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**EFFECTIVENESS OF VIDEO-MEDIATED EXTENSION APPROACH AS USED BY
SASAKAWA GLOBAL 2000 TO INFLUENCE SOCIAL LEARNING AMONG RICE
FARMERS IN UGANDA**

BY

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DECLARATION

I, **Gabriel Karubanga**, declare that this dissertation is a result of my own work. However, the ideas that are not of my own have been credited. I further affirm that the dissertation has never been presented to any University or other tertiary institution for the award of certificate, diploma or degree.



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APPROVAL

This dissertation has been submitted for examination with the approval of the following supervisors.



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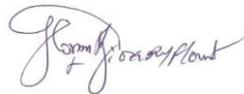


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DEDICATION

To my dear parents, brothers, sisters and friends

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LIST OF ABBREVIATIONS

APEP:	Agricultural Productivity Enhancement Programme
DSIP:	Development Strategy and Investment Plan
DVD:	Digital Versatile Disc
F2FEA:	Face-to-Face Extension Approach
FFS:	Farmer Field School
FGDs:	Focus Group Discussions
GIS:	Geographical Information Systems
GPS:	Geographical Positioning Systems
HoDFA:	Hoima District Farmers Association
IITA:	International Institute of Tropical Agriculture
IMF:	International Monetary Fund
JKUAT:	Jomo Kenyatta University of Agriculture and Technology
KAFACOS:	Katweyambe Farmers' Cooperative Society
KYU:	Kyambogo University
MAAIF:	Ministry of Agriculture, Animal Industry and Fisheries
MARFA:	Mahyoro Rice Farmers Association
NAADS:	National Agricultural Advisory Services
RUFORUM:	Regional Universities Forum for Capacity Building in Agriculture
SAPs:	Structural Adjustment Programs
SG 2000:	Sasakawa Global 2000
SHARE:	Sharing Capacity to Build Capacity for Quality Graduate Training in Agriculture in African Universities
SPSS:	Statistical Package for Social Sciences
UBOS:	Uganda Bureau of Statistics
VMEA:	Video-Mediated Extension Approach

ABSTRACT

The increasing availability and access to Information and Communication Technology (ICT) is providing new opportunities to address the persistent challenge of limited access to agricultural information and knowledge by smallholder farmers. Farmer videos are among the ICTs with high potential to enhance effectiveness of agricultural extension delivery in the Sub-Saharan region. However effective integration of ICT in extension systems has to take into account the social learning, which is well documented as the major mechanism for farmer learning and innovation. This study assessed the benefits of a video-mediated extension approach (VMEA) as compared to the conventional Face-to-face Extension approach (F2FEA). Specifically, the study focused on farmer perception on VMEA; how VMEA integrates the social learning phenomenon to influence change; comparison of the relative strengths of VMEA and F2FEA.

The study was conducted among rice farmers in Kamwenge and Hoima districts in Uganda. The VMEA was implemented in Kamwenge district for three years by Sasakawa Global 2000 (SG 2000), a Non-Governmental Organization (NGO), while in Hoima, the F2FEA was the dominant approach delivered mainly through Hoima District Farmers' Association (HoDFA). A cross-sectional survey was conducted among 196 farmers in the two districts. The study involved all rice farmers (100) subjected to VMEA by SG 2000 in Kamwenge, and 96 rice farmers who benefited from the F2FEA through HoDFA in Hoima district. Semi-structured interviews, focus group discussions, field observations and key informant interviews were used to collect the quantitative and qualitative data. Quantitative data were analyzed using Statistical Package for Social Sciences (SPSS) while thematic analysis was applied to the qualitative data.

Although both VMEA and F2FEA were skewed to benefit more men than females, the timing and central location of the video shows constrained the females more compared to the F2FEA. About 38% and 29% were female beneficiaries of F2FEA and VMEA respectively. Most farmers who attended video shows were within a distance of 1.5 Km from their homes while distance was not a limiting factor for the F2FEA. However, because of the entertainment element embedded in the VMEA, it attracted more diverse audiences including the youth and other potential farmers, while the F2FEA targeted known farmers. The VMEA triggered social interactions and exchanges between farmers than the F2FEA. The practical experiences presented in the videos triggered discussions among farmers as they compared with their own practices and explored creative ways of adapting some practices to overcome their constraints, hence fostering innovation among the farmers. The conversations that followed the videos and exchanges thereafter were stronger social learning features of the VMEA compared to F2FEA. The T-tests indicate that on one hand, VMEA is stronger in mobilization and awareness creation, fostering self-guided learning, and social interactions and networking amongst farmers. On the other hand, F2FEA is stronger in facilitating knowledge acquisition and retention, and knowledge application due technical backstopping by extension workers.

The strengths of VMEA and F2FEA are complementary in the processes of farmer learning and innovation. The two approaches therefore would not be sufficient when used independently. The two approaches when used in combination more effectively enable farmer access to information and knowledge thereby facilitating learning and innovation among farmers. Successful integration of VMEA and F2FEA however calls for rethinking of institutional arrangements, roles of the extension worker, and pragmatic retooling of the extension worker to effectively utilize videos in the farmer learning processes including video documentation of farmer practices and experiences.

CHAPTER ONE

GENERAL INTRODUCTION

1.1 Background

The advancements in Information and Communication Technologies (ICTs) since the 1990s and the recent popularity of the mass media have opened new windows of opportunity for improvement in development communication globally. The ICTs consist of computers, Television (TV), radio, telephone and video (Bentley et al., 2011; Asenso-Okyere & Mekonnen, 2012; Sseguya, Mazur, Abbott & Matsiko, 2012; FAO, 2014), plus the procedures, and processes that support the processing, storage and dissemination of information (Ssewanyana, 2007; Cai & Abbott, 2013). Access to agricultural information especially by smallholder farmers in developing countries such as Uganda remains a major challenge (Uganda Bureau of Statistics [UBOS], 2010); though is vital for enhancing social development (Kilelu, 2013; Chepkoech, 2015) and specifically agricultural innovation (FAO, 2014). The increasing availability and access to ICTs even in developing countries is opening up new opportunities for enhancement of agricultural information delivery systems to the smallholder farmers.

