 2006).

To this end, striga weed continues to be a major challenge among maize farmers especially in Western Kenya. As a result, volumes of maize produced and supplied cannot meet the market demand. This low performance is further attributed to many factors, one being weak system of information dissenimation hence low adoption of modern agricultural technologies (Toyama *et* *al.*, 2009; GoK 2010). Technologies such as improved seed varieties, fertilizers, herbicides and pesticides can result into increased production. However, inadequate knowledge and information on such technologies poses a great threat to food and nutritional security among Kenyan people.

Knowledge and information have been recognized as the prime drivers of socio-economic development in the world (Asenso-okyere and Mekonnen, 2012). On the other hand, agriculture is seen as a key pillar in economic development because of its huge contribution of about 25 per cent to Gross Domestic Product in most developing nations (FAO, 2010). This implies that economic prosperity through agriculture can only be achieved when rural farmers who are resource-poor, have access to information on agricultural technologies (Bowonder and Yelwender, 2005).

In the light of this, many institutions including relevant government agencies and private sectors have created agricultural extension unit to take a leading role in promoting technology transfer during farmer education. Shaik *et al.* (2014) emphasized the importance of agricultural extension in providing appropriate knowledge and information on emerging agricultural innovations to improve productivity. Agricultural knowledge and information is therefore crucial as it empowers farmers to make critical decisions on appropriate cropping patterns.

In Kenya, there are two main categories of extension service providers(ESPs) namely: public and private sectors. These ESPs have established various extension strategies that include Training & Visit (T&V), Participatory Rural Appraisal (PRA), and Farmer Field Schools (FFS) among others to strengthen the extension activities (NASEP, 2012). In addition, a number of dissemination pathways have been developed over time to help in the spread of extension messages. Such pathways include, face to face interactions, audio (Radio), visual (Television) print media (Amudavi *et al*., 2009). All these developments are in the line with the fact that productivity of farmers can be improved through improvement of extension and advisory delivery services (GOK, 2007).

In Rachuonyo sub-County, a number of dissemination pathways have been adopted to spread striga control technologies. Such pathways include FFS demonstrations, field days, farmer teachers, extension agents among others (Murage *et al*.2012). Currently, the FFS approach is very active with farmers in cluster groups where they meet regularly to learn various value chains across production systems. There are also a number of faith based organisations, Community Based Organisation (CBO), and other Non-Governmental Organisations (NGOs) which organise field days to educate and show farmers new agricultural technologies to be adopted for increased productivity. These private extension providers work in close collaboration with local leaders within the area in order to reach rural farmers with technologies generated from research stations.

Despite the extensive use of the above mentioned technology-dissemination pathways, a number of farmers are yet to be reached with new agricular messages. This scenario is attributed to low ratio between extension officer to farmers that currently stands at 1:1,500 (Africa Science News, 2013; Nyanganga *et al*., 2015) against the FAO recommended ratio of 1:400 (Cristina and Caitlin, 2013). In addition, women farmers who are seen to be active in rural farming do not have close contact with extension officers because their huge commitments in daily house duties and limited resources (Asenso-okyere and Mekonnen, 2012).

To bridge the above gap, agricultural extension sector is currently seeking the best ways to empower farmers through provision of necessary knowledge and information. Previous ways included decentralization of extension services (Nambiro *et al.,* 2006), which advocated for the entry of other organizations, especially from the private sector. Others are enactment of new constitution in the year 2010, where provision of the extension services was devolved to lower administrative levels in order to take extension services closer to farmers and ensure their participation in service delivery (GOK, 2011). More recently, Government of kenya through Ministry of agriculture rolled out e-extension programmes, Information Communication Technologies (ICT) based agricultural extension (Grace, 2015). Such concerted efforts were initiated by the need for faster ways to reaching many farmers with appropriate agricultural information besides traditional methods (Bentley *et al.*,2015).

It is believed that the current developments in ICT present incredible opportunities for farmers to learn via ICT tools. Intergration of ICT tools such as mobile phones, TV, agricultural video shows among others in agriculture goes a long way in providing access to information by rural farmers. Video technology is an emerging ICT tool that is currently being promoted as a communication approach in agricultural extension. Some notable platforms for application of this technology in Kenya include, laptop project which is believed to empower Kenyan people to be competitive globally for decades to come, the introduction of digital content which is seen as an extensive efforts in the government's initiative of incorporating ICT in education (Daniel, 2014), rural electrification programmes that aim at promoting electricity access among rural people and high rate of mobile penetration which is 80.5 per cent with 32.8 million Kenyans possess mobile phone and about 22.3 million Kenyans use internet (Communication Authority of Kenya, 2014).

In addition, there are many successful stories and studies from other Countries about the use of farmer to farmer videos as a communication pathway on Agro-insight communication and

Digital Green repositories.Video technology combines both visual and verbal communication methods and it appears to be a suitable communication tool for agricultural information and knowledge (Vidya and Chinnaiyan 2010). In Kenya, the use of video started to take root a few years ago, however, much is not known about its effectiveness.

1.2 Problem Statement

Farmers in Rachounyo of Homa-Bay County experience huge maize crop losses as a result of striga weed infestation. Research that has been conducted over time has led to development of several striga control technologies which include the use of resistant maize varieties such as *Imazapyr* resistant maize (IR), use of herbicides, intercropping system, application of manure and chemical fertilizers (Esilaba, 2006). Others are stem borer and striga management strategy like Push-pull technologies (Khan *et al.*, 2008). Dissemination of striga control technologies in this region has adopted the use of various communication pathways such as face to face interaction, print media, audio, visual, written among others (Amudavi *et al*., 2009).

However, there is still low uptake of these technologies amongst maize farmers who prefer using traditional striga control strategies such as uprooting and weeding despite the above mentioned initiatives (Mignouna *et al.,* 2011, Nambafu *et al.*, 2014). This low uptake has been attributed to the past communication pathways embraced to spread messages on striga control technologies (Murage *et al*., 2012). Some of the pathways are not working out as they are overstretched due to limited resources (Albert *et al*., 2014). For instance, Farmer Field Schools only accommodate a maximum of thirty (30) farmers per school season and this could be a barrier to scaling up agricultural information (Tripp, 2005). This creates a wide gap between the availability of the striga control technologies purportedly to be adopted and the actual uptake of such measures hence, search for alternative communication pathway that would meet the diverse information needs of maize farmers (Oswald, 2004).

The introduction of video mediated learning in agricultural field was to fill the gap. However, limited literature exists particularly on its effectiveness. The current study therefore, sought to assess and provide evidence on effectiveness of VML in terms of percentage of farmers who participated and received messages relevant, in addition to how successful both VML and Farmer Field School approaches influenced farmers' decision to uptake various striga control technologies.

1.3 Justification of the Study

The ever increasing demand for maize grains in Kenya calls for more supply. Farmers need timely information on various technologies to improve their productivity. The traditional systems for providing information have not been successful in reaching large number of farmers. It is therefore belived that embracing non-traditional ways such as use of video would go along way in reaching rural farmers with necessary information.

Video mediated learning has been seen to be very conveincing during farmer education. This technology combines pictures and words in motion. Viewers can easily learn through seeing and hearing how technologies are being implemented. According to (Chi, 1989), a combination of hearing and seeing contributes to over 50 per cent retention of what is learnt. It is also believed that a picture is worth a thousand words; aspects that lead to building of lasting memories among the participants. Further, agricultural videos are made by farmers themselves within their local context. A scanario that greatly contributes to acceptance of technologies featured as most farmers prefer learning from their fellow farmers. Videos therefore leverage conditions to enable farmers talk to each other as they share their experiences. Extension officers and other agricultural specialists during video viewing only guide learning process.

Similarly, farmers from Farmer Field Schools (FFS) learn through discovery as they carry out field experiments using emerging technologies. These farmers benefit a lot since they learn by doing. Learning by doing is believed to contribute to 80 per cent retention. In addition, FFS involves group discussions where each member contributes to the subject matter and criticizes some of the field findings. The FFS graduates therefore tend to have an in-depth understanding of the topic. In general, both video and FFS are powerful tools for sharing agricultural knowledge and information. Knowledge triggers action, which involves decision to uptake various striga control technologies disseminated. Subsequently, this leads to unlocking of maize production for both food and commercial purposes.

1.4 Objectives of the Study

The main objective of the study was to assess the effectiveness of video mediated learning and Farmer Field Schools on striga weed management so as to contribute to increase in maize yields and food security in Rachuonyo sub-county, Kenya.

1.4.1 Specific Objectives:

1. To evaluate farmers knowledge, attitude and perception on video mediated learning and Farmer Field Schools approaches in dissemination of striga control technologies.
2. To assess farmers' uptake of striga weed management technologies through video mediated learning and farmer field school approaches.
3. To determine the effects of socio-economic and intitutional factors on uptake of messages disseminated through video mediated learning and farmer field school approaches.

1.5 Research Questions and Hypothesis

1.5.1 Research Questions

1. What are the farmers' knowledge, attitudes and perceptions towards Video Mediated learning and FFS approaches in disseminate of striga control technologies?
2. What is rate of uptake of striga management technologies disseminated through FFS demonstrations and Video mediated learning?

1.5.2 Hypothesis

3. Socio-economic and intitutional factors have no effect on the uptake of messages disseminted via video mediated learning and farmer field school approaches.

1.6 Scope of the Study

The study was based on the use of video and FFS demonstrations as communication tools in agricultural extension. It was then narrowed to Rachuonyo Sub-County in Homa-Bay County where maize is the main crop being grown and farms are heavily infested by striga weed. The variables of interest were the farmer demographic factors, perception, attitude, knowledge and the rate of uptake of various striga control technologies disseminated.

Definitions of Key Terms

In the context of this study, the following key terms have the meaning as explained below;

Striga- a parasitic weed that draws nutrients and water from cereal crops' roots

Extension officer/agent- an employee of the Ministry of Agriculture or Private sector with technical agricultural skills

Agricultural information- good news or processed facts about production of various crops and livestock

Agricultural technologies-Refers to new inputs, methods, new processes or new innovations to improve the production and productivity in agriculture, examples are improved seed varieties, fertilizers and use of farm machinery.

Uptake- means putting into practice/use technologies disseminated/learnt.

Video Mediated Learning- means the use of words and pictures combined in one motion to spread agricultural technologies.

Old communication channels- these are traditional means/media through which a message is transmitted to the intended audience. They include face to face, audio, written print media among others.

New communication channels- these are emerging means through which a message is transmitted to the intended audience. They include print media, audio visual among others.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Striga, also known as witch weed remains a major problem to cereals and other crops such sugarcane (AATF, 2011). According to Nambafu *et al.,* (2014), Striga weed jeopardizes the efforts already initiated in achieving nutritional and food security because of huge yield losses; usually over 80 per cent. Such efforts include new technologies and better farming systems that have been developed to combat the striga weed across Africa. However, the concern has been on the development of striga control technologies leaving out the possibility of farmers learning to understand such technologies prior to adoption. This has created a big gap making the striga control technologies inaccessible hence no in-depth knowledge leading to low/no adoption. Researchers have also failed to find appropriate dissemination pathways to meet the farmers' knowledge and learning capability.

2.2 Striga Control Technologies

Nambafu *et al.* (2014) conducted a study on knowledge and attitude of maize farmers towards striga control technologies. The study was carried out in western Kenya where a total of 120 farmers were interviewed. This study found that striga weed was a major challenge to maize production and these farmers manifested unparallel-led knowledge on Striga weed and its management. In addition, striga control technologies such as push-pull and resistant maize varieties were found to be very expensive especially for small scale farmers. Only 2 per cent of the total farmers interviewed tried intercropping maize with *desmodium*. However, they had abandoned such intercropping because large piece of land was needed for its implementation. The study concluded that most maize farmers preferred traditional means to combat striga weed despite presence of many modern technologies within the locality. This study was therefore skewed toward knowledge, attitude and adopted technologies leaving out contribution of dissemination pathways used to spread messages on these striga control technologies.

Kazuyuku *et al*. (2011) carried out a study that revealed a number of striga control technologies available for use by maize farmers. This study was carried out in Malawi and it aimed at investigating farmers' perception and their constraints in adopting various striga weed control options. Household survey through face to face interviews was conducted in a sample of 247 farmers. These farmers acknowledged striga weed as a major threat to their maize production. They further perceived use of manure as the best and effective technology for striga control. This was closely followed by crop rotation, fertilizer application and hand pulling technologies. However, only a few farmers adopted various striga control options while majority did not due to lack of trust on such technologies. This study was therefore skewed on laid undertaking about on-farm trials and development of striga control technologies leaving out the possibility of farmers gaining trust and acceptability through learning and understanding such control measures.

Further, Magani *et al.* (2011) conducted a study on the role of biological control in the management of striga in maize crop. This was an integrated management approach towards combating striga and the study was carried out in two countries namely: Southern Guinea and Nigeria. The study found that *Fusariumoxy sporumfungal* pathogens (foxy 2), have ability to infect and cause diseases against all growth phases of the parasite and presents possibility for striga control. The study therefore was skewed towards control of striga biologically ignoring the dissemination pathways which could be employed to enhance farmers learning and knowledge necessary for its uptake.

Push-pull is another striga control technology that has been developed by ICIPE and partners. Application of this technology has attracted many studies especially on its spread and effectiveness to combat striga weed and stem borer. Mwangi *et al*. (2014) conducted a study to assess the adoption rates between Push-pull (PPT) and *Imazapyr* resistant maize (IR) technologies for striga weed management. This study was carried out in western part of Kenya. A total of 326 farmers were surveyed and the study applied the Average Treatment Effect framework to evaluate rates of adoption. The study found relatively similar rates of adoption between PPT (37 per cent) and *Imazapyr* resistant maize technology (36.3 per cent). However, majority of the farmers cited PPT as the most attractive strategy for striga management. In this regard, the study strongly recommended more efforts to be undertaken in order to bridge the gap in adoption of PPT by exposing farmers to information about the technology. It however, failed to suggest the dissemination pathways that can be used to meet farmers' information needs and knowledge on Push- pull technology.

MacOpiyo *et al*. (2009) analyzed the strengths and weaknesses of various striga control technologies. This study revealed cultural practices such as crop rotation and intercropping to be effective in reducing striga seed banks besides improving soil fertility. However, benefits of such technologies could take long to be realized. In addition, the study revealed that the use of chemicals and IR-maize technologies provide immediate yield benefit and easy to implement by farmers. Unavailability of good amount of herbicide IR- maize variety and high costs of chemicals are major threats to their application.

2.3 The Changing Nature of Agricultural Extension in Kenya

For long, agricultural extension sub-sector in Kenya has been evolving with entry of new actors in its provision. The extension service providers (ESPs) include public extension sector under ministry of agriculture, private extension providers under various cash crops programmes, Non-governmental organizations (NGOs),farm inputs and agro-chemical companies and faith based organizations (Munyua,2010). These ESPs work to bring extension services close to farmers through farmer education. However, enhancing learning for better understanding among ESPs has become a major challenge since various organization are assuming role as knowledge broker at the local, national, regional or global level (Van Mele *et al*.2011). The extension functions such as organizing and strengthening farmer groups, training, articulating demand, networking, linking to markets are now fulfilled by a dispersed and non-coordinated body of organizations, entrepreneurs and projects (Van Mele *et al*.2011).