In Africa, the role of mass media in rural development has for long been recognized but their effectiveness and appropriateness vary because of differences in the socio-cultural context (Van Mele, Wanvoeke & Zossou, 2010a). For example, radios, TVs, videos and telephones have traditionally been employed as communication tools to address extension related challenges allied to access and use of agricultural information (Ssewanyana, 2007; Van Mele et al., 2010a; FAO, 2014) but their effectiveness to date is contested. Availability of communication channels alone is not enough to enable utilization of the information especially if it is targeted at changing the practices and ensuring change in behaviors like in the case of farmers. The change in practices by farmers, for example, sometimes requires unlearning some of the knowledge that has for long been taken for granted and changing the way farmers look at the world and their responsibility in a development context. Effective communication channels for behavioral change must also embrace the key principles for social change, which for example, the social learning theory elaborates (Bandura, 1997). Indeed, some scholars argue that limited access to and use of agricultural information by farmers is one of the key factors limiting social learning and thus development of the agricultural sector (Bentley, Van Mele, Zoundji & Guindo, 2014a;

Bentley, Van Mele, Okry & Zossou, 2014b). But it can also be argued that failure to embrace social learning in any agricultural information delivery system limits its use. Thus, mere emphasis on ICT development without giving special attention on how knowledge through these channels is coded and decoded for use (Ssewanyana, 2007; Cai & Abbott, 2013); and how it influences social learning and behavioral change is not useful and may not be conducive to rural development (Van Mele et al., 2010b).

In Sub-Saharan Africa (SSA) and specifically in Uganda, reforms in extension services have tended to focus on organization involving the decentralization of the service delivery with limited consideration on the effectiveness of the approaches and tools used to deliver the information. Most international agencies are turning their aspirations to ICT media including radio and video because they are known to influence farmer learning [*to some extent*] to enhance innovation (Van Mele et al., 2010a). Nevertheless, ICTs can greatly enhance the effectiveness of extension workers to perform better to make extension service delivery more efficient (Chepkoech, 2015).

In Uganda, one of the ICTs that have been tested to enhance effectiveness of extension delivery is videos. The video-mediated extension approach (VMEA) to extension was introduced in 2005 by AfricaRice in collaboration with Sasakawa Global 2000 (SG 2000). This approach of using videos to increase farmer' access to agricultural knowledge and practices is considered by its proponents as a novel, low-cost method that provides timely, on-the-spot and reliable information and advice to many farmers at once (Chepkoech, 2015). It is reported that the use of video also enhances more interactive learning among farmers (MacGregor, 2007; Bentley, Chowdhury & David, 2015a). However, how the video enhances farmer learning in the context of social learning theory is not explained. I adopt the definition of social learning as suggested by Bandura (1997) – a process where people learn and innovate from their own experiences but also by observing the actions of others and the results of those actions.

In 2005, AfricaRice started developing farmer-to-farmer videos involving sharing of information among peers to enhance learning and change of farming behavior (Van Mele et al., 2010a). Consequently, some rural development agencies promoting rice production such as SG 2000 piloted use of videos in Kamwenge district, Uganda (Appendix 1) between 2007 and 2010 by

locating the video shows in a central place which was open for all people to attend. In this case, the participants were self-selected to participate in the video shows. The videos originally developed in Benin with farmers who spoke Mandinka language were translated into English and distributed to 18 public and private organizations in Uganda for agricultural extension workers to use in training farmers (Bentley, Van Mele & Musimami, 2013a; Tumwekwase, 2013). SG 2000 received over 1000 rice video Digital Versatile Discs (DVDs) for training farmers in Uganda (Van Mele et al., 2013). In 2012, AccessAgriculture, an International organization based in Kenya followed up 15 out of 18 organizations to ascertain whether they distributed and used the videos to train farmers. The role of AccessAgriculture is to develop and distribute videos, and train partner organizations in the development of quality and scripted farmer-to-farmer training videos to enhance farmer innovations through interactive learning (Van Mele, 2012). In their follow-up visits to organizations and farmers, focus was on gaining feedback particularly from farmers on whether they watched the video and liked the information provided by foreign farmers and how their lives changed (Bentley et al., 2013a). However, it would also have been important to know how and why farmers continued to learn and change in the rice production practices and technologies even without external support.

An assessment of the effectiveness of videos by Tumwekwase in 2013 focused on numbers and categories of audiences reached including the smallholder rice farmers in Kamwenge district of Uganda. Although it was reported that farmers who attended the video shows applied the recommended practices and technologies shown in the video (Bentley et al., 2013a; Tumwekwase, 2013), the mechanisms of how this happened is not elaborated. Further, issues related to access and use of the acquired knowledge and information are not fully exploited from the farmers' perspective. The Agricultural Productivity Enhancement Program (APEP) funded by the United States Agency for International Development (USAID) in collaboration with the office of the Prime Minister used the videos to promote rice to over 7,000 farmers nationwide (Mohapatra, 2009; Tumwekwase, 2013). The intention was to promote better technologies and practices in rice production. It is therefore assumed that the videos are designed and probably applied in the rather archaic mind-frame of technology transfer, which does not fit well in the new paradigm shift towards learning and innovation to influence change in agricultural systems. Aligning such ICT tools to the current thinking in agricultural development for effectiveness and relevance is partly done and perhaps should be one of the functions of the capacity strengthening

of the international Non-Governmental Organizations (NGO) like AccessAgriculture (Van Mele, 2012). The capacity building, however, does not only need to depend on reliable evidence on embedded technicalities for effectiveness of video but also situate such a communication tool in the theoretical and practical contexts of learning and innovation, where social learning is central. In this study, effectiveness of VMEA is defined in terms of its capacity to enhance access to and use of agricultural information and influence interactive learning through fostering awareness creation, knowledge acquisition and retention, knowledge application and sharing of experiences among farmers. Because of lack of the baseline data, VMEA is compared with the Face-to-Face Extension Approach (F2FEA) with rice farmers in Hoima district, Uganda to ascertain its effectiveness and relative advantages for integration in extension to enhance innovation.