In spite of this, extension approaches continues to evolve with development and adoption of more participatory approaches. The Training & Visit (TV) that promoted Asia's Green Revolution in the1970s (Anderson,2006) was developed to put the farmer, the resource constraints, abilities and needs at the centre of the whole extension system (Semama *et al.*, 2000). However, the farmers were unsatisfied with the extension activities because their real needs were not taken into account during the implementation of the extension approaches (Moumouni, 2005). In 1990s, Participatory Rural Approach (PRA) was established. This approach was therefore built on the view that local communities atleast know something that professionals may not know (NASEP, 2012). Later, in 2000s, Farmer Field Schools approach was established. According to Davis *et al. (*2011), FFS are science-based, rely on hands-on discovery learning, and can therefore benefit farmers who attend. However, there is little evidence that FFS graduates share their knowledge with other farmers who were unable to participate in field school sessions (Waddington *et al.*, 2014).

Currently, ICT is being adopted to provide agricultural information on various technologies. According to Shaik *et al*., (2014), ICT has many applications in provision of agricultural information to rural farmers as they gain control over communication tools. Application of ICT can increase agricultural productivity by matching agronomic practices to climatic trends, inputs acqusition and use of resources optimally and ensure good agronomic practices that lead to improvement of soil fertility (Richard *et al.* 2011).

2.4 Information Communication Technologies in Agriculture

To reach a larger audience in agricultural sector, integration and utilization of ICT becomes necessary. This necessity was long recognized and access to ICTs was even made one of the targets of the Millennium Development Goal No. 8 which emphasized on the benefits of new ICTs in the fight against poverty (World Bank, 2009). More recently, during the ratification of Sustainable Development Goals (SDGs) at the New York, a lot of emphasis was placed on the importance of ICT in bringing quality sustainable life to people (Close the Gap, 2016).

Further, a report given on the status of Agriculture in Africa by AGRA, established that African agenda of growth rate of 6 per cent can only be achieved through transformation brought by ICT (Kosura, 2013). Food insecurity and high poverty levels which are common problems bedeviling Africans, can be reversed when emerging ICT tools are properly infused in agriculture. This is due to the fact that ICT offers solution and brings about knowledge on how to handle crops and animals and allows farmers to forecast weather patterns and even source for key farm inputs such as seeds and fertilizers including where to sell the farm produce (Albert *et al.,* 2014).

A study by Bentley *et al.* (2015) revealed the extent through which ICT tools have been used to reach farmers with agricultural messages. This study found that ICT tools, such as video combined with instructions from agricultural experts may reach larger audience of farmers. Chowdhury *et al* (2010) found that exposure to multimedia which includes video can intrinsically stimulate farmers to an extent of carrying out on-farm trials with the technologies featured on their own farms especially if the video clip watched is of high quality. However, the impact of ICT tools can only be felt if they are well distributed, affordable, and available within farmers' access and field officers are taught on how to effectively use them for farmer education (Bentley *et al*., 2015).

2.5 Video Mediated Extension in Developing Countries

The use of video in agricultural extension has attracted many studies especially in developing countries. Access Agriculture and Digital Green are two organisations that have led and continue to lead in video distribution for farmer-to-farmer training across Africa and Asia continents. According to Gandhi *et al*., (2009), Digital Green approach is currently deployed in India, Ghana, and Ethiopia. This deployment was founded in the belief that video could be a powerful communication tool to increase the effectiveness of extension service delivery. The study also found that video watching combined with in-person instructions can encourage farmers to put into use new agricultural technologies learnt at a relatively lower cost compared to traditional extension methods since farmers have confidence and a greater trust in the information shared. However, this study acknowledged that videos benefits can only be realized when video production process is within farmers' context and the usage are within broader extension processes.

According to *accessagriculture,* video interactive technology has enabled access to farming extension services at the click of a button. Technoserve a private organization is using Access Agriculture videos in a Mobile Training Unit in North Rift Valley Kenya. Some of the videos which have been catching farmer's attention are the series on Sustainable Land Management. Among other conversation points for the farmers are, new farming techniques, avoiding burning of maize stalks after harvesting as it helps in enhancing soil fertility and importance of intercropping, (http://www.accessagriculture.org). Technoserve is now exploring the Access Agriculture website to select other suitable videos to help farmers in their target counties.

From Uganda, Cai *et al.,* (2013), conducted a study on effectiveness of video as a communication tool in agricultural extension. The main aim of the study was to test whether video as a tool could either complement or replace traditional lecturing methods. Training on raw method of planting beans was done via the use of video, lecture method and combination of video and lecture among small farmer groups in Kamuli district, Uganda. A total of 325 participants were then interviewed using questionnaires. The study found that video could be an effective complement of traditional lecture method and at times could replace the conventional lecture method during training sessions. This study also found that training method that incorporates both video and traditional lecture is better for farmer groups with relatively low prior knowledge on the topic. It however, admitted the possibility of farmers complaining about the missing opportunities for feedback and interaction with agricultural experts when video screening is done alone without in-person instructions.

In Bangladesh, videos have been used to spread a number of agricultural innovations. A study by Chowdhury, Van Mele, and Hauser (2011) showed that women farmers had watched videos on rice seed health. Experiments were done in a number of villages. Within one group of villages, new seed preservation technologies were implemented resulting into an increase of 15per cent rice yields. However, there was no increase in yield within control villages. Heong *et al*. (2014)

also carried out a study to evaluate the willingness of participants to adopt various practices after watching television dramas containing agricultural messages. This study found that participants were willing to adopt agro ecological practices, which included keeping flowers on rice bunds to attract beneficial insects and also to reduce seed rate and pesticide use among others. However, Bentley *et al.,* (2015) admitted that many women who are actively engaged in agriculture could be easily reached if videos are screened at public places in villages.

In Benin, Okry *et al*. (2013) conducted a study to evaluate the process of video dissemination and its use in rice training. Questionnaires and checklists were administered to leaders of radio stations and extension services. Focus group discussions were also held with farmer associations. It was found that nearly all the radio stations surveyed had specific programmes on agriculture. Some of these radio stations had developed and distributed Video Compact Discs (VCDs) containing agricultural messages to farmers and extension service providers. The study also revealed how farmers were willing to pay for VCDs for their viewing at home. This showed their eagerness in investing on issues pertaining to knowledge acquisition. However, none of the radio stations publicly screened the videos hence few farmers were reached.

Further, Soniia and Asamoah *et al*. (2011) in their study on video as a tool for agricultural extension provision among cocoa women farmers in Ghana explored the effectiveness of video viewing clubs (VVC) as a training method. Survey was conducted among thirty two (32) women who had been trained on cocoa plantation. The results revealed that VVC is an effective, interactive, low cost, time saving method that provides both literate and illiterate populations with skills, knowledge and information on complex topics. This study however did not take into consideration the male cocoa farmers who also engage in cocoa plantation. Only one gender may not give a true picture on the effectiveness of any dissemination tool.

2.6 Video in Trainings

Various past studies by a number of authors have shown that videos are powerful tools for farmer trainings. Van Mele *et al*. (2011) conducted a study on how video facilitates learning amongst farmers for sustainable agriculture. The study found that farmers are hungry for audio-visual tools in knowledge sharing. The author emphasized greatly on the use of a video for a group or entire community. This gives an added advantage for the use of video for training a larger audience of farmers at once. The study concluded that video is a powerful tool for training and it triggers discussions afterwards whether combined by in- person instruction with extension agents or watched by farmers alone.

Mali's farmers were trained via video on how to fight striga. Afterwards, Bentley and other authors conducted a study in 2014 to evaluate the social innovations triggered. The study found that farmers were able to adjust their social structures after watching videos. They formed farmer groups which enabled them hand pull striga for income generation. Committees were also formed in some villages to further show videos. The findings therefore show how persuasive video is as a dissemination tool in bringing changes in the life of a farmer.

2.7 Theoretical framework

2.7.1 Spiral of Silence theory

It was propounded by Elisabeth Noelle-Neumann in 1984. It states that media advertises opinions that are considered as ideal and people usually tend to adjust their views in order to avoid being isolated within the society. People who perceive their opinions to be similar to public opinion will openly speak out, whilst those who think their opinion is less in favor will suppress their views. This aspect of spiral of silence theory that is willingness to speak out is what the study is based on.

The theory therefore is related to the video; in such a way that publicly screened video influences viewers' opinion. Majority of video participants who perceive messages as useful would speak out confidently in support of the majority opinion. While the minority who do not embrace video messages would began to voice majority opinion in order to avoid being isolated.

2.7.2 Habermas Communicative Action theory

The theory explains the importance of having social groupings of farmers who come together to share their experiences, problems and opportunities using both FFS and video platform. After coming together, farmers together with the researcher engage in a dialogue on the importance of the technologies, their benefits, how to disseminate it to other farmers so that they could adopt it in order to control striga which cause food insufficiency among the rural people.

The theory describes learning process among farmers as an interaction among peers that facilitates implementing activities on the farms. It postulates that extension approaches have grown from hands-on techniques involving experimenting, farmer to farmer inferences, discoveries and conclusions, with eventual farmers generating new knowledge while integrating with old experiences. This strategy of learning innovations, assumes that knowledge, behaviour and social relationships cannot be solely transmitted from one party to another, but must be uniquely created by the human agent as a consequence of critical thinking, experimentation and communicative action. The core feature is the ownership by the learner (farmer), not just for owning outcomes, but also of the process of internalizing the processes involved.

CHAPTER THREE

METHODOLOGY

3.1 Area of Study

The study was conducted in Rachuonyo South sub-County of Homa-Bay County, Kenya. The area was targeted because it is one of the regions highly infested by striga weed resulting in huge yield losses. The Sub-County covers a total of 509.75km square, and divided into two divisions namely Kasipul and Kabondo. It has a population of approximately 220,668 inhabitants (GOK, 2012). This area lies between longitudes 34˚25 and 35˚0 East and latitudes 0˚15 and 0˚45 south. Its altitude ranges from 1,135m above sea level to about 1300m above sea level.

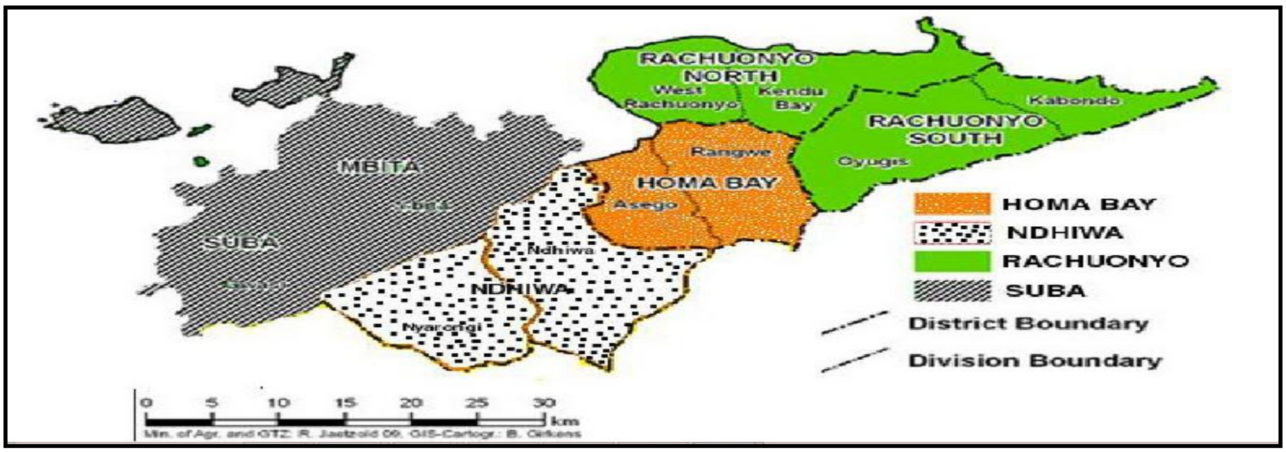

Figure 3. 1 ***Map of Homa-Bay County Showing Rachuonyo Sub-County***

Source: Homa-Bay County Integrated Development Plan (2013-2017)

Rachuonyo South sub-County has a bimodal pattern of rainfall with the long rains falling between April and July while short rains are experienced from September to December. The rainfall is however, not very reliable and it ranges between 1000mm and 1300mm per year with a mean of 1150mm rainfall per year (Jaetzold *et al*., 2006). Temperature ranges from 18^{o}c to 30^{o}c with a mean temperature of 24^{0}C. The area falls under Agro-Ecological Zone (AEZ) Upper Midland (UM1), which supports tea and coffee as cash crops (County Government of Homa-Bay, 2013). Agriculture is the main economic activity, however, people in this region also engage in lumbering, mining and transportation as the area is served with tarmac ked road. The major food crops produced in the area include maize, sweet potatoes, sorghum, beans, kales, and millet (Nyasimi, 2014). Farmers in this area have small farm sizes averaging at two acres per households. The soil is deep, well-drained relatively fertile (Sikei, 2009).

3.2 Research Design

The study adopted a descriptive survey design particularly for describing information, data, events, perceptions and issues (Mugenda and Mugenda, 2003).

3.3 Conceptual Framework

To unlock production of maize among farmers, access to information concerning striga control technologies is paramount. It was believed that video mediated messages would motivate farmers to adopt various striga control practices and subsequently improve maize yields. The conceptual frame work therefore, presented the interrelationships in the study, the key variables involved and how they are interrelated. This conceptual framework was based on the assumption that farmer’s perception, knowledge and attitude were influenced by the dissemination pathways hence uptake of various striga control technologies.

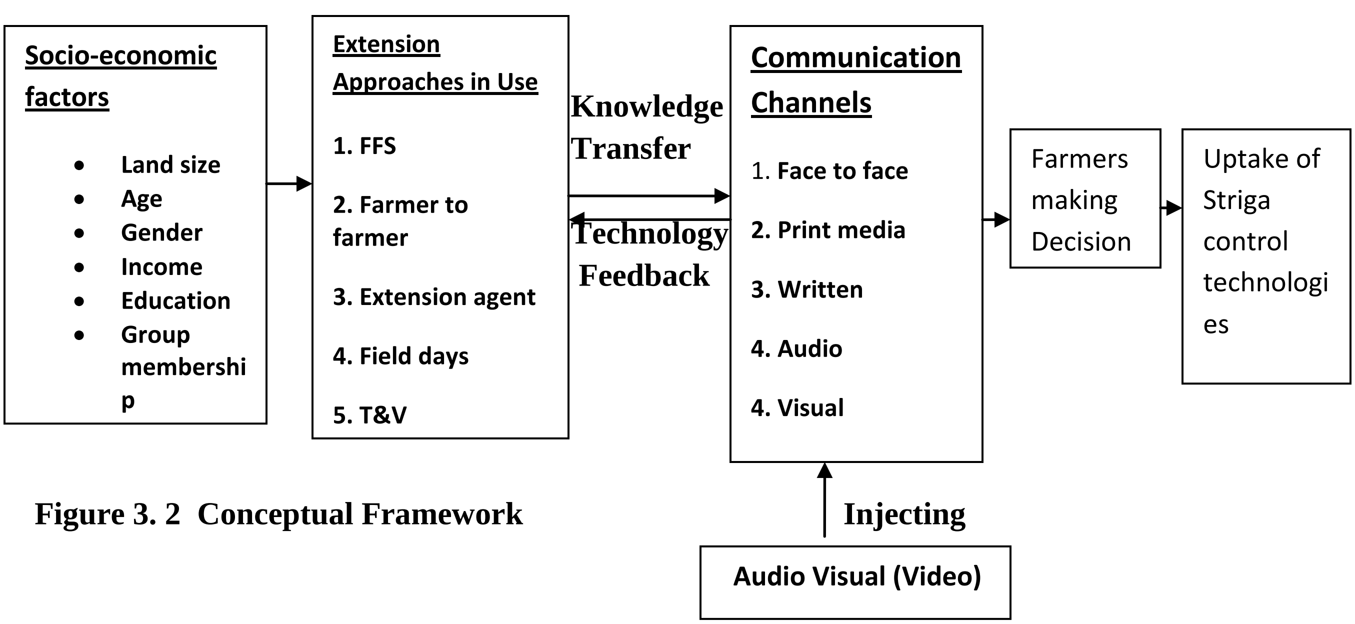

Figure 3. 2 Conceptual Framework

3.4 Target Population

The target population for the study was maize farmers of Rachuonyo South Sub-County. These farmers engaged in maize production majorly for local consumption. Many farms have been infested by striga weed resulting into huge yield losses.

3.5 Sampling Procedure

This study was part of a project implemented by Access Agriculture in Kenya. Rachounyo South Sub-County in Homa-Bay County was purposively selected because it is one of the regions highly infested by striga weed resulting in huge grain losses. A multistage sampling procedure was employed to divide the sub-county into smaller admintrative units- villages strata. This was due to fact that multistage sampling procedure facilitates sequential sampling across two or more hierarchical levels (Cochran, 1977). To achieve this, the Sub-county was first divided into divisions, then to locations and finally villages. Ten villages were randomly selected using random number table.

In order to arrive at a specific respondent, a list of registered maize growing farmers from the department of Social services was drawn with the help of local administration (area agricultural extension officers) from Oyugis Intergrated Project (OIP), a local NGO that works to uplift the livelihood of people within the sub-county. A total of 173 farmers who were on the list and work closely with OIP formed a sampling frame. Because of this small population, sample size was determined using Simplified formula for proportion by Yamane (1967).

$$n = \frac{N}{1+N*(e)^2} \quad \text{...equation 1}$$

Where: n = sample size

N = Size of population,

e = acceptable sampling error (level of precision)

$$n = \frac{173}{1+173*(.05)^2} = 120.65 \text{..................................equation 2}$$

The sample size arrived at was 120 households (rounded to the nearest whole number).

Systematic random sampling technique was employed to select the farm households. The sampling interval (k) was determined using the formula ***k** =**N/n**, (*Mugenda and Mugenda, 2003) where **N** is the population size and **n** is the sample size. The sampling interval, k was therefore **173/120= 1.44** rounded to **1** (whole number).This implied that the first 120 farmers in the list were selected for the study. The selected farmers were put into three farmer groups and trained on striga weed management via video (G1), FFS (G2) and combination of video and FFS(G3). To achieve equal distribution, each group had 40 members. Also, they were far apart to avoid exchange of ideas among themselves. Nevertheless, to meet objectives of the study, all the trained farmers were purposively sampled and interviewed.

A total of 119 farmers were successfully interviewed as one interview guide from combination of video and FFS group was incomplete, therefore excluded in the analysis.

3.6 Data Collection and Analysis

The study used primary data collected through semi-structured questionnaires. The questions were formulated in English. The questionnaire was administered to the farmers through face to face to enable clarification and probing of the respondent for accurate answers. To achieve this, three locals with necessary education and farming experience were trained as enumerators. Both qualitative and quantitative data were collected among the selected farming households.The data was then coded, cleaned and entered into Statistical Package for Social Sciences (SPSS version 22) for analysis. The descriptive study findings were presented through frequencies, pie-charts, graphs and percentages. Inferential findings were presented using Pearson’s coefficient of correlation to identify degree of association, relationship and significant differences between independent and dependent variables.

The first objective was achieved through the use of Likert scale. Likert scale measures attitudes and behaviors using answer choices that range from one extreme to another. Previous study by Mcharo (2013) used Likert-scale to measure farmers' perception of the effectiveness of agricultural extension agents in knowledge transfer to maize growers in Kilindi district, Tanzania. For objective two, descriptive analysis was employed where adoption rates were presented through percentages. Past study by Mwangi *et al*., (2014) used descriptive analysis to measure adoption rates of push-pull and IR-maize technologies among farmers in Western Kenya.

Binary logistic regression model was employed to achieve objective three. The dependent variable (uptake of striga management technologies) assumed two responses i.e. 1 if farmers adopted striga control technologies and 0 otherwise. Kaguongo (2010) employed logistic model to determine factors influencing adoption of orange flesh sweet potato varieties in Western Kenya. Likewise, Khan and Akram (2012) used the same model to investigate farmers' perception of extension methods used by the extension personnel for the dissemination of new agricultural technologies in Khyber Pakhtunkhwa, Pakistan.

The probability to adopt striga control technologies given the sets of socio-economic and institutional factors was represented as;

$$P(t_i|x) = \frac{e^{B_0+B_1X_i}}{1+e^{B_0+B_1X_i}} \quad \ldots\ldots 1$$

Likewise, the probability of not adopting the new technologies is given as:

$$P(t_0|x) = 1 - P(t_i|x) = \frac{1}{e^{-(x_iB_i+u)}} \quad \ldots\ldots 2$$

Where:

t_i= uptake of striga management technologies

βi are the estimated coefficients, X_i is a row of independent (explanatory) variables such as age, gender, land size, level of education, group membership, and perception and μ is the allowable error term.

3.7 Variables included in the model and expected outcome

Table 3. 1 Expected outcome

Variable	Description of the variable	Expected sign
Uptake	Dependent variable	
Age	Age of the respondent	+/-
Gender	Sex of the respondent	+/-
Household size	A number of household members	+/-
Education-level	Level of education of the respondent	+/-
Land size	Measured in acres.	+
Group membership	respondent belonging to any social group	+
Perception	Respondents view	+/-

3.7.1 Justification for Inclusion of Various Independent Variables

Age: Age of the farmer was expected to have a negative or positive sign. Owners of agricultural land and most of the farming activities are carried out by the elderly in the community, the older the farmer is, the higher the chances of adopting various striga control technologies in order to realize increased maize production unlike the younger farmers who majorly target higher levels of education and office jobs in the town centers. However, some scholars argue that young farmers are believed to be more educated and tend to accept new technologies faster than the older ones do (Mutuma, 2013).

Gender: It was expected to have a positive or a negative relationship on uptake of striga control methods. Discrimination in land ownership in most of the traditional communities limits women's chances of owning agricultural land. Men are mostly the head of the families except in cases where a woman is widowed. This gives the man title to most of the decision making process in agricultural activities. Diagne (2009) found a positive relationship between male headed households and adoption of push- pull technology.

Membership to Farmers' Group; Farmer groups are enterprises voluntarily owned and controlled by farmers themselves. These groups are formed with a goal of meeting various needs within the society. According to Chi Truong *et al*., (2011), farmer groups are avenues of advisory services and alternative learning ground. It was therefore hypothesized that membership to farmers group would positively influence farmers to learn and subsequently adopt of various video and FFS messages.

Level of Education: It was hypothesized that high level of education would influence adoption of both video and FFS messages. This was due to the fact that more educated farmers were believed to have good interpretation of the both video and FFS messages hence a positive relationship. Studies by Ouma and De Groote (2011) found positive influence of level of education on uptake of agricultural technologies.

Land size: The effect of land size on uptake of video and FFS messages was expected to be either positive or negative. Farmers with large truck of land are likely to reserve part of their land in order to experiment new technologies (Simtowe *et al*., 2011).On the other hand, farmers with small parcel of land are seen to be able to adopt labour intensive technologies as they use rely on labour provided by family members (Genius *et al.,* 2006).

Household size: The study hypothesized that household size would have a positive or negative influence of uptake of video and FFS messages. Household size is usually linked to provision of labour for various farm activities (Mwangi *et al*., 2014). Amudavi *et al.* (2008) found a positive influence of household size on uptake of push pull technology, one of the striga control technologies in western Kenya.

Perception: Perception is the views that a farmer holds based the prior experience or felt needs. The study hypothesized that farmers' perception would have a positive or a negative influence on the uptake of video and FFS messages. Farmer's perception towards emerging agricultural technologies is a key determinant in decision making process to utilize such initiatives (Nabifo, 2003). Perceiving agricultural messages is first step in understanding farmers' acceptance and continued use of the technologies.

CHAPTER FOUR:
RESULTS AND DISCUSSION

4.0 Introduction

This chapter presented the findings of the research according to the objectives of the study. However, it started by outlining the key socio-economic characteristics of the respondents which were later used to understand adoption process.

4.1 Socio-economic characteristics of maize farmers of Rachuonyo South Sub-county.

The research was carried out to understand the characteristics of the farmers, their production activities, challenges and access to extension services as far as maize production is concerned. These characteristics were understood with regard to age, gender, level of education, sources of income, household head, size the land, land tenure system practiced and membership to various social groups.

4.1.1 Age of the respondents

Figure 4.1 presents age of all the respondents interviewed. Majority of the farmers (47 per cent) were in age bracket of 20-40 years. This implied that most of the farmers were energetic and therefore able to invest on new technologies learnt. Further, the study found about 31 per cent of the respondents in age bracket of 41-50 years. These farmers were believed to have settled on farming as their profession.

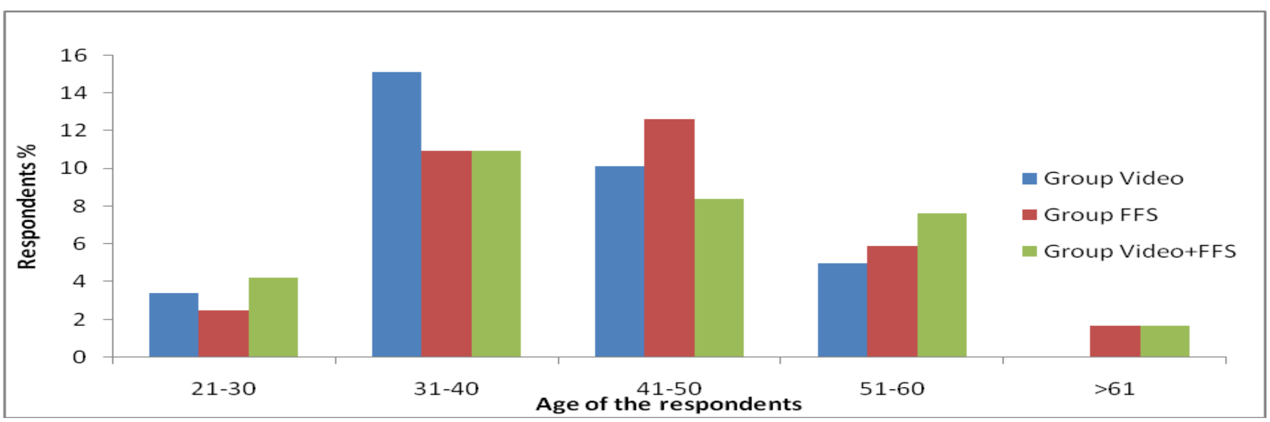

Figure 4. 1 Age of the respondents

Only 18.5 per cent of the respondents were in the age between 51-60 years while 2.5 per cent were in the age above 61 years. Among the video participants, 18.5 per cent of the farmers were in the age bracket 21-40 years, 15.1 per cent aged 31-40 years and 3.4 per cent aged 21-30 years. On the other hand, 13.4 per cent of the farmers in the same age bracket (21-40 years) trained via FFS. Although this difference was small (5 per cent), however, it implies that relatively younger farmers attended video shows as compared to FFS demonstrations. The findings therefore corroborated with the observation by Okello *et al*., (2010) that younger farmers are more willing to utilize ICT tools for agricultural purposes than the old ones.

4.1.2 Gender of the respondents

A total of 79.9 per cent of the respondents who were interviewed were women while men composed only 20.1 per cent (Table 4.1). This suggests that a relatively high level of acceptance of new technologies by women. Women are believed to be actively engaged in rural farming. Video as a communication platform in agricultural extension was a new technology to nearly all the respondents.

Table 4. 1 Gender of the respondents

	G1-Video		G2-FFS		G3-Video +FFS		Total (n=119)	
Gender	Frequency	per cent	Frequency	per cent	Frequency	per cent	Frequency	**per cent**
Male	7	5.9	11	9.2	6	5	22	**20.1**
Female	33	27.7	29	24.4	33	27.7	97	**79.9**
Total	**40**	**33.6**	**40**	**33.6**	**39**	**32.7**	**119**	**100**

The fact that majority of the respondents who received training through video were women, was a clear indication that many women farmers could access extension services easily via video as compared to traditional ways of extension services delivery. This study finding supports assertion by Bentenley et *al.,* (2015) that many women were likely to be reached with new agricultural messages through publicly screened videos. In addition, a study by Blumenstock and Eagle, (2012) revealed that women were so willing to share mobile phones -which are ICT tools just like videos in dissemination of agricultural information than men. Lack of adequate access to agricultural information which presents a disturbing situation for agricultural improvement as asserted by Asenso-okyere and Mekonnen, (2012) can be reversed by the use of video mediated learning. This is due to the fact that farmer to farmer videos offer incredible opportunities for rural women to be reached with new agricultural technologies.

4.1.3 House-hold head of the respondents

Majority of the respondents interviewed were house-hold heads. All men surveyed were heads of household. However, they comprised only 20.1 per cent of the total population interviewed. A total of 48.7 per cent women interviewed were household heads. The high percentage (48.7 percent) was attributed to high level of HIV/AIDs infection in the region hence most of men died leaving behind their wives with greater responsibilities of making decisions on what to be done on the land. The average household size was five (5).

4.1.4 Level of Education of the respondents

The literacy levels were relatively low among the farmers interviewed. Majority of the respondents (63.9 per cent) had primary education while about 1.7 per cent of the respondents did not have any formal education (Table 4.2). Among the G-1 members, 2.5 per cent had tertiary eduction, 32.5 per cent secondary education and 60 per cent primary education.

Table 4. 2 Level of education of the respondents (n=119)

Level of education	G1-Video group		G2-FFS group		G3-Video +FFS		**Total n=119**
	Frequency	per cent	Frequency	per cent	Frequency	per cent	**per cent**
Tertiary	3	2.5	1	0.8	0	0	**3.3**
Secondary	13	10.9	7	5.9	17	14.3	**31.1**
Primary	24	20.2	30	25.2	22	18.5	**63.9**
None	0	0	2	1.7	0	0	**1.7**
Total	**40**		**40**		**39**		**100**

The G-2 group had 2.5 per cent participants with tertiary education, 17.5 per cent with secondary eduction,75 per cent with primary education and 5 per cent had no formal education. The video plus FFS group had 43.6 per cent with secondary education and the rest of 56.4 per cent with primary education.