1.2 The Challenge of Extension Approaches in Uganda

Smallholder agriculture is the main contributor to agricultural production in SSA and therefore need appropriate extension approaches for increased food and income security (Wellard, Rafanomezana, Nyitenda, Okotel & Subbey, 2013; Chepkoech, 2015). The agricultural extension system in Uganda has undergone drastic reforms in the past fifty years with the aim of transforming smallholder farming to be more productive, competitive and rewarding to provide decent living to those engaged in it. The reforms have involved shifts from the state controlled and enforcement approaches of the colonial times (Anderson, 2007; Bashaasha, Mangheni & Nkonya, 2011) to the balance between regulatory and educational approaches of the post-independence (Semana, 2008; Kibwika & Semana, 1998; Bashaasha et al., 2011) to intensification approaches such as the Training and Visit Approach of the 1990s (Anderson, 2007; Semana, 2008; Bashaasha et al., 2011) to the recent neo-liberal approaches based on principles of decentralization and privatization such as the National Agricultural Advisory Services (NAADS) (Bashaasha et al., 2011; FAO, 2014), to the current thinking of pluralistic extension delivery approach. The intention here is not to discuss these shifts in extension delivery but to point out that despite the well intentioned shifts in approaches, their impact on transforming smallholder farmers has been minimal. Therefore, changing designs of the delivery system without revisiting the fundamentals of learning among smallholder farmers is analogical to buying a new whip to whip a dead horse hoping that it will wake up and run faster.

According to Ministry of Agriculture Animal Industry and Fisheries [MAAIF] (2016), the delivery of agricultural extension in Uganda comprises of diverse extension approaches and tools including face-to-face training, Farmer Field Schools (FFS), field demonstrations, agricultural shows and fairs, field days, exchange visits and mass media. However, if these approaches and tools are not grounded in the basic learning theories and practices that are transformational, farmer innovations through social learning process may not be effectively achieved. Even the seemingly learning oriented approaches like the farmer-to farmer extension approaches and farmer field schools have registered only limited evidence of farmer learning to enhance innovation, hence posing serious implications for their scaling-out (Wellard et al., 2013; FAO, 2014). To be effective, the extension system needs to involve and enhance access and learning by most disadvantaged people to allow more inclusive service delivery (Bertus, Suzanne & Willem, 2010; Van Mele, 2011; FAO, 2014), which also requires the right use of approaches especially in the current paradigm of learning and innovation. Kibwika (2006) for example illustrates how smallholder vanilla farmers in Uganda organized themselves to learn and innovate with the aid of ICTs particularly radio even without external backstopping from extension agents.

The recent Uganda's National Agricultural Advisory Services (NAADS) program was meant to bridge farmers' linkages with the sources of information or knowledge (Karubanga, 2013). Even with the substantial financial investment in the NAADS, MAAIF (2016) reveals that over the last fifteen years, only 20% of the farmers had been reached by extension. Several other studies illustrate how the NAADS failed to effectively deliver extension services to the smallholder farmers (see MAAIF, 2009; MAAIF, 2013; FAO, 2014).

Given the high farmer to extension worker ratio in SSA, ensuring access to agricultural information by farmers is still problematic (World Bank, 2012; Danielsen, Karubanga & Mulema, 2015). In Uganda, for example, one extension worker is expected to reach about 3189 farmers (Danielsen et al., 2015). Whereas this challenge cannot be addressed with effective tools only, several scholars (FAO, 2014) contend that ICTs can enhance access to agricultural information and catalyze learning for innovation among farmers. Video-mediated extension is one of the approaches that also allows for participation of the ordinary people (Chowdhury et al., 2011; FAO, 2014) and putting them at the centre of their own learning and transformation

(Bentley et al., 2013a; Wellard et al., 2013). Inherently, videos embrace group learning which provide a better means for reaching greater numbers of farmers at once (FAO, 2014; Chepkoech, 2015). Effectiveness of such ICT tools however needs to be grounded in social learning mechanisms that provide space for continuous farmer learning and innovation.

1.3 Background to Video-mediated Extension Approach

A network of video-mediated extension first emerged in 2003 in Bangladesh where the first video project in Bogra district attracted over 200 poor women who watched the video in groups of 20-25 for 6-8 minutes about post-harvest handling processes (Van Mele et al., 2005). However, ensuring wider coverage with video services means incurring certain costs especially if run on a rotational basis. Video is widely used especially in Bangladesh and now West Africa to disseminate information about technologies and practices in rice production (Bentley et al., 2013a). Evidently, experiences from Bangladesh indicate that all women who attended the video shows learnt from the video and could explain at least one practice presented in the video (Van Mele, Zakaria, Begum, Rashid & Magor, 2007). In Benin, Bentley et al. (2014b) report that in 19 villages, farmers experimented with new rice farming practices and technologies after watching the video, which attracted both youth and women and that in some cases, farmers approached extension workers to inquire how they could access some of the technologies such as rice seed demonstrated in the videos. Thus, if properly used, videos have a high potential to trigger proactive learning.

Like other extension methods, timing of video is crucial for attracting attendance and enhancing learning by farmers (Van Mele et al., 2007; Bentley, Boa & Salm, 2016). Tumwekwase (2013) pointed out that the timing of video shows hinders participation by women and distant people. In Benin, early evening screenings are reported to be the most convenient time for women to attend with an assumption that they will have finished performing their domestic chores (Bentley et al., 2014a). However, to allow the viewers to watch, discuss and go home early, the video should not exceed 20 minutes and could be preceded by some entertainment like loud modern African music to attract the audience especially the women and the youth (Bentley et al., 2014b).

1.4 Rationale for Video-mediated Extension Approach

Proponents of VMEA argue that videos can speak for themselves to enhance learning (Bentley et al., 2014b), because they encompass pictures, words and body language which are important for

the ability to communicate effectively (MacGregor, 2007; Tumwekwase, 2013; Bede, 2016). The pictures in the video arouse and maintain the interest of the learner as they engage the hearing and sight senses (MacGregor, 2007; Ufuoku & Agamayu, 2010; Olujide & Oladele, 2011; Bede, 2016). Because of these attributes, farmers are able to see, hear and remember very well what is being demonstrated in the video (Bandura, 1997; Bentley, Van Mele, Touré & Mourik, 2013c); thus aiding greater learning and understanding of practices and technologies (Ufuoku & Agamayu, 2010; Van Mele et al., 2010b; Bede, 2016). If well kept, videos are a repository of knowledge that can be used by future generations (Tumwekwase, 2013). Videos also trigger reflection among farmers with reference to their experiences as a starting point to their change of behavior.