The results suggested that relatively high percentage of respondents who had post primary education preffered video shows as compared to FFS demonstrations. This implies that the level of education has influence on the use of ICT tools in agriculture. Relatively well educated farmers tend to embrace emerging commuinacation tools in agricultural extension. This is in line with some scholars who aurgue that farmers who have low literacy levels are less likely to acquire agricultural information with the help of ICTs tools such as video (Czapiewski *et al.*, 2013). High education levels therefore improve farmers' ability to internalize the striga control technologies presented hence decision to adopt.

Table 4. 3 Correlation between Farmer's age, gender, household size and level of education

Characteristics	Groups	Age	Gender	Household size	Education level
Age	Video	1			
	FFS	1			
	Video +FFS	1			
Gender	Video	-.181	1		
	FFS	.244	1		
	Video +FFS	.233	1		
Household size	Video	-.068	.281	1	
	FFS	.589**	.308*	1	
	Video +FFS	.226*	.287*	1	
Education level	Video	.672**	-.093	-.066*	1
	FFS	.741*	.188	.402*	1
	Video +FFS	.361*	.282	.097	1

Significance: **. Correlation is significant at the 0.01 level (2-tailed), *. Correlation is significant at the 0.05 level (2-tailed)

The results of analysis of data presented in Table 4.3 revealed a significant positive correlation between farmer's age and level of education at 67 and 71 per cent for video and FFS respectively. This implies that as age increases, respondents become more educated. However, there was no significant correlation between gender and level of education, age and gender.

4.1.5 Land size

Majority of the farmers (86.5 per cent) owned land on individual tenure basis. This was followed by leasehold 12.7 per cent and communal 0.8 per cent (Table 4.4). Over 84 per cent farmers had less than two (2) acres piece of land. This could be due to high population density which stands at about 431 people per square kilometer (Sikei, 2009) hence land has been subdivided into smaller fragments. In addition, most farmers had devoted larger portions of their land for crop production leaving small pieces for livestock and other activities such as forestation. Since profiling of farms in most cases is done on the basis of land size (Eastwood *et al*. 2010), where a cut-off size for small farm holders being less than 4.9421 acres (World Bank 2003), it was concluded that majority of the respondents were small scale farmers. The GoK (2009) also documented that small scale farms in Kenya usually are within the range of 0.2 to 3 acres.

Table 4. 4 Farmers land size and tenure systems

Characteristic		Video group (per cent)	FFS group (per cent)	Video+ FFS group (per cent)	**n=119 Total (per cent)**
Land size	< 2 acres	26.9	30.3	27.7	**84.9**
	2-5 acres	4.2	2.5	5	**11.7**
	> 5 acres	2.5	0.9	0	**3.4**
Land Tenure	Individual	29.4	31.9	25.2	**86.5**
	Leasehold	3.4	1.7	7.6	**12.7**
	Communal	0.8	0	0	**0.8**

4.1.6 Group membership

Farmer group membership provides a way through which many farmers may be reached with various agricultural interventions. From the analysis, over 80 percent of the respondents belonged to various social groups (Table 4.5). Within these groups, farmers were able to interact, share their concerns and look for solutions not only in farming but also across domains of life. They contributed money on regular basis (table banking), invested the money and share profits accruing from such investments. The remaining respondents (17 per cent) who did not belong to any group cited low income status and old age as hindrance to group involvement.

Table 4. 5 Farmers Group membership n=119

Group membership	G1-Video group per cent	G2-FFS group per cent	G3-Video +FFS per cent	**Total per cent**
No	5	8.4	4.2	**17.6**
Yes	28.6	25.2	28.6	**82.4**

Group members were constantly sharing with each other about the benefits and evaluated the success of their development initiatives. As they were interacting, their curiosities were aroused and this motivated them in trying new technologies and ideas. In this regard, Adong *et al.* (2013) posits that farmer groups form a means of reaching farmers by many agricultural based organizations with an aim of enhancing agricultural improvement through sharing of information and capacity building.

4.1.7 Source of Income

Agriculture is the main source of income among respondents interviewed. Majority of the respondents (90 per cent) purely depended on agriculture as source of their livelihood. Only a few depended on other sources such as employment (1.6 per cent) and business (8.4 per cent) to supplement income from farming (Table 4.6). Past studies by Sikei (2009) and Homa-Bay development Plan (2013-2017) have also recognized agriculture as the main source of income for people in this region.

Table 4. 6 Farmers source of income

Source of income	FFS	Video +FFS	Video	**Total (per cent)**
	(per cent)	(per cent)	(per cent)	**n=119**
Agriculture	30.3	28.6	31.1	**90**
Business	2.5	4.2	1.7	**8.4**
Employment	0.8	0	0.8	**1.6**

All farmers ranked maize as the first and a major crop grown in the area. However, maize yield has not been good as most of them obtained an average of 2 bags of per acre. Maize varieties grown included DK, Punda Milia, Pioneer, H614, H625, Duma, local cultivars identified as *Nyamula* and *Maragol*. Others crops grown include improved sorghum varieties such as seredo, improved sweet potatoes such as Kaboda, beans, groundnuts. Farmers United, a private organization had traversed the region training farmers on good agronomic practices especially on maize and bean crops. This has led to a number of farmers shifting to maize production for both food and cash. In regard to this, the County Government of Homa-Bay (2013) admitted that over 80 per cent of the farmers produce maize and beans as the two crops are considered as staple foods of the county.

4.2 Challenges and access to extension services.

Striga hermonthica was one of the most mentioned threats to maize production. This parasitic weed is known as '*kayongo'* in local language (Luo). Majority of the farmers (51.5 per cent) cited striga as a major constraint to their maize production. Nambafu *et al.* (2014) found Striga weed as a major problem to maize production as compared to drought and soil infertility. Other challenges mentioned included high cost of farm input (23 per cent), pest and diseases (15.5 per cent), soil erosion and infertility problems (5 per cent) and unpredictable weather conditions (5 per cent) as shown in Table 4.7. Prior to this research, most farmers had embraced a number of control strategies to cope with striga problem. Such strategies included early weeding, farm yard manure application and uprooting. However, such traditional initiatives have not yielded a lot as striga weed continued to infest many farms.

Table 4. 7 Challenges and access to agricultural extension services

Variables		FFS group per cent	Video group per cent	Video+FFS per cent	**Total(per cent) N=119**
Challenges	Unpredictable weather	0.8	2.5	1.7	**5**
	Pest & diseases	5.9	5	4.2	**15.1**
	Striga weed	14.4	18.5	19.4	**52.3**
	High cost of farm inputs	10.9	6.7	5	**22.6**
	Soil erosion & infertility	1.7	0.8	2.5	**5**
Access to extension service (yes)	Ministry of Agriculture	2.5	3.4	1.6	**7.5**
	Private sector	13.4	15.1	11.8	**40.3**
Interaction levels	Weekly	3.6	1.9	1.9	**7.4**
	Monthly	8.8	7	3.6	**19.4**
	Quarterly	19.3	14	8.8	**42.1**
	Yearly	10.5	5.3	15.8	**31.1**
Information Sought	Agronomic techniques	15.8	10.5	8.8	**35.1**
	Improved seeds	7	5.3	8.8	**21.1**
	Pest & diseases	8.8	3.5	7	**19.3**
	Marketing	7	3.5	5.3	**15.8**
	Striga management	3.5	5.2	0	**8.7**
Extension Approaches	FFS	24.5	14	19.3	**57.8**
	Field days	1.8	3.5	1.8	**7.1**
	Farmer to farmer	7	3.5	3.5	**14**
	Training and Visit	8.8	7	5.3	**21.1**
Communication channels	Face to face	26.3	14	15.8	**56.1**
	Audio	12.3	10.5	12.3	**35.1**
	Print media	3.5	1.8	0	**5.3**
	Audio-Visual	0	1.8	1.8	**3.6**

On access to agricultural extension, the study found that less than a half of the total respondents (47.8 per cent) were able to get access to the agricultural extension services. Out of this, only small percentage of the farmers (7.5 per cent) got these services from Ministry of Agriculture (county government), while majority (40.3 per cent) obtained such services from private extension providers. However, their level of interaction with extension officers was limited. Only 42.1 per cent of the farmers interacted with extension officers on quarterly basis, 19.4 per cent on monthly basis, 31.1 per cent of yearly basis and 7.4 per cent on weekly basis (Table 4.7). This implies that extension officers had no close contacts with maize farmers since majority were small scale farmers. The finding supports assertion by Gadhi *et al*., (2009) that extension officers usually restrict their interaction to the more resourced farmers in each village hence devote little time for resourced- poor farmers.

In terms of information sought from extension officers, about 35 per cent of the respondents needed information on new agronomic practices such better ways to cultivate land. This was closely followed by improved seeds and fertilizers (21.1 per cent), pest and disease control (19.3 per cent), marketing (15.8 per cent) while only 8.7 per cent of farmers needed information on striga management. This implies that majority of the farmers did not have adequate knowledge and information on striga weed and its control techniques as information on this aspect was rarely sought. According to Acheampong *et al.,* (2015), an appropriate knowledge and information concerning new technologies stimulate farmers' ability to comprehend such technologies for sound decision making. This is due to the fact that knowledge influences acceptance of new ideas hence uptake of technologies developed over time to combat striga.

Further, the study found Farmer Field School as the most active extension approach used to disseminate agricultural information among farmers in this area. Majority of the respondents

(57.8 per cent) mentioned FFS, which involves a group of farmers having face to face interaction with agricultural experts. Other approaches were farmer to famer (14 per cent), Field days (7.1 per cent), Training and Visit approach (21.1 per cent). These extension approaches adopted various communication channels to reach intended farmers with messages. Such channels included face to face (56.1 per cent), audio (35.1 per cent), written and print media (5.3 per cent) and audio-visual (3.6 per cent) mainly via TV. This implies that traditional channels of communication (face to face and audio) were popular in this area.

The findings therefore corroborated with previous study by Gillward *et al.* (2010) which revealed that the traditional methods that rely on face to face channel still remain popular especially in rural areas despite the penetration of new ICT tools. In addition, Daudu and Okwu (2011) in their study on extension channels established that interpersonal communication channels (face to face) were commonly used by rural farmers more than the mass media which include the audio-visual. Furthermore, face to face communication channel has been regarded as rich due to social cues which one takes advantage over to influence others (Szostek *et al.* 2011).

4.3 Farmers Perception, Attitude and Knowledge on Video mediated learning and Farmer Field School messages.

4.3.1 Farmers Perception on messages disseminated by video mediated learning, FFS and a combination of VMLand FFS

The study revealed that majority of the video participants (72.5 per cent) that was 32.5 percent found messages disseminated very useful, 40 percent of them found messages useful (Table 4.8). This implies that a greater proportion of video participants positively perceived messages disseminated as relevant in their quest to improve maize production. Most of them cited video messages as very informative, clear and covered the topic matter. The images of fellow farmers and the use of sorghum stalks as alternative materials for compost manure preparation really caught their attention. They were amazed and excited to see better ways of farming using locally available resources. Some noted being entertained too apart from learning striga control technologies. This finding augurs well with previous study by Zossou *et al.* (2009) who revealed that farmer to farmer videos are rich in images and well enthused for farmer trainings.

Table 4. 8 Farmers perception towards video and FFS messages

Aspects measured	Categories of farmers	Very useful per cent	Useful per cent	Slightly useful per cent	Slightly not useful per cent	Not useful per cent
Relevance of messages	G1(VML) n=40	32.5	40	11.5	8.5	2.5
	G2(FFS) n=40	25	32.5	8.5	14.5	19.5
Clarity of messages	G1	37.5	42.5	15	3.4	1.7
	G2	27.5	32.5	17.5	12.5	10
Coverage of topic	G1	40	42.5	11.5	5	2.5
	G2	22.5	35	15	17.5	5

On the other hand, 57.5 per cent of the G2-FFS participants that was, 25 per cent of them found messages disseminated as very useful, 32.5 per cent of them useful (Table 4.8). This implies that slightly above a half of them positively perceived messages as relevant in their quest to improve maize production. They appreciated learning many ways to combat striga weed which has been a major cause of yield losses within their farms. Though this percentage was a little bit lower than that of video (a range of 15 per cent), however, it implies that video clips were greatly appreciated. The source of messages (whether from Video or FFS) therefore had a greater influence on farmers' perceptions towards messages being communicated. Mcbride *et al.* (1999) also found information sources to play a big role in influencing farmers' perceptions and attitudes towards new technologies.

Among the G3- Video and FFS group, perception was evaluated on topic coverage, relevance of the messages, understandability of the messages, quality of the video and video length. In terms of coverage of the topic, majority of the G3 participants (90 per cent) found video to be very effective tool, 7.5 per cent of them found video to be fairly effective and 2.5 per cent of them not effective (Figure 4.2).

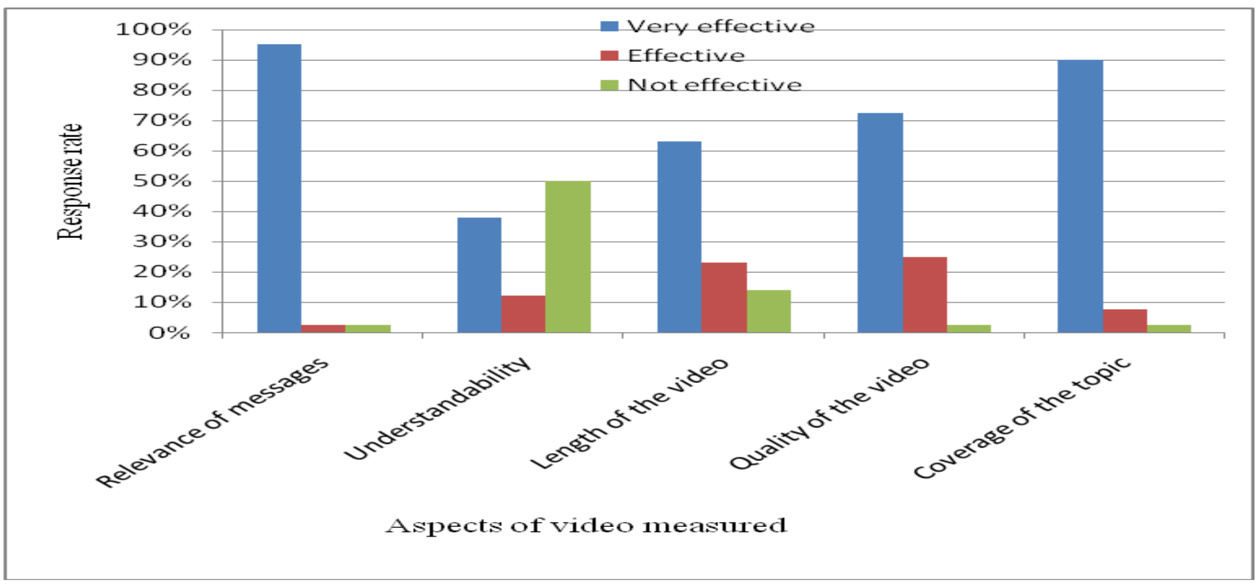

Figure 4.2 Farmers' perception on various aspects of Video Mediated Learning

In regard to understandability of messages, 38 per cent of the G3 participants found video to be very effective as, 12 per cent of them effective and 50 per cent found it not effective. The reason behind low understandability was the language (English) used to pass video massages during screening. Most farmers had low reception power for both English and Kiswahili languages, a factor attributed to low level of literacy in this area (Sikei, 2009).

In terms of duration the video was shown, 63 per cent of the G3 participants found video to be very effective, 23 per cent of them found it effective and 14 per cent of them found it as not effective. Relevance of the massages was measured at the same time and it was found that 58 per cent of the G3 participants viewed messages as very relevant; 33 per cent found messages relevant and only 9 per cent found messages not relevant. Lastly, 72.5 per cent of G3 participants found video quality as very effective, 25 per cent of them effective and 2.5 per cent them not effective. This shows that video images were very clear and the background was appealing to most farmers. These findings imply that farmers viewed video mediated learning as an effective communication approach to promote sharing of agricultural ideas. In a related study by Zossou *et al*. (2009), it was found that farmer to farmer videos are efficient way in reaching many farmers with relevant information.

4.3.2 Farmers attitude towards video mediated learning and FFS approaches.

About 27.5 per cent (very good) and 40 per cent (good) of video participants found video as a viable tool to communicate agricultural information (Table 4.9). This clearly suggests that agricultural videos can be used to encourage farmers to learn and continue to participate in extension activities.

Table 4. 9 Farmers attitude towards Video and FFS communication approaches

Aspects measured	Categories of farmers	Very Good Per cent	Good Per cent	Neither good nor bad Per cent	Bad Per cent	Very bad Per cent
	G1(VML) n=40	27.5	40	15	12.5	5
Viability	G2(FFS) n=40	17.5	32.5	12.5	20	17.5
Excellence in knowledge	G1	37.5	42.5	15	3.4	1.7
	G2	17.5	32.5	19.5	14.5	8.5
Approval for other farmers	G1	22.5	42.5	11.5	5	2.5
	G2	12.5	32.5	22.5	20	12.5

In addition, they noted that video was an excellent approach for knowledge acquisition due to its ability to present information in simple formats. They saw how other farmers demonstrated and explained various striga control technologies on a camera and became intrinsically motivated to search for more information. This demonstrates the persuasive nature of agricultural videos in extension science. Further, it points that participants had a positive attitude towards video mediated learning. Past study by Zossou *et al. (*2009), also found that 89 per cent of the farmers who participated in video viewing considered video as an excellent communication tool for farmer training.

In regard to FFS group, the study revealed that a half of G2 participants (50 per cent) found FFS as a viable approach to communicate agricultural messages (Table 4.9). This implies that FFS was still an effective approach in delivering agricultural information among rural farmers. These participants had close contact with facilitators hence developed interest towards learning striga control technologies. However, farmers who did not find FFS a viable approach cited time as a major limiting factor. This was attributed to the fact that FFS training could go for relatively longer hours. Since most farmers were engaged in other production and social activities, trainings beyond three to five hours were rendered unattractive. In contrary, study by Oladosu (2006) revealed that FFS farmers complained about the duration of training as being too brief for meaningful knowledge transfer. Further, facilitation process was marred by the use of jargons as trainees were unable to translate every word into local language.

On approval, 45 per cent of the G2 participants found FFS as an appropriate approach for communicating agricultural information (Figure 4.3). This means that FFS is still a reliable approach in extension despite emergence of Information Communication Technologies in the field of agriculture. They cited that having personal interaction with extension officers usually motivate them to learn more and put into use the new ideas gained. The rest who did not recommend FFS to other farmers cited time and poor facilitation process especially the use of scientific terms as major constraints. To further improve FFS, farmers in this area asked for regular farm visits by facilitators in order to create close contact and sense of trust.

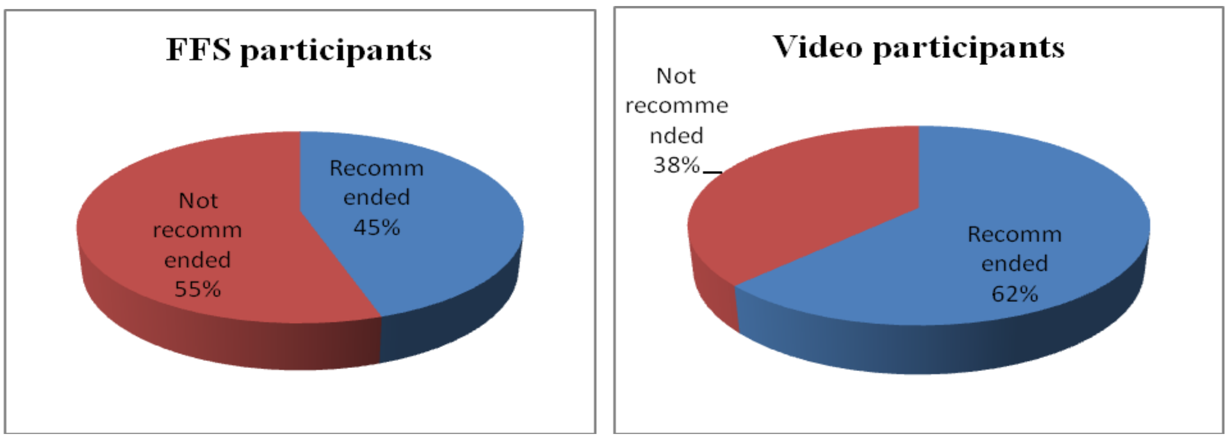

Figure 4.3 Percentage of respondents who recommended video and FFS tools

On the other hand, over 60 per cent of G1 participants approved the use of video to educate other farmers with similar messages in order to join hands in fighting striga within their farms. For improvement, G1 participants advocated for local language video versions. Reason behind this, was low level of education (Sikei, 2009) hence could not understand foreign languages very well. In short, both FFS and video tools were recommended for communicating agricultural messages. However, percentage of farmers who recommended VML was higher than FFS, a difference of 17 per cent. This shows clearly that video participants had a positive attitude towards VML.

4.3.3. Farmers' knowledge on messages disseminated via Video, FFS and a combination of VMLand FFS

Majority of G3- participants (89 per cent) were aware of striga weed and out of this, 72.5 per cent of them could recall various striga control technologies after training (Figure 4.4). This implies that video watching combined with in person-instructions from facilitators greatly encouraged farmers to learn very fast and gain better understanding of the striga control technologies. Farmers in this category therefore took advantages presented by the two pathways in order to acquire knowledge. For instance, FFS has an advantage of providing intensive learning (Murage *et al* (2012), while video mediated learning has the advantage of sharing ideas informally using social networks within the community (Bentley *et al*. 2014). Therefore, they were able to capitalize on small group discussions and use social networks to gain better understanding of the technologies disseminated.

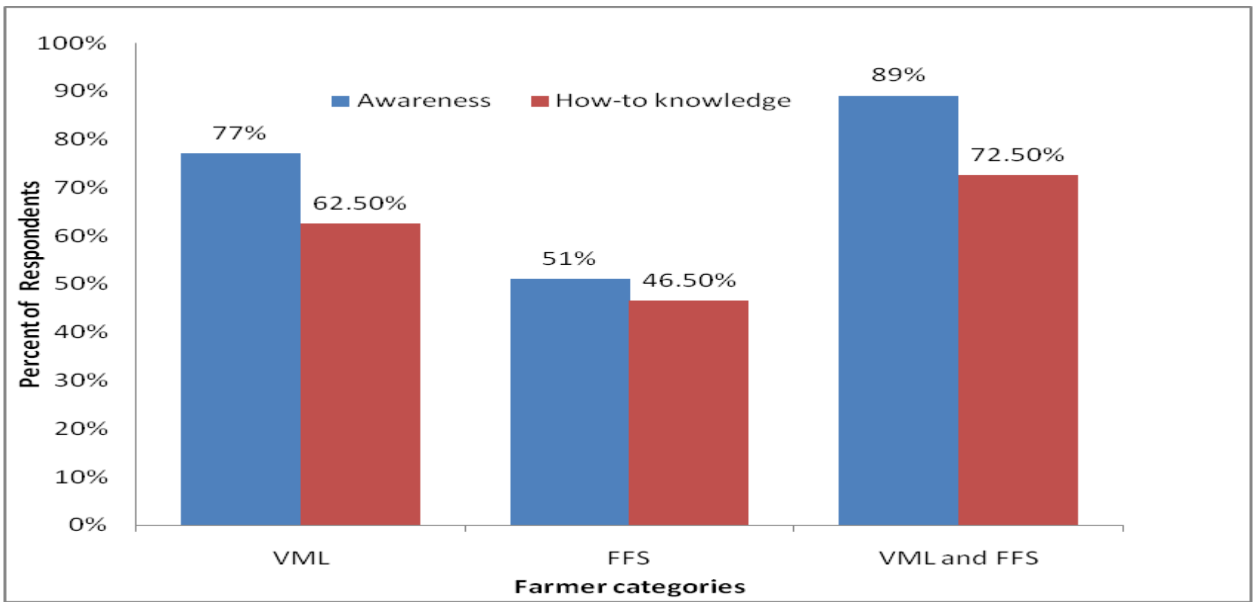

Figure 4. 4 Knowledge of the farmers on striga management after Video and FFS trainings

Furthermore, about 77.5 per cent of G1 participants were aware and had knowledge on striga control technologies after training (Figure 4.4). This implies that majority of farmers understood striga biology, its effects and control mechanisms as they could see and hear at the same time. Most of them could narrate how small striga seeds were and also recall hand pulling, compost manure, micro-dosing and joining hands as a community in fighting striga. This shows that they were ignited to learn more and gained knowledge on striga weed management. In this line, past study by Karubanga *et al*., (2016), revealed that watching videos usually increase retention power of the participants to an extent of remembering most things learnt. Earlier findings by Bentley *et al*. (2014) also indicated that many farmers were able to recall videos and remember topics learnt after video watching.

Lastly, about 50 per cent of G2 participants were aware and had knowledge on striga weed management after training (Figure 4.4). This implies that a half of the FFS participants understood the basic concepts of striga weed management. Majority of G2 participants could only recall push-pull, uprooting and compost manure technologies. This was due to the fact that demonstrations were mostly done on push-pull and intercropping technologies. Other striga control technologies such as crop rotation and weeding were rarely mentioned as they were presented theoretically without field trials. This observation demonstrates the power of learning by doing as farmers gain deeper experiences with the technologies tried in the field. In support to this, Davis (2010) revealed that learning through field experimentations usually motivate farmers to gain practical skills with the technologies under test.

In comparison, the above results revealed a difference of about 20 per cent between VML and FFS participants who had knowledge on striga weed management. This implies that video viewing enhances faster knowledge acquisition as compared to FFS lectures and demonstrations. As farmers see and hear, they internalize information and absorb much of what is being presented. This leads to building of lasting memories. Earlier study by Rogers (1980), also depicted that mass media (such as video) was more important at knowledge stage of an innovation decision process. Furthermore, a study by Rajula *et al.*, (2011) on lecturing extension agents and multimedia found significant but small differences in knowledge gained between two groups ranging from 18.63 per cent to 29.10 per cent. However, it contradicts findings by

Karubanga *et al*., (2016), which revealed no significant difference in knowledge acquisition between video and FFS participants. This could be attributed to the fact that Karubanga's study statistically compared the two approaches unlike this study. When the two approaches are combined, quantifying the actual impact and magnitude of individual extension method on knowledge, attitude and perceptions may be difficult (Murage *et al*.2012).

Nevertheless, about 37.5 per cent of the video participants shared their newly acquired knowledge with others farmers. They acknowledged visiting neighbor farmers' plots for demonstrations on technologies watched. The idea was to reach members of the community with technologies learnt in order to improve their farming activities. In contrast, only 17.5 per cent of FFS participants shared their newly acquired knowledge with other farmers. This clearly suggests that FFS farmers were not compelled to a greater extent of sharing out knowledge gained. The finding therefore corroborates with previous study by Zossou *et al.* (2009) which revealed that farmers who attended video shows were touched with the messages and assisted in dissemination of agricultural technologies within their community.

Table 4. 10 Correlation between farmers' demographic characteristics and perception towards video mediated and FFS demonstration messages

Video mediated farmers

Variables	Age	Gender	Household size	Education level	Land size	Group membership	Perception
Age	1						
Gender	-.181	1					
Household size	-.068**	.281*	1				
Education level	.672**	-.093	-.066*	1			
Land size	.461**	.105	.254	-.147	1		
Group membership	-.002	.069	.128	.105	.048	1	
Perception	-.249	.007	-.085	.069	.032	.299	1

FFS group

Variables	Age	Gender	Household size	Education level	Land size	Group membership	Perception
Age	1						
Gender	.244	1					
Household size	.589*	.308	1				
Education level	.741**	.188	-.069	1			
Land size	.232	-.248	.055	.164	1		
Group membership	-.290	.198	-.105	-.182	.090	1	
Perception	-.120	.064*	.084	.098	.220	.429*	1

Significance: **. Correlation is significant at the 0.01 level (2-tailed), *. Correlation is significant at the 0.05 level (2-tailed)

Table 4.10 presents a significant positive relationship between farmer's group membership and perception among FFS participants.

4.4 Farmers' uptake of striga management technologies disseminated through Farmer Field School demonstrations and Video Mediated Learning

4.4.1 Uptake of striga management technologies

About 42.5 per cent of farmers who participated in video trainings put into use hand pulling, compost manure, intercropping, push- pull, inorganic fertilizer and IR- maize technologies. Interestingly, this intensity of uptake was low than expected since most of the G1 participants had indicated that they had perceived video messages relevant and their knowledge enhanced after training. However, more than half (over 50 per cent) of those who had not implemented such technologies noted that they were in the process of adoption while others claimed lack of reliable weather as it delayed to rain. In addition, most farmers perceived technologies such as push-pull to be knowledge-driven and therefore lack of adequate understanding slowed their implementation. Mwangi *et al.*, (2014) also found adoption rates for Push pull and IR-maize to be 37 per cent and 36.3 per cent respectively among farmers in Western Kenya.

In regard to G-2, the study revealed 35 per cent of FFS participants adopted striga control technologies such as use of inorganic fertilizers, compost manure application, push-pull, use of IR-maize uprooting among others. The rest of the FFS participants noted that they were in the process of adoption while others cited lack of deeper understanding about some technologies hence could not make clear decision on their implementation. Nevertheless, 46.1 per cent of a combination of video and FFS participants implemented striga control technologies such as push-pull, manure application, intercropping, uprooting and inorganic fertilizers.

From the above analysis, there was relatively high percentage of respondents implementing striga control technologies disseminated through VML as compared to FFS participants. This means that a farmer who watched agricultural videos had higher probability to put into use striga control technologies disseminated without on-farm trials. This finding was consistent with earlier studies by Zossou *et al.* (2009) which found higher adoption rate among video participants compared to farmers who attended workshop training.

The fact that Video Mediated Learning approach had the highest impact on possibility of farmers implementing technologies learnt could be attributed to video's persuasive nature and stimulating power. In a related study by Bentley *et al*., (2015), they noted that quality agricultural videos are more convincing as they boost farmers' self-confidence and improve understanding on farming practices and associated skills. However, these findings contradict assertion by Rogers (1983) that interpersonal channels (personal, face-to-face contacts) are more important at the persuasion stage of decision making process to uptake various innovations. Also, it contradicts earlier findings by Rickeck *et al*., (2008) who found that FFS demonstrations had the highest impact in influencing uptake of Integrated Pest Management (IPM) approaches compared with media sources such as videos.