In addition, video supports and promotes both cognitive and meta-cognitive development thus making learning more permanent (Bandura, 1997; MacGregor, 2007). Video enhances engagement by learners during the learning process and stimulates self-activity and direction (Ufuoku & Agamayu, 2010; Olujide & Oladele, 2011). Even in a formal learning environment like a school, teachers can use video to explain most complex scientific phenomena by enabling learners to watch it over and over again (Mahajan, 2011). However, this requires some technical capacities in order to use the videos effectively. Similarly, retrieval of video messages by farmers reinforces their knowledge and comprehension as they can play it back (Oladele, 2008). With VMEA, a lot of flexibility on the learning time and learners pace is possible compared to other extension approaches especially if a farmer can own a video and play it at the time of their convenience. However, effective use of video is often challenged by lack of equipment, electricity and funds to facilitate extension workers (Van Mele et al., 2016). If documented in a foreign language, it requires the presence of technical staff to translate complex information (Bentley et al., 2015a). For example, Van Mele et al. (2016) point out that some of the organizations that received copies of videos in Uganda did not give them to their grassroots extension workers or to farmers' associations because extension workers lacked logistical facilitation. This implies that ensuring effective scaling-out of videos requires availability of adequate funding.

1.5 Problem Statement

In Uganda, there are efforts by the Government through the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) to reform the extension service delivery. Despite the efforts, farmers still have limited access to reliable agricultural information (Danielsen et al., 2011; FAO, 2014). Reviews of these reforms and different approaches tend to put the blame on inappropriate designs and inadequate resource investment including the small number of extension workers each one serving several thousands of smallholder farmers. As earlier pointed out in the introduction section, in Uganda, the extension worker to farmer ratio is 1:3189 (Danielsen et al., 2015). While not refuting these claims, effective use of the tools and methods of extension delivery need to be considered. Some gaps remain in the conventional extension approaches and tools regarding their effectiveness to enhance access to reliable information and fostering social learning for innovation among farmers (Cai & Abbott, 2013; FAO, 2014). Given the structural and logistical challenges of the extension worker reaching every smallholder farmer, emerging ICTs open windows of opportunity for leveraging the already constrained extension systems. VMEA is one of the ICT aided approaches that have been experimented in Uganda by agricultural and rural development agencies. However, the effectiveness of a tool or method in extension depends on how well it embraces the fundamentals of social learning, which is known to be the mechanism for continuous learning and innovation among farmers (Kibwika, 2006; Bentley et al., 2014a). Video is presented as a promising extension communication tool with potential to enhance access to information and social learning through fostering interactions among farmers (Zossou, Van Mele, Vodouhe & Wanvoeke, 2009) but how this tool is effectively used in the context of social learning in Uganda is a matter of concern given experience of previous tools and methods used. A tool like video can only be as good as the user who applies it appropriately, in the right context and with attention to the principles of learning for change. The assertions that VMEA is more effective, cannot be universally accepted. This study therefore aimed to assess how VMEA enhanced access, use and social learning as piloted by SG 2000 in Kamwenge district, Uganda, with rice farmers from 2007-2010. The focus is on how the VMEA can guarantee continuous learning by farmers to innovate so as to overcome the bottlenecks in their rice production system as well as other challenges in the rice value chain. As earlier mentioned, the VMEA is compared with the F2FEA with rice farmers in another district in Uganda, Hoima. Both Approaches aim at changing the behaviour of farmers in terms of farming

practices. Therefore, the study sought to determine the effectiveness of VMEA as used by SG 2000 to influence social learning among rice farmers in Uganda.

1.6 Objectives

The aim of the study was to determine the effectiveness of VMEA employed by SG 2000 to influence access and use of agricultural information through social learning to enhance innovation among rice farmers in Uganda. The specific research objectives were to:

- i. Determine the effectiveness of VMEA in facilitating access to and use of new agricultural knowledge and technologies among rice farmers in Kamwenge district, Uganda.
- ii. Assess a social learning approach to video-mediated extension in enhancing innovation among rice farmers in Kamwenge district, Uganda.
- iii. Determine the effectiveness and advantages of integrating video in extension to enhance innovation among rice farmers in Kamwenge district, Uganda.

1.7 Justification of the Study

Failures of extension systems is not only a matter of the design and resource investment, it is also about how well the tools and methods fit the context and more especially in as far as they are able to influence life-long learning among the farmers. Evaluations of extension systems have notably omitted analyzing how well the tools and methods are applied and how these are anchored in sound theory and practices of learning for change. There is seemingly excitement among extension professionals and development actors that the advancement and availability of ICTs will greatly enhance farmer' access to agricultural knowledge and technologies and hence accelerate their transformation. Unless these ICTs are applied in a manner that address the fundamentals of learning and innovation, they may be a false promise in the improvement of farmer' access to and utilization of agricultural knowledge and technologies.

The study aims to unravel video as a potential ICT for enhancing extension service delivery if applied and adapted to the social learning among farmers to foster innovations with reference to rice farmers where the VMEA has been piloted. The outcome of this study has relevance for practitioners, extension agents and policy. It may assist practitioners to redesign service delivery for more effective and efficient extension. Extension workers will be able to effectively organize and operate the videos to ensure equitable access and enhance proactive and self-guided learning

through fostering experiential sharing among farmers in Uganda. As there are new directions and efforts towards the use of video to disseminate information to farmers in Uganda, the results inform future policy decisions to re-formulate the extension delivery guidelines to create new opportunities or expand on the existing ones to integrate video in extension.

1.8 Conceptual Framework

ICTs including video are believed to bring about social learning to enhance innovation through increasing access to information among farmers (Asenso-Okyere & Mekonnen, 2012; Cai & Abbot, 2013). Farmer innovations are an outcome of the farmer learning processes triggered by knowledge or information sources such as video (Bandura, 1997; MacGregor, 2007). Farmer learning and innovation is characterized by social interactions and exchange. The social learning theory therefore offers the explanatory mechanisms through which farmers learn, innovate and change their practices to improve their production systems. In this regard, all extension approaches and methods aimed at changing farmer' knowledge, attitudes and behaviors need to be situated within and informed by the social learning theory (Bandura, 1997).

Video is one of the ICTs that have demonstrated high potential for application in agriculture to enhance farmer' access to information to influence processes of change for development. The video combines three key elements with regard to their effectiveness. First is the visual element where farmers can see what is being demonstrated in a near real-life situation; secondly is the audial element where farmers can also hear the explanations that go along with the demonstrations; and the third is the entertainment element which attracts people to come and get exposed even those who may not be farmers. These elements make the video unique in influencing farmer learning and hence innovations.

Figure 1 illustrates how the video is conceived to influence learning and innovation based on a case of smallholder rice farmers in Uganda, and in particular using experiences of SG 2000 project. The use of and effectiveness of video as information delivery system to smallholder farmers is also dependent on several logistical factors. In particular, the logistic arrangements including publicity, timing and location of video shows have an influence on access and use of agricultural information by farmers (Danielsen & Kelly, 2010; Karubanga, 2013). The dotted arrows in Figure 1 indicate how logistical arrangements and attributes of access and use of agricultural information have a direct and/or indirect influence on the farmer learning process

(indicated by a dotted circle). It is conceptualized in this study that the farmer learning and innovation process consists of awareness creation, knowledge acquisition and retention, knowledge use, and knowledge and experience sharing which in turn creates more awareness. These are key attributes of social learning theory, which is used to explain the relevance and effectiveness of the video-mediated extension in Uganda. The social learning theory responds to the growing demands from farmers by articulating innovation needs, accessing new knowledge, and facilitating interactions, peer learning, sharing and behavioral change (Kilelu, 2013; FAO, 2014). In social learning and behavioral change, people often learn from their own experiences but also can learn by observing others, in this case through videos (Bandura, 1997; MacGregor, 2007; Glanz, Rimer & Viswanath, 2008). Social learning theory therefore provides a framework for assessing the effectiveness of video-mediated approach to farmer learning and innovation.



Figure 1: Conceptual framework for assessing the effectiveness of VMEA in influencing farmer learning and innovation

The audio-visual power of the video arouses interest and curiosity among farmers to get exposed to information; thus creating awareness (Bandura, 1997; Bede, 2016). What farmers see and hear is translated into knowledge acquired and retained for later use albeit with some form of modifications, experimentations, and adaptations (Bentley, Van Mele, Harun-Ar-Rashid & Krupnik, 2015b). The video triggers social interactions and discussion among the viewers to

reflect on what has been seen and heard and also share with other people who may not have viewed the video. In such processes, farmers are able to establish common understanding through repackaging of knowledge for localization and adaption to the specific needs and context. The interactions, discussions and joint reflections that follow the video shows are important for strengthening farmer learning; thus making video effective for integration in extension to enhance innovation (Cai & Abbott, 2013; Chepkoech, 2015). The positive attributes of video provide good example of key elements of any extension approach that is aimed at influencing change in practices and technologies.

1.9 Organization of the Dissertation

This dissertation is composed of five chapters. The first chapter provides overall introduction and context of the study – laying a foundation for developing a common thread across the empirical chapters. Aside from a common background and context, the introduction chapter presents the overall framing of the study with respect to the research objectives and conceptual framework elaborated above. The empirical chapters (Chapters 2, 3 and 4) to a great extent stand independent though cross-references are made in some cases. Hence the chapters build on each other with respect to the research objectives. Each chapter provides the specific background to the topic also drawing on related literature and elaborates the methodology, results as well as the attendant conclusions. Specifically, chapter 2 is about the farmers’ perspective on how the logistical arrangements affected access to and use of agricultural information through VMEA using the case of SG 2000 in Uganda. The chapter also partly explains how the logistical arrangements influenced social learning among farmers in Uganda. Chapter 3 focusses on the effectiveness of a video-mediated extension in influencing social learning to enhance innovation among farmers in Uganda. The chapter also explores, how the follow-up methods used by SG 2000 could have been further strengthened using videos – implying that videos can potentially be mainstreamed in other extension methods or approaches. Chapter 4 identifies the relative advantages of VMEA in comparison with the commonly used F2FEA. The intention here is to illustrate that videos can be complementary rather than competing approach to extension delivery system. Finally, chapter 5 discusses the key findings and presents the overall conclusions and implications emerging from the study.

CHAPTER TWO

ACCESS TO AND USE OF VIDEO-MEDIATED AGRICULTURAL INFORMATION: LESSONS FROM THE CASE OF SASAKAWA GLOBAL 2000 RICE VIDEOS IN UGANDA

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1.1 Introduction

Globally, Information and Communication Technologies (ICTs) have been used to enhance access to and use of agricultural information especially in the developing countries (Van Mele et al., 2010a; Van Mele et al., 2010b; Asenso-Okyere & Mekonnen, 2012). This is a result of lack of enough extension workers in the world to visit all the farmers to provide information when they need it (FAO, 2014; Bentley et al., 2015a; Chepkoech, 2015). In Uganda, for example, one extension worker serves about 3189 famers (Danielsen et al., 2015). In addition, the extension workers are not well facilitated to reach the highest capacity of sparsely distributed and uncoordinated farmers (FAO, 2014), thus the need for appropriate approaches that enhance access to information by farmers (Van Mele et al., 2010b; FAO, 2014; Danielsen et al., 2015).

ICTs have the potential to enhance access to timely on-the-spot agricultural information to smallholder farmers (Bertus et al., 2010; Bentley et al., 2015a); but the opinion about their appropriateness tend to differ (Van Mele et al., 2010b). Farmer-to-farmer training videos are among the high potential ICTs for providing access to information in a range of agricultural domains (improving productivity as well as value addition and reducing post-harvest losses). However, the appropriateness of ICTs especially video in terms of its effectiveness in enhancing access to and use of information by farmers in not yet clear regarding the organizational, social, economic and technical factors.

The privatization of extension service delivery in Uganda initiated fifteen years ago proved ineffective in transforming the smallholder farmers leading to its disbandment in 2015. It is thus, critical to explore alternative approaches that foster access to information by smallholder farmers who depend on agriculture for both food and income security (Van Mele et al., 2005; Bashaasha et al., 2011; Bentley et al., 2014a). David and Asamoah (2011) and Bentley et al. (2015b) argue that if ICTs including video are well employed, they may reach many people including the rural

poor, marginalized women and the youth. Heavy focus on ICTs in this particular case videos by extension service providers has been on distribution and showing farmer learning videos (Bentley et al., 2015b). However, there is limited attention on the factors that affect the effectiveness of video in addressing challenges related to access and use of information by marginalized groups (Cai & Abbott, 2013; Bentley et al., 2015b); an issue of investigation in this paper.