4.4.2 Striga control technologies put into use

Figure 4.5 indicates that farmers adopted different technologies that were disseminated. On average, 51 per cent of video participants adopted hand pulling technology, 21 per cent compost manure, 7 per cent inorganic fertilizers, 5 per cent weeding, 3 per cent intercropping, 5 per cent push-pull, 2 per cent crop rotation and 2.5 per cent IR- maize.

On the other hand, 47.5 per cent of the respondents who received FFS training adopted hand pulling, 16 per cent compost manure, 3 per cent inorganic manure, 6 per cent weeding, 5 per cent intercropping, 5 per cent crop rotation, 5 per cent IR-maize and 10 per cent push- pull. Lastly, 40 per cent of the respondents who received a combination of video plus FFS trainings adopted hand pulling, 27.5 per cent compost manure, 5 per cent inorganic manure, 2.5 per cent weeding, 7.5 per cent intercropping, 7.5 per cent crop rotation 10 per cent push pull, and no farmer adopted IR- maize.

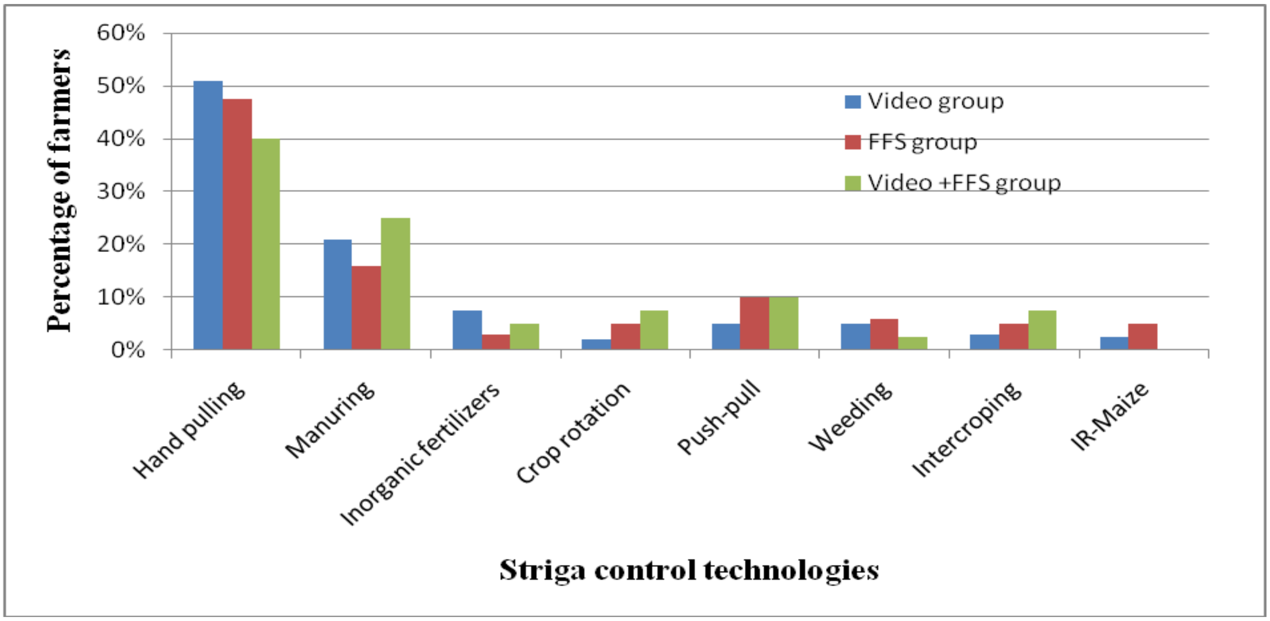

Figure 4.5 Striga control technologies implemented

From the analysis, over 40 per cent of the total respondents interviewed adopted hand pulling technology. They noted hand pulling as cheap and most convenient technology whose application largely depends on labor which was provided by family members. Adoption of manure was due to its affordability and availability within the area. Since most of the farmers were keeping domestic animals such as chicken, cows, sheep and goats, they were able to get animal waste and plant residue for manure preparation. The use of inorganic fertilizers and IR-maize was relatively low due to lack of enough credit facilities to acquire such inputs. Only three farmers out of 119 farmers interviewed were found using IR- maize variety. This numbers was small despite putting a lot of emphasis on IR- maize, which is commonly known as *'Ua Kayongo'* and its availability within local agro-vets.

Application of Push- pull technology was equally low, despite previous studies identifying it as suitable to small scale farmers in addressing major maize production constraints such as striga, stem borer attack and soil infertility (Khan *et al.*, 2011). However, there was relatively high percentage of adopters from FFS group as compared to other groups. This could be due to field demonstrations on push pull technology during FFS trainings. Non-adopters of this technology cited it as more labour intensive which requires relatively larger portion of land and deeper knowledge.

Intercropping was equally implemented though majority of the farmers did not consider it as a viable way to combat striga. However, Odhiambo and Ransom (2001) proved that an intercrop of maize and beans reduces incidences of striga infestation. The same trend was witnessed in other striga control technologies such as weeding and crop rotation. Furthermore, low adoption of crop rotation was attributed to over-reliance on maize crop as source of food. Lack of adequate knowledge in designing a rotational programme for various crops could be a limiting factor towards technology adoption.

Moreover, study found that all farmers who adopted various striga control technologies realized greater improvements within their farms. Some of these improvement included soil fertility 17.5 per cent, improved yield (42.5 per cent), and soil erosion reduction (11 per cent), stem borer and diseases control (14.5 per cent), fodder availability (5 per cent) improved soil moisture content (9.5 per cent). Striga control technologies such as push pull have been found to be suitable in improving soil fertility by action of nitrogen fixation (Khan *et al.,* 2007). Besides this, Desmodium and Mulato used in push pull act as animal feeds, repel stem borer moths from ovipositing eggs on maize and also provide good ground cover hence protect soil from erosive agents.

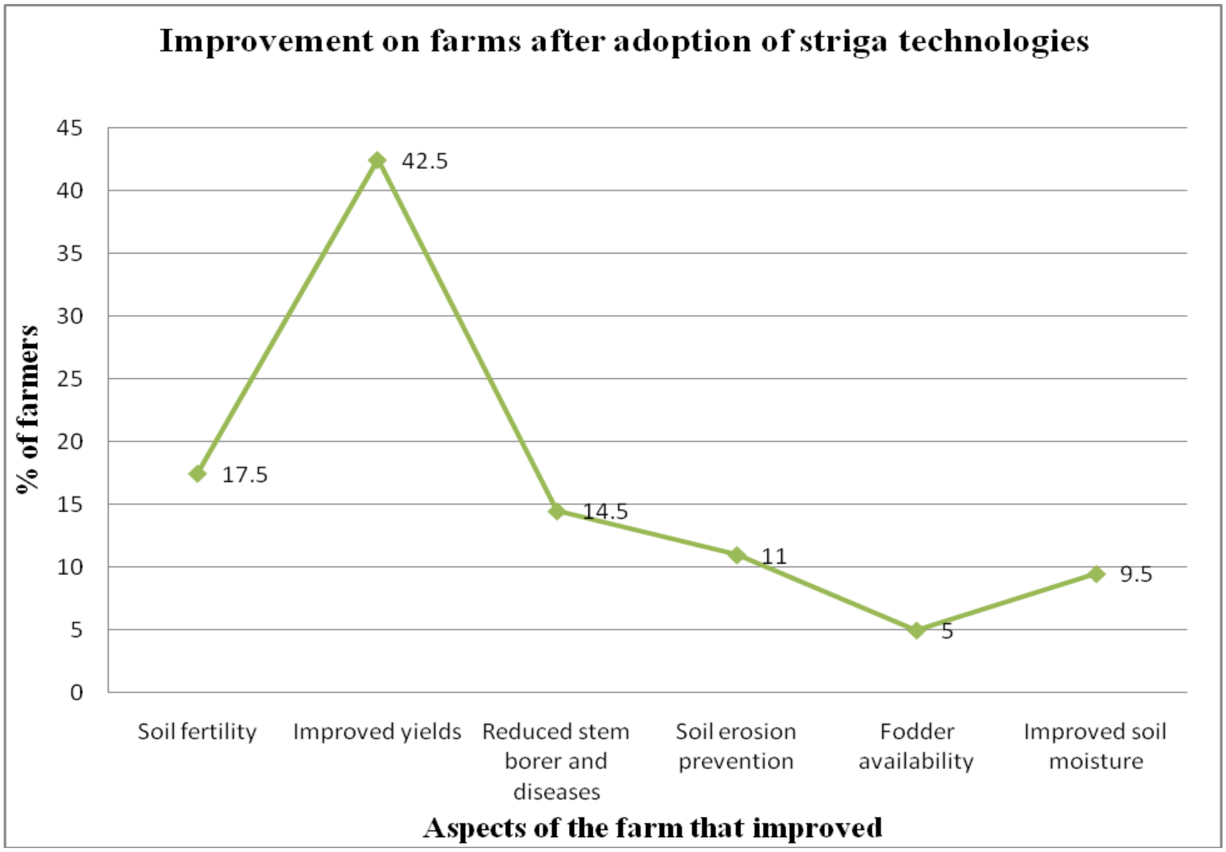

Figure 4. 6 Aspects of the maize farm that improved after uptake of striga control technologies

Striga control technologies such as manure application, intercropping, and crop rotation helped in improving soil structure and texture. Crop rotation reduces the build-up of pest and diseases which could attack maize crop. Manure application increases soil moisture content as well improving soil structure. A study by Vanlauwe *et al.* (2008) also showed that cultural practices such as manure application, intercropping and crop rotation usually help in improving soil fertility and enhance good soil health. According to Kabambe *et al.* (2007) IR- maize variety has the ability to suppress striga emergence hence maize crop fully assimilate water and nutrients available. Inorganic fertilizers usually encourage proper root development, faster growth hence early maturity and quality yields. Most farmers acknowledged obtaining an increased yield ranging from 1 bag to 2.5 bags per hectare.

Moreover, adopters of these striga control technologies were motivated in trying more new technologies. Over 30 per cent of video participants who adopted striga technologies were motivated in trying other technologies. They were motivated by the background in which the images were captured. They discovered real picture of striga weed, its growth habit and control mechanisms. Majority of farmers acknowledged relevance of the messages towards increased maize productivity. The FFS group too was motivated to try other technologies. Push pull demonstrations revealed other technologies which were key to improving maize production. Such technologies included correct spacing (15 per cent), row planting (12.5 per cent), organic farming (17.5 per cent), early planting (42.5 per cent) and proper storage using gunny bags (12.5 per cent) as indicated in Figure 4.7.

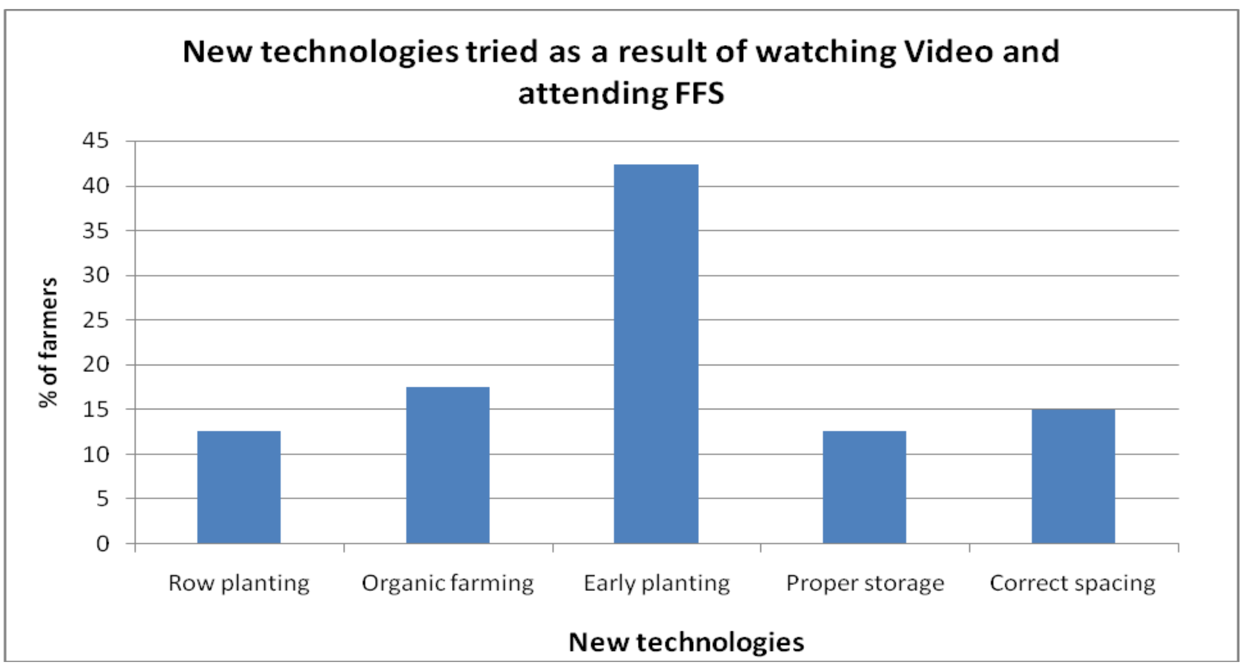

Figure 4. 7 Farmers' motivation in trying others technologies

In support, Bentley *et al.* (2014); Bentley and Van Mele (2011) revealed that farmers who watch farmer to farmer videos always find technical information which drives them towards experimenting new technologies within their farms. Furthermore, Zossou *et al*. (2009) found video viewing to trigger more innovations than conventional extension methods. A study by USAID (2013) also found 36 per cent of viewers trying other farming technologies after watching an episode “Shamba Shape Up”.

Table 4. 11 Correlation between farmers' characteristics, perception of the farmers and uptake of striga control technologies disseminated

FFS group

Variables	Age	Gender	Household size	Education level	Land size	Perception	Uptake
Age	1						
Gender	.244	1					
Household size	.589**	.308*	1				
Education level	.741**	.188	.402*	1			
Land size	.232	-.248	.055	.164	1		
Perception	-.120	-.064	-.084	.098	-.220	1	
Uptake	-.223	.252	-.162	.134	.179	.504**	1

Video group

Variables	Age	Gender	Household size	Education level	Land size	Perception	Uptake
Age	1						
Gender	-.181	1					
Household size	-.068	.281	1				
Education level	.672**	-.093	-.066	1			
Land size	.322*	.105	-.071	-.147	1		
Perception	-.249	.007	-.085	.069	.032	1	
Uptake	.157	-.190	.121	-.130	.086	.612**	1

Significance: **. Correlation is significant at the 0.01 level (2-tailed), *. Correlation is significant at the 0.05 level (2-tailed)

The results in table 4.11 show a strong significant and positive correlation between farmers' perception and uptake for both video and FFS groups.

4.5 Influence of farmers' socio-economic factors on uptake of videos and FFS messages

The study sought to find out the influence of farmer socio-economic factors on adoption of striga control technologies disseminated. The result obtained from binary regression model explained 73 per cent and 75 per cent of the variations in the likelihood of farmers, uptake various video and FFS messages respectively (Table 4.12).