Video-mediated Extension Approaches (VMEAs) aim at providing agricultural information with the intention of enhancing access to knowledge leading to behavioral change among the smallholder farmers. Whether VMEA ensures access to knowledge by smallholder farmers is an assumption this study was set out to investigate. Since 2007, Sasakawa Global 2000 (SG 2000), a Non-Government Organization (NGO) piloted VMEA in fourteen districts of Uganda on specific agricultural enterprises: Kamwenge and Ntungamo (Western region); Mukono, Buikwe and Wakiso (Central region); Jinja, Kamuli, Namutumba and Tororo (Eastern region); and Lira, Dokolo, Apac, Oyam and Gulu (Northern region). Particularly, VMEA was piloted in Kamwenge district (2007-2010) to promote access and use of agricultural information mainly on practices in rice production. Farmers were brought together on predetermined and publicized dates, time and location to acquire relevant information on the practices involved in rice production.

Van Mele et al. (2005), Tumwekwase (2013) and Bentley et al. (2014b) have highlighted reliability, location, appropriateness and timing of video shows as key attributes influencing access to agricultural information. Danielsen and Kelly (2010) cited similar attributes in the criteria for measuring access to information though in this case focusing on plant health clinics. They also point out that affordability and feasibility of the advice are likely to affect the use of the acquired knowledge, also key attributes for assessing effectiveness of VMEA in enhancing use of the acquired information.

Kamwenge district in western Uganda is where use of VMEA is reported to have been successful in enhancing access and use of agricultural information on rice production practices by all age groups, sex and other socio-economic characteristic differences (Tumwekwase, 2013). Therefore, this paper assessed the factors that affect access to and use of video-mediated

agricultural information drawing lessons from the case of SG 2000 rice videos in Kamwenge district, Uganda. In this study, video participants are the farmers who attended, viewed and accessed information from videos. In the context of this study, access to agricultural information refers to attendance of video shows by sex, age, education, occupation of the respondent, farm size and land allocated to rice production as influenced by publicity, timing of video shows and distance to the video sites (Danielsen & Kelly, 2010). Use refers to how the acquired knowledge is adapted and applied in practice by farmers in their respective agricultural production contexts.

1.2 Methodology

A cross-sectional study was conducted in Mahyoro sub-county (Figure 2) in Kamwenge district, Uganda from August 2015 to February 2016.

The sub-county in Kamwenge district was selected for this study because SG 2000 showed videos there from 2007 to 2010 and this provided an opportunity for an assessment of how video enhanced access and use of information by smallholder farmers. The study employed a qualitative approach, relying mainly on group interviews of the smallholder rice farmers targeted by SG 2000 in the district. Six Focus Group Discussions (FGDs) were conducted in purposefully eight selected villages (Table 1) with forty eight purposively selected farmers from a list of 100 video participants that attended the video shows. Out of the 48 FGD participants, 19 were males and 29 were females (Table 1). To generate the proportions of farmers regarding the nature of access and use of information provided through VMEA, 100 participants who were selected through census using Mahyoro Rice Farmers Association (MARFA) registers. The data generated through semi-structured individual interviews were used to complement the findings from the FGDs.

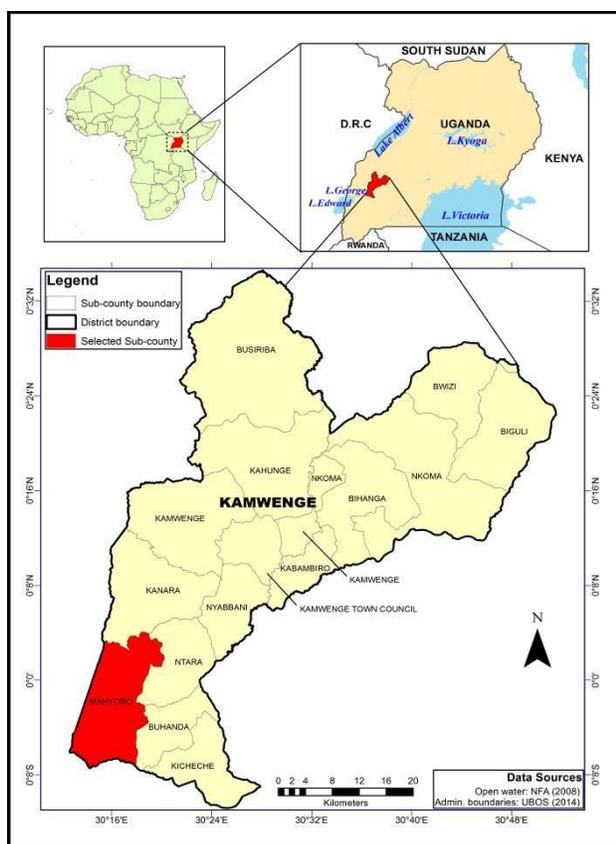


Figure 2: Mahyoro sub county, study area

In total, seventy one males and twenty nine females in the sample respectively were interviewed to gain their insights about the potential of VMEA in enhancing access to agricultural information. Table 1 shows the number of respondents and their respective villages of origin/residence.

Six key informants (Table 1) from among the participants were also purposively selected for follow up to clarify some of the key issues (timing, distance and gender) that emerged in the focus group discussions regarding access to agricultural information.