Table 4. 12 Influence of farmers' socio-economic factors uptake of messages disseminated via VML and FFS approaches

	G1- Video alone		G2- FFS		G3-VML +	FFS
Variable	Coefficients	P-values	Coefficients	p-values	Coefficients	P-values
Age	-2.361	0.096***	-1.481	0.069***	-1.52	0.085***
Education	2.897	0.176	3.453	0.383	1.874	0.274
Gender	-2.953	0.073***	4.169	0.026**	-2.015	0.988
Hh-size	1.609	0.212**	-2.607	0.160	1.021	0.345
Land size	2.894	0.055***	1.765	0.069***	2.034	0.020**
Group membership	2.307	0.083***	4.632	0.081***	1.175	0.064***
Perception	6.551	0.022**	2.085	0.023**	4.353	0.984
Constant	6.551	0.185	0.185	0.956	4.148	0.030
-2 Log likelihood=23.042* Cox &Snell R square=.545 Nagelkerke R=.732 Probability >Chi-square =0.000, Number of observations= 40			-2 Log likelihood=20.066* Cox &Snell R square=.548 Nagelkerke R=.754 Probability>Chi-square =0.000, Number of observations= 40		-2 Log likelihood=24.46* Cox &Snell R square =.486 Nagelkerke R=.695 Probability >Chi-square =0.000, Number of observations= 39	

Source: Field data (2016)

Dependent variable: Uptake, ***Significance at 10 per cent, ** significance level at 5 per cent

From Table 4.12, farmers' uptake on both video and FFS messages was significantly and positively influenced by land size, group membership and perception. On the other hand, gender of the respondent had a significant but negative effect on the uptake of video messages.

However, it had a positive influence on uptake of FFS messages. Age also significantly influenced uptake of both Video and FFS messages. All the significant variables answered part of the research question three, indicating an improvement on them could result in an increase on uptake on striga control technologies.

As expected, the gender of the household head significantly contributed to uptake of video, FFS messages at p=0.073 and at p=0.026 respectively. The result implies that there was higher probability of uptake of video messages if the respondent was a female. This finding was not puzzling as in most developing Countries; rural women are believed to be largely involved in on-farm activities. Women provide labor during production, processing, storage and even do the marketing of the farm output. The study findings therefore endorsed Oyugi *et al*., (2014) who reported that most women in rural areas are involved in production of food crops. The difference in adoption rate between women and men could be ascribed to the fact that, more males prefer gathering at various centres politicking as some move to urban areas for white collar jobs. Past studies by Onoja *et al*., (2012), have also reported a higher probability of female farmers adopting various fish practices than male headed households.

Age of the respondents influenced the uptake of the messages disseminated at (p=0.096), (p=0.069) and (p= 0.085) for video alone, FFS and a combination of video and FFS respectively. This implies that probability of younger farmers getting exposed and adopting both video and FFS messages was higher compared to their older counterparts. According to Nambafu *et al*., (2014), young farmers are currently getting more involved in farming activities and have better understanding of the emerging agricultural technologies. This promoted faster diffusion of striga control technologies leading to enhanced decision making towards uptake of such technologies.

As expected, land size positively and significantly contributed to uptake of both video mediated learning, FFS and a combination of video and FFS massages at (p=0.055), (p=0.069) and (p=0.020) respectively. Farmers with large tracks of land were more likely to uptake various messages due to perceived benefits attached to such messages. However, smallholder farmers only put into use labour intensive technologies such as uprooting due to readily available family labour (Mwangi *et al*., 2014). A study by Simtowe *et al*., (2012) also reported a significant relationship between farm size and adoption of improved technology and stated that there was a positive correlation between farm size and adoption of improved technology.

Membership to a farmer group significantly and positively influenced the farmers' ability to uptake of messages from video mediated learning, FFS and a combination of Video Mediated Learning and FFS at (p=0.083), (p=0.081) and (p=0.064) respectively. This could be due to the fact that farmer groups offered alternative learning grounds and encouraged networking amongst farmers. The finding confirms the importance of farmers' social networks in sharing agricultural information and knowledge (Gueye, 2009). Group membership was also reported to have significant and positive influence at (p= 0.027) on adoption of IR-maize technology (Mwangi *et al*., 2014). However, a study by Murage *et al*., (2012), contradicts these findings by arguing that, farmers who belong to social groups might take longer time to uptake striga control technologies (push pull) than non-members due to negative attitude that may arise from some group members.

As expected, farmers' perception significantly and positively influenced uptake of both video and FFS messages at 5 per cent significance level. Farmer's perception towards emerging agricultural technologies is a key determinant in decision making process to utilize such initiatives (Nabifo, 2003). The study suggested that the adoption rate was high among the farmers who found the technologies disseminated to be meeting their expectations in terms of increased maize production. The intensity of an individual's perception towards new technologies therefore is key in determining the anticipated uptake behavior (Lemon, 2010). Perceiving agricultural messages is first step in understanding farmers' acceptance and continued use of the technologies.

In short, farmer socio-economic factors such as age, gender, household size did not contribute much to uptake of video mediated learning, FFS and a combination of video mediated and FFS messages. These study results therefore corroborated with earlier findings by Langyintuo and Mungoma (2008), which revealed that some farmer's characteristics only affect uptake of emerging technologies to some degree. Langyintuo's study further revealed that when variables representing information source are added into binary logit model, contribution of farmer's characteristic to uptake becomes insignificant. Meaning, source of information whether Video Mediated Learning or FFS or a combination of the two played a greater role in maximizing uptake of various technologies disseminated rather than the demographic characteristic of the farmer.

CHAPTER FIVE:
SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of the Findings

The study aimed at providing evidence on effectiveness of video mediated learning and FFS on striga weed management among maize farmers in Rachuonyo south sub-county of Homa-Bay county, Kenya. Specifically, the study sought to evaluate farmers' perception, attitude and knowledge towards messages disseminated via video mediated learning and Farmer Field School. In line with this objective, the study findings indicated that 72.5 per cent, of the video participants viewed video messages as relevant and informative while only 57.5 per cent of FFS participants found messages disseminated as relevant. Majority of video participants were impressed with video background, seeing new technologies well explained and demonstrated by fellow farmers. They had positive attitude towards video as a communication tool in agricultural extension.

On average, 89 per cent of participants from a combination of Video and FFS had acquired knowledge on striga control technologies after watching video clips and attending FFS lectures. This was closely followed by 77.5 per cent and 50 per cent of participants from VML and FFS respectively. Further, the study revealed that most of the farmers viewed video as a viable tool to communicate agricultural messages.

The second objective was to assess uptake of various striga control technologies disseminated. Based on this, the study found that 46.1 per cent of participants from a combination of VML and FFS, 42.5 per cent from VML and 35 per cent from FFS group implemented technologies disseminated. Hand pulling was the most adopted practice because it largely depends on labour which was provided by family labour. Push pull and use of IR- maize were the least technologies to be adopted due to high investment cost associated with them. Farmers who adopted striga control technologies realized greater improvements within their farms. Such improvements included improved yield (42.5 per cent), soil fertility (17.5 per cent), soil erosion reduction (11 per cent) low pests and diseases attack (14.5 per cent). Furthermore, majority of the respondents were motivated to try out other technologies such as row planting, correct spacing with an aim to improve agricultural productivity.

The last objective was on effects of socio-economic factors on uptake of both video and FFS messages. The study found that socio-economic factors such as age, gender, and such as education level did not contribute much to adoption of striga control technologies disseminated. However, farmer perception significantly contributed towards uptake of various video and FFS messages.

5.2 Conclusion

The existing pressure on agricultural extension to undergo a number of changes is triggered by increased number of farmers as well as the aging extension staffs. This scenario calls for numerous changes in the traditional way of extension provision which are now seen to be inefficient and ineffective. This study adopted the use of video technology which was believed to be one of the ways to transform agricultural extension in order to meet the current information needs of the farmers.

The study revealed that majority of the video participants had positive attitude, high perception towards video messages as well as higher adoption rate towards striga control technologies as compared to FFS farmers. This clearly suggests that video is an effective communication tool for delivery of agricultural information. However, due to lack of access to most of video related accessories in most parts of rural areas, the use of video can still complement FFS demonstrations and other traditional extension approaches. Further, the study finds that effective and efficient means of providing agricultural information is key in maximizing uptake of new messages disseminated rather than farmer personal and socio-economic factors. This call for an urgent need to review of dissemination pathways in order to ensure such pathways are attractive to all farmers irrespective of farmers' personal and socio-economic factors.

5.3 Recommendations

The emergence of video technology offers a new platform and new opportunities for disseminating agricultural information. With the greater acceptance of video within the area, the study recommends the following;

i. There is need for the Government to intensify the installation of electricity to rural people to provide necessary infrastructure for video mediated learning.

ii. To increase awareness of video as a communication tool in agriculture, there is need for more video clips across various crop and livestock value-chains.

iii. There is need for partnerships among information providers and development organizations with an aim to translating 'Fighting striga' into local language and distribute these DVDs among farmers.

iv. Since extension services have a greater impact on information delivery to rural farmers, there is urgent need to streamline activities of various extension service providers and policy formulated to standardize the kind of information that is passed to farmers.

v. Future studies should explore attributes of video technology that influence famers' perception.

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APPENDICES

APPENDIX I: QUESTIONNAIRE

CONCENT FORM

UNIVERSITY OF NAIROBI

DEPARTMENT OF AGRICULTURAL ECONOMICS

AGRICULTURAL INFORMATION AND COMMUNICATION MANAGEMENT

VIDEO MEDIATED EXTENSION SERVICES VERSES FARMER FIELD SCHOOL

I am WYCLIFFE ONGACHI, a student at the University of Nairobi studying Masters of Science degree in Agricultural Information and Communication Management. Currently, I am conducting a study on the **"EFFECTIVENESS OF VIDEO LEARNING AND FARMER FIELD SCHOOLS ON STRIGA WEED MANAGEMENT AMONG MAIZE FARMERS OF HOMA-BAY, KENYA"** to better understand and obtain insights on farmer's perceptions, attitude and knowledge on video technology. This is addition to assess and compare farmers' uptake of striga management technologies disseminated through video technology and FFs demonstrations. This study is being conducted in Homa-Bay County among Maize producers and I am pleased to have you take part in the study.

The information given will be treated with a lot of confidentiality and will be used purely for thesis writing. No names will be included and if you accept, your participation and cooperation in this study is highly welcome.

Do you accept to participate? Yes ☐ No ☐

QUESTIONNAIRE FOR AGROUP OF FARMERS WHO HAVE WATCHED THE VIDEO

Section A: General information

Questionnaire No………

County………………………………Division………………………………Location……………

Sub-location………………………Village……………..Date of Interview…./…/…(dd/mm/yy)

Name of interviewer…………………………………………………………………………..

Section B: Demographic data/ General information of the Respondent

1. Respondent's name…………………………………age…………phone number……….
2. Gender: Male[ ] Female [ ] *(Tick where appropriate)*
3. Are you the household head?

Yes [ ] No [ ]

4. What is the highest level Education attained by the Household head? *(Tick where appropriate)*
   1. University [ ]
   2. Tertiary college [ ]
   3. Secondary [ ]
   4. Primary [ ]
   5. None [ ]
   6. Others (specify) ______________________________

5. What is the size of your land?

1.>2 acres2 [ ] cres s 3. Mor [ ] 5 acres [ ]

6. What is the Land tenure system under which your parcel of land falls?

1. Individual [ ] 2. Leasehold [ ] 3. Communal [ ] 4. Others (specify)……

7. What agricultural activities do you practice and what proportion of your land do you allocate for such use

Agricultural activity	Proportion of land allocated
1. Crop production	
2. Livestock production	
3. Others(specify)	

8. Do you belong to any farmer/social group

Yes [ ] No [ ]

If yes, which one and what benefits do you get from the group?

……………………………………………………………………………………………………

If No, why?

……………………………………………………………………………………………………

9. What is your main source of income (rank enterprises as 1st, 2nd,**etc**)

1.Agriculture	Enterprise: Maize Sorghum Dairy cows others(specify)
2. Business	Enterprise: Agro-dealers Farm produce Retailers others(specify)
3.Government employment	Salary Pension others(specify)
4.Others(specify)	

10. Do you manage your farm or somebody else manages for you?

Yes [ ] No [ ]

If No, who manages for you and why?
……
………………………………………………………………………………………………………

Section C: Farmer maize production experience

11. a) Do you grow maize crop in your farm? Yes ☐ No ☐

If Yes, for how long have you been growing maize?*(Tick where appropriate)*

1. 1-2years [ ]
2. 2-5 years [ ]
3. 5-7 years [ ]
4. Above 7 years[ ]
5. others (specify)……………..

12. How many times do you plant Maize in a year (Growing seasons)?

1.Once a year 2. Twice a year 3. Others(specify)………………………

13. Please indicate the varieties of Maize grown and their approximate yields in the previous growing seasons.

Variety	Season	Approx.Yields (Quantity in bags)

14. Do you face any challenge in your maize production?

Yes ☐ No ☐

If yes, which challenges doyou face?

1. unfavorable weather conditions,
2. pest and diseases,
3. weeds(striga)
4. poor farming methods
5. others (specify)………………………………………………………………………….

15. How do you cope with the respective challenges in your maize production?

Challenge	Coping strategy
1. unfavorable weather conditions	
2. pest and diseases	
3.weed(striga)	
4. poor farming methods	
5.others(specify)	

SECTION D: Access to and availability of Agricultural Extension

16. Do you get access to extension services?

Yes ☐ No ☐

If yes, where do you get these services from?

1. Extension agents from Ministry of Agriculture
2. Local leaders
3. Others(specify)……………………………………………………………………..

17.a)How often do you interact with the extension officers/people who provide extension services?

1. Daily [ ] 2.Weekly [ ] 3.Monthly [] 4. Quarterly [ ] 5.Other *(specify)*………

18. What kind of information do you mostly seek from and/or givenby the extension providers/offices?

1. Marketing information
2. Information about the new agronomic techniques
3. Pest and diseases control technologies
4. Weed and weed control technologies
5. Others (specify)…………………………………………………………..

19. Which extension approaches do they use in order to reach you with the information?(Tick as appropriate)

1. Field days [ ]
2. Training&Visit [ ]
3. Farmer to farmer[ ]
4. Others(specify)[ ]………………

20. Do you have/access the following resources? (Tick as appropriate)

i. Radio [ ]
ii. Mobile Phones [ ]
iii. Electricity [ ]
iv. Solar panel [ ]
v. TV [ ]
vi. DVDs [ ]
vii. Video camera [ ]
viii. CDS [ ]
ix. DVD player [ ]
x. Flask Disk [ ]
xi. Desk/Lap top [ ]
xii. Projector [ ]
xiii. Extension agent(s) [ ]

PART TWO

Section E: Video mediated extension/learning

21.i) Are you aware of Video technology used in agricultural extension?

Yes [ ] No [ ]

If yes, which one and how did you learn about it?

Type……………………………………………………………….

ii) How learnt/ source of information?