Table 1: Number of FGD video participants per village and individual interviews

Village	Number of males	Number of females
FGD participants		
Rwetuma [*]	1	1
Buhindagi [*]	1	1
Kitonzi [*]	0	1
Burembo [*]	0	1
Katanga [*]	1	1
Kitomi	3	5
Karere	7	9
Kyendangara	6	10
Sub-total	19	29
Individual and key informants		
Individual interviews	71	29
Key informant interviews	4	2
Sub-total	75	31
Total	94	60

Sources: FGDs, semi-structured individual interviews and key informant interviews; **Legend:** FGDs = Focus Group Discussions; *Villages with low attendance of video participants combined to form one FGD

Basing on the MARFA registers, FG participants were purposively selected by taking at least eight participants from each of the three villages. The three villages were Karere, Kyendangara and Kitomi. These three villages had higher number of video participants. The remaining five villages such as Rwetuma, Buhindagi, Kitonzi, Katanga and Burembo indicated with superscript star had registered low attendance of video participants. The participants in these villages were purposively selected and combined to form one FGD to discuss the issues related to access and use of information. Two FGDs of eight participants were conducted in Karere and Kyendangara

villages respectively and one for Kitomi village. Generally, the focus of the interviews was to understand how the organizational factors (e.g. distance, publicity and timing of video shows), the social factors (e.g. sex, education and age) and the technical (e.g. comprehension of key messages and applicability of information/practices) influenced use of information delivered through VMEA.

In this study, the attributes for understanding the nature of access were adopted from Danielsen and Kelly (2010). These are the criteria developed to assess the potential of plant health clinics in providing access to plant health services by smallholder farmers. Among these include publicity, timing, gender, location and feasibility of the advice. Similar attributes were used to inform the use of VMEA in providing access to information by smallholder farmers. Other relevant attributes were included namely; age, education, occupation, farm size and land under rice production.

Content analysis was applied using themes representing variables of interest, namely; organizational, social, economic and technical factors influencing access to information from the videos as applied by SG 2000. Quantitative data were analyzed using SPSS 18.0 version to generate the percentages of video participants' opinions on access and use of agricultural information. A one samples t-test was performed to test for significance of land allocated under rice production and the influence of timing of videos shows on access to video-mediated information. The effect sizes (r) were indicated to illustrate the influence of land under rice production and timing of videos shows on farmers' access to video-mediated agricultural information. Quotes and pictures were used to support the explanations from the video participants. The GPS coordinates were entered into ArcGIS version 10.1 software to generate maps for the video catchment area and distribution of participants.

1.3 Results and Discussion

1.3.1 Access to video-mediated agricultural information

Table 2 presents the attributes of access to agricultural information in terms of social factors (e.g. sex, age and education), organizational factors (e.g. distance, publicity and timing of video shows), and economic factors (e.g. occupation of respondents, farm size and land allocated to rice production).

Table 2: Attributes of access to video-mediated agricultural information

Variable	% (n=100)
<i>Sex</i>	
Males	71
Females	29
<i>Age</i>	
Below 30 years	25
Between 31-50 years	54
Above 50 years	21
<i>Level of education</i>	
No formal education	89
Formal education (not beyond primary)	11
<i>Distance to place of video show</i>	
Less than one kilometer	27
One to two kilometers	53
Three to four kilometers	17
More than four kilometers	3
<i>Major occupation of respondents</i>	
On-farm activities	98
Off-farm activities	2
Average farm size (Acres)	3
Average land allocated to rice production (Acres)	1.5

Source: Household survey, 2015

Sex and influencing factors

Showing videos publicly was meant to provide an opportunity for all people to access the video services irrespective of their sexes. Results in Table 2 indicate that more males (71%) in the sample attended the video shows than females (29%) (also see Karubanga, Kibwika, Okry & Sseguya, 2016). This is because the timing of video shows was slated to start at 6:00pm but usually started at 7:30pm and ended at 10:00pm which did not favour participation and learning by some segments of farmers especially females. This partly explains why the timing of video

shows was statistically significant in influencing attendance and learning from video shows by rice farmers at 1% level of significance ($t=58.186$, $p<0.05$, $r=0.99$). The higher participation of males was attributed to their relatively high level of mobility, having more free time to attend and being favoured by the timing of the video shows as they stayed longer in Kyendangara trading centre drinking and socializing.

Basing on the culturally established gender division of labour, reportedly, the least participation of women has been somewhat due to their heavy engagement in performing other domestic chores such as cooking and taking care of children. The obligations involved in by women coupled with the timing of video shows tended to limit their participation in the video events. This forces women to stay home performing such duties as determined by the culture of various communities (also see FAO, 2014; Bentley et al., 2015b), yet they get heavily involved in performing most of the agricultural activities (Ibrahim, Saingbe & Abdulkadir, 2012; MAAIF, 2016). If videos are shown publicly in rural villages at more favourable time, likely more women would benefit (Bentley et al., 2015b). Thus, commencing video shows in the afternoon hours preferably midday or 3:00pm provides an opportunity for women to attend and go back home early to attend to other household chores as stated by one of the Rwetuma female farmer;

We busy women have the desire to attend the video shows but because of the timing of these shows we find it difficult to attend as we cannot walk back home late in the night. Coming to the video show early is okay but when it comes to ending late in the night it becomes difficult and risky especially for us female farmers because of insecurity cases associated with raping and fear of wild animals from Kyambura wildlife reserve and Queen Elizabeth National Park as well as disapproval from our husbands (FGD interview, 23 August 2015).

Given that female farmers contribute over 70% of the agricultural labour force, their limited access to extension services implies lower uptake of improved technologies with serious implications on productivity and agricultural output (MAAIF, 2016). This confirms what Bashaasha et al. (2011) and FAO (2014) recommended that rural people especially females need special attention to enhance their access to information through decentralization and use of appropriate extension approaches. If the issue of timing the video show events is not addressed, there is a likelihood of females and distant farmers missing out on attending the video services. This calls yet for another suggestion to organize the show for one video on a particular step in

rice production lasting 12-15 minutes and not a series. This would allow time for participants to discuss what they have seen in the video as well as allowing for an opportunity for females and distant video participants to attend and later go home early.

Age

Results in Table 2 further show that most (52%) of the farmers who participated in the video shows were in the middle age category of 31-50 years. It is however important to note that the youth (below 31 years) attended the video shows possibly due to the entertainment element embedded in the video (also see Karubanga et al., 2016). Thus, the video seems to be an alternative extension communication tool in mobilizing and attracting more productive age group (also see FAO, 2014).