1. From friends [ ]
2. From extension agents [ ]
3. From nearby farmer [ ]
4. From media [ ]
5. Others(specify)…..

22. Have you ever watched a Video clip showing striga control technologies?

Yes [ ] No [ ]

If yes, where did you watch the video from? ***(Tick the answer)***

1. Home [ ]
2. Farmer field School [ ]
3. Barazas[ ]
4. Field days [ ]
5. Neighbour farmer [ ]
6. Others*(specify)*……….

23. What technologies on striga control were you trained on?

……………………………………………………………………………………………...

24. Did the video clips shown to you as an individual or in a group?

1. Individual [ ] 2. A group [ ]

25. How many times did you watch video?*(tick appropriately)*

1. Once [ ] 2. Twice [ ] 3. Three times. [ ] 4. Others (specify)………….

26. a)How did you find information/messages disseminated via video in your striga management?

1. VeryUseful [ ] **3.** Slightly not useful [ ]
2. Slightly Useful[ ] **4.** Not Useful [ ]

b) Support your answer …………………………………………………………………

27.a) What is your opinion on the video as a tool to for dissemination agricultural information on striga management?

1. Very good [ ] 4. Bad[ ]
2. Good [ ] 5.Very bad [ ]
3. Neither good nor bad

b) Support your answer …………………………………………………………………

28. Has your knowledge on striga been enhanced through video watching?

Yes [ ] No [ ]

If Yes, explain how?

……………………………………………………………………………………

29. Have you used the knowledge gained to train other farmers and with what results?

Knowledge gained	Result
1.	
2.	
3.	

30.Would you recommend video technology to other farmers as a viable tool for agricultural extension?

Yes [ ] No [ ]

If yes, why?

……………………………………………………………………………………

And if No, why?

……………………………………………………………………………

31. In your opinion, what needs to be improved in video technology for its wide use as a tool for communication an agricultural extension?

………………………………………………………………………………………

Section E: Uptake of striga control technologies disseminated through Video mediated extension

32. From the videos that you have just watched, what are the technologies used to control striga in maize production?

………

33. Did you put into use the technologies learnt/disseminated?

Yes [ ] No [ ]

If yes, which of these technologies are you practicing on your farm and why?

Striga control technologies adopted	Reasons for adoption
1.Hand pulling	
2.Manure application	
3.Use of fertilizer	
4.Crop rotation	
5.Push-pull	
Use of resistant and tolerant maize varieties	

34. Is there any improvement on yourfarm after applying the striga control technologies?

Yes [ ] No [ ]

If yes, which ones and why?

………

35. Did watching the video motivate you to try more new technologies on striga control on your farm?

Yes [ ] No [ ]

If yes, which new technologies have you tried in your farm and why?

New technology	Reason for trial in the farm

THANK YOU FOR YOUR PARTICIPATION

QUESTIONNAIRE FOR THE FARMER FIELD SCHOOLS GROUP

Section A: General information

Questionnaire No………
County………………………………Division………………………………Location……………
Sub-location………………………Village……………..Date of Interview…./…/…(dd/mm/yy)
Name of interviewer………………………………………………………………………..

Section B: Demographic data/ General information on the Respondent

1.Respondent's name………………………………age…………phone number……….
2.Gender: Male[ ] Female [ ] *(Tick where appropriate)*

3. Are you the household head?

Yes [ ] No [ ]

4. What is the highest level Education attained by the Household head? *(Tick where appropriate)*

1. University [ ]
2. Tertiary college [ ]
3. Secondary [ ]
4. Primary [ ]
5. None [ ]
6. Others (specify)____________________________

5. What is the size of your land?
1.>2 acres [ ] 2. 2-5acres [ ] 3. More than 5 acres [ ]

6. What is the Land tenure system under which your parcel of land falls?

1. Individual [ ] 2. Leasehold [ ] 3. Communal [ ] 4. Others (specify)…

7. What agricultural activities do you practice and what proportion of your land do you allocate for such use

Agricultural activity	Proportion of land allocated
4. Crop production	
5. Livestock production	
6. Others(specify)	

8. Do you belong to any farmers/social group?
Yes [ ] No [ ]

If yes, which one and what benefits do you get from the group?
………………………………………………………………………………………………………

9. What is your main source of income (rank enterprises as 1st, 2nd,**etc**)

1.Agriculture	Enterprise: Maize Sorghum Dairy cows others(specify)
2. Business	Enterprise: Agro-dealers Farm produce Retailers others(specify)

3.Government employment	Salary Pension others(specify)
4.Others(specify)	

10.Do you manage your farm or somebody else manages for you?

Yes No

If No, who manages for you and why?

…………………………………………………………………………………………………
…………………………………………………………………………………………………

Section C: Farmer maize production experience

11. a) Do you grow maize crop in your farm? Yes [ ] No [ ]

If Yes, for how long have you been growing maize?*(Tick where appropriate)*

1.0-2 years[ ] 2. 2-5 years[ ] 3. 5-7years[ ] 4. 7-10 years [ ] 5. Others (specify).......

12. How many times do you plant Maize in a year (Growing seasons)?

Once a year 2. Twice a year 3. Others(specify)………………………

13. Please indicate the varieties of Maize grown and their approximate yields in the previous growing seasons.

Variety	Season	Appro.Yields(Quantity in bags)

14. Do you face any challenge in maize production?

Yes [ ] No [ ]

If yes, which challenges doyou face?

1. unfavorable weather conditions,
2. pest and diseases,
3. weeds (striga)
4. poor farming methods
5. others (specify)…………………………………………………………

15. How do you cope with the respective challenges in your maize production?

Challenge	Coping strategy
1. unfavourable weather conditions	
2. pest and diseases	
3.weed(striga)	
4. poor farming methods	
5.others(specify)	

SECTION D: Access to and availability of Agricultural Extension

16. a) Do you get access to agricultural extension services?

Yes [ ] No [ ]

b) If yes, where do you get these services from?

1. Extension agents from Ministry of Agriculture
2. Local leaders
3. Others (specify)

17.a)How often do you interact with the extension officers/people who provide extension services?

1. Daily [ ] 2.Weekly [ ] 3. Monthly [ ] 4.Quarterly [ ] 5.Other *(specify)*

18. What kind of information do you mostly seek from and/orgiven by the extension providers/offices?

1. Marketing information
2. Information about the new agronomic techniques
3. Pest and diseases control technologies
4. Weed and weed control technologies
5. Others (specify)……………………………………………………………..

19. Which extension approaches do they use in order to reach you with the information?

5. Field days
6. Training and visit
7. Farmer to farmer
8. Others(specify)

20. Do you have/access the following resources? (Tick as appropriate)

i. Radio [ ]
ii. Mobile Phones [ ]
iii. Electricity [ ]
iv. Solar panel [ ]
v. TV [ ]
vi. DVDs [ ]
vii. Video camera [ ]
viii. CDS [ ]
ix. DVD player [ ]
x. Flask Disk [ ]
xi. Desk/Lap top [ ]
xii. Projector [ ]
xiii. Extension agent(s) [ ]

PART TWO

Knowledge, perception and attitude towards FFS demonstrations

20.i) Are you aware of FFs demonstrations used in agricultural extension?

Yes [ ] No [ ]

If yes, which ones and how did you learn about them?

21. Have you ever attended FFs demonstrations on striga control technologies?

Yes [ ] No [ ]

If yes, what techniques on striga control were you trained on?

……………………………………………………………………………………………………..

22. How many times in your life have you attended the FFS demonstrations? (*circle the anwers*)

1. Once
2. Twice
3. Three times
4. others(specify)…

23. How did you find information/messages disseminated via FFS demonstrations in your striga management?

1. VeryUseful [ ]
2. Slightly Useful[ ]
3. Slightly not useful [ ]
4. Not Useful [ ]

b) Support your answer above…………………………………………………………………….

24. a)What is your opinion on FFS as a tool for dissemination of agricultural information on striga management

1.Very good [ ]
2. Good [ ]
3. Bad [ ]
4. Neither Good nor Bad [ ]
5. Very Bad [

b) Support your answer above……………………………………………….............................

……………………………………………………………………………………………………..

25. Has your knowledge on striga been enhanced after attending FFS demonstrations?

Yes [ ] No [ ]

If yes, explain how?

……………………………………………………………………………………………….

26. Have you used the knowledge gained to train other farmers and with what results?

Knowledge gained	Result
1.	
2.	
3.	

27. Would you recommend FFs to other farmers as a viable tool for agricultural extension?

Yes [ ] No [ ]

If yes, why?

………………………………………………………………………………………………
………………………………………………………………………………………………

And if No, why?

…………………………………………………………………………………………………
…………………………………………………………………………………………………

28. In your opinion, what needs to be improved in FFS for its wide use as a tool for communication an agricultural extension?

………………………………………………………………………………………………

SECTION C: Uptake of striga control technologies disseminated through FFs demonstrations

29. From your FFs demonstrations, what are the technologies used to control striga in maize production?……………………………………………………………………………………
…………………………………………………………………………………………………

30. Have you put into use the technologies learnt through FFs above?

Yes [ ] No [ ]

If yes, which of these technologies are you practicing on your farm and why?

Striga control technologies adopted	Reasons for adoption
1.Hand pulling	
2.Manure/compost application	
3.Use of fertilizer	
5.Inter-cropping with legumes	
5.Push-pull	
6.Use of resistant and tolerant maize varieties	

31. Is there any improvement you can make on your farm after applying the striga control technologies?

Yes [ ] No [ ]

If yes, which ones and why?

…………………………………………………………………………………………………

32. Did FFs demonstrations motivate you to try more new technologies on striga control on your farm?

Yes [ ] No [ ]

If yes, which new technologies have you tried on your farm and why?

New technology	Reason for trial in the farm
1.	
2.	
3.	

THANK YOU FOR YOUR PARTICATION

QUESTIONNAIRE FOR A GROUP OF FARMERS WHO HAVE WATCHED THE VIDEO AND ATTENDED FARMER FIELD SCHOOLS DEMOSTRATION

Section A: General information

Questionnaire No………

County………………………………Division………………………………Location……………

Sub-location………………………Village……………..Date of Interview…./…/…(dd/mm/yy)

Name of interviewer…………………………………………………………………………..

Section B: Demographic data/ General information of the Respondent

5. Respondent's name…………………………………age…………phone number……….

6. Gender: Male[ ] Female [ ]*(Tick where appropriate)*

7. Are you the household head?

Yes [ ] No [ ]

8. What is the highest level Education attained by the Household head? *(Tick where appropriate)*

1. University [ ]
2. Tertiary college [ ]
3. Secondary [ ]
4. Primary [ ]
5. None [ ]
6. Others (specify) ______________________________

5. What is the size of your land?

1.>2 acres2[illegible]cres 3. Mo re than [ ] 5 acres [ ]

6. What is the Land tenure system under which your parcel of land falls?

1. Individual [ ] 2. Leasehold [ ] 3. Communal [ ] 4. Others (specify)……

7. What agricultural activities do you practice and what proportion of your land do you allocate for such use

Agricultural activity	Proportion of land allocated
7. Crop production	
8. Livestock production	
9. Others(specify)	

8. Do you belong to any farmer/social group?

Yes [ ] No [ ]

If yes, which one and what benefits do you get from the group?

……………………………………………………………………………………………………

If No, why?

……………………………………………………………………………………………………

9. What is your main source of income (rank enterprises as 1st, 2nd,**etc**)

1.Agriculture	Enterprise: Maize Sorghum Dairy cows others(specify)
2. Business	Enterprise: Agro-dealers Farm produce Retailers others(specify)
3.Government employment	Salary Pension others(specify)
4.Others(specify)	

10. Do you manage your farm or somebody else manages for you?

Yes [ ] No [ ]

If No, who manages for you and why?

……………………………………………………………………………………………………

………………………………………………………………………………………………

Section C: Farmer maize production experience

11. a) Do you grow maize crop in your farm? Yes [ ] No [ ]

If Yes, for how long have you been growing maize?*(Tick where appropriate)*

1. 1-2years [ ]
2. 2-5 years [ ]
3. 5-7 years [ ]
4. Above 7 years[ ]
5. others (specify)……………..

12. How many times do you plant Maize in a year (Growing seasons)?

1.Once a year 2. Twice a year 3. Others(specify)………………………

13. Please indicate the varieties of Maize grown and their approximate yields in the previous growing seasons.

Variety	Season	Approx.Yields (Quantity in bags)

14. Do you face any challenge in your maize production?

Yes [ ] No [ ]

If yes, which challenges doyou face?

6. unfavorable weather conditions,
7. pest and diseases,
8. weeds(striga)
9. poor farming methods
10. others (specify)……………………………………………………………….

15. How do you cope with the respective challenges in your maize production?

Challenge	Coping strategy
1. unfavorable weather conditions	
2. pest and diseases	
3.weed(striga)	
4. poor farming methods	
5.others(specify)	

SECTION D: Access to and availability Agricultural Extension

16. Do you get access to extension services?

Yes [ ] No [ ]

If yes, where do you get these services from?

4. Extension agents from Ministry of Agriculture
5. Local leaders
6. Others(specify)………………………………………………………………..

17.a)How often do you interact with the extension officers/people who provide extension services?

1. Daily [ ] 2.Weekly [ ] 3.Monthly [] 4. Quarterly [ ] 5.Other *(specify)*………

18. What kind of information do you mostly seek from and/or givenby the extension providers/offices?

1. Marketing information
2. Information about the new agronomic techniques
3. Pest and diseases control technologies
4. Weed and weed control technologies

19. Which extension approaches do they use in order to reach you with the information?(Tick as appropriate)

9. Field days [ ]
10. Training&Visit [ ]
11. Farmer to farmer [ ]
12. Others(specify) [ ]………………

PART TWO

Section E: Combination of video and FFS learning

20. How effective is the use of Video in dissemination of agricultural information (agricultural extension) compared to FFS with regard to the aspects below? *(Tick where appropriate)*

Aspect	Very Effective	Effective	Slightly Effective	Not Effective
Cost of accessing information				
Relevance of information				
Accessibility of information				
Frequency of access				
Understandability of the message				
Coverage				

2.From your own experience how useful (quality of content) is the agricultural information obtained from the video and FFS?

1. Very Useful **2.** Slightly Useful **3.** Slightly not useful **4.** Not Useful

Section E: Uptake of striga control technologies disseminated through both Video mediated and FFS approaches

32. From the videos and FFS that you have just attended, what are the technologies used to control striga in maize production?

………………………………………………………………………………………………………
………………………………………………………………………………………………………

33. Did you put into use the technologies learnt/disseminated?

Yes [ ] No [ ]

If yes, which of these technologies are you practicing on your farm and why?

Striga control technologies adopted	Reasons for adoption
1.Hand pulling	
2.Manure application	
3.Use of fertilizer	
4.Crop rotation	
5.Push-pull	
Use of resistant and tolerant maize varieties	

34. Is there any improvement on yourfarm after applying the striga control technologies?

Yes [ ] No [ ]

If yes, which ones and why?

…………………………………………………………………………………………………

35. Were you motivated to try more new technologies on striga control on your farm?

Yes [ ] No [ ]

If yes, which new technologies have you tried in your farm and why?

New technology	Reason for trial in the farm
1.	
2.	

THANK YOU FOR YOUR PARTICIPATION