Education level

Most video participants (89%) in the sample had not attained any formal level of education (Table 2). The higher proportion of farmers in the sample without formal education depict that the video is effective in enhancing access to information and learning among farmers who are illiterate because of the attractive nature of images and demonstration ability embedded in the video (also see Bandura, 1997; Bede, 2016). In addition, the use of videos help the illiterate farmers to learn because it allows the use of both senses of seeing and hearing in order to learn as affirmed by MacGregor, (2007) David & Asamoah (2011) and Van Mele, (2011). However, the findings as affirmed by Rogers (1995) and Danielsen and Kelly (2010) have revealed that despite the demonstrations embedded in the video, the complexity of the technical language (English) used in the video somehow limited farmers capacity to comprehend the explanations about the practices demonstrated in the video (also see Mphahlele, 2007; Bentley et al., 2015b).

Distance to place of video shows

Majority (81%) of the video participants perceived the designated location of video shows to be appropriate because it was located at MARFA office (Figure 3) where farmers frequently gathered for meetings. About (53%) of the video participants who attended the video shows travelled one to two kilometers with the most distant video participant travelling about 7km to the venue of the video shows. Four other distant participants came from Rwentuma (3) and Katanga (1) villages who indicated that they had gone to Kyendangara trading centre for leisure.

This illustrates the power of video in mobilizing and attracting farmers including those from far to get exposed to the information and knowledge as affirmed by Bede (2016). While Kyendangara FG participants approved the distance as being walkable, the respondents from Rwetuma, Buhindagi, Kitonzi and Burembo regarded the location of the video shows as being far from their homesteads. One of the furthest female video participant from Burembo village noted that, she had to walk 7km to the venue where the video was being shown. But when asked what motivated her to walk that long distance, she said;

Because I was a Vice Chairperson of MARFA, I was compelled to go and attend the video shows. It would not look good for us the leaders not to attend and watch the videos with farmers, yet we were supposed to be exemplary (Key informant interview, 12 December 2015).

The videos were well attended by farmers from Kyendangara village because they were located close to the video venue as indicated in Figure 3. For example, even old people from Kyendangara village found it easy to attend the video shows because they were able to walk the short distance of about a quarter a kilometer (Key informant interview with the old female video participant). Limited intensity of coverage of video in locations distant from the video venue seem to be explained by the inappropriate timing and distance farmers were expected to travel and watch the video.

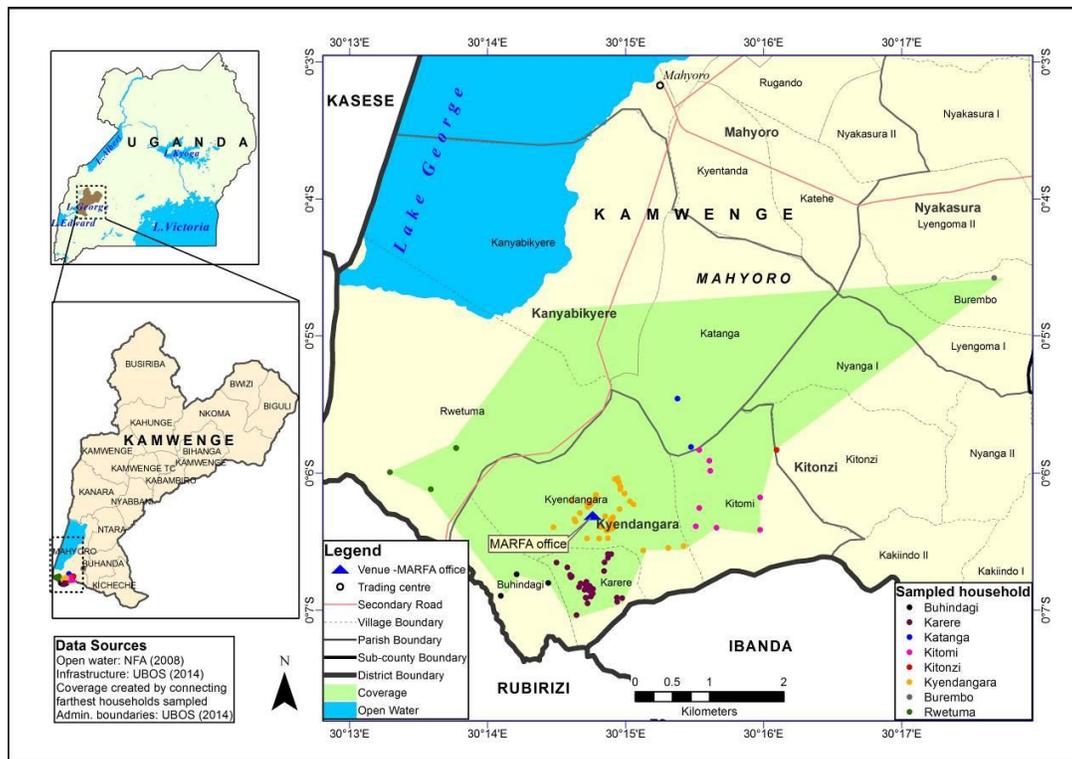


Figure 3: Video catchment areas and distribution of participants

Principally, participants reported that distant farmers who attended mainly hired motor cycles while others used bicycles to get to the venue. Females and other distant farmers recommended that rotating the video shows in particular parishes or villages would provide an opportunity for easy access to video services as this will shorten the walkable distance. Thus, the physical location of the video shows need to be considered by video operators as a key organizational factor because it determines who attends the video events (also see Bentley et al., 2015b). However, the findings disagree with those of Van Mele (2011) in Bangladesh where he found out that agricultural training videos had significant impact by reaching out to more females (54%) than males (46%) because they were operated in villages where females resided. Therefore, use of ICTs such as video need to be designed and operated to complement the extension workers to perform their extension duties more effectively in enhancing access to information by marginalized rural poor farmers as affirmed by Sseguya et al. (2012).

On a different note, the means used to create awareness about the video shows affected access to information by farmers especially the distant one by limiting their attendance. The distant farmers got to learn about these video shows as a surprise or by accident as they were in transit to other places. Only two major ways were used by SG 2000 staff through MARFA chairperson to create awareness about the video shows including; written church announcements and group leaders. The letters written in English were pinned in Kyendangara trading centre where the video would be shown. This form of creating awareness about the video shows mainly favoured the nearby people and this could be a reason why majority (97%) of the farmers who attended the video shows were from villages within Kyendangara parish. One of the Karere village female farmer during a FGD commented that *“even the individuals who are illiterate that saw the advert but could not read were not aware and missed the video shows.”* Other participants (16) learnt about the video shows via the sign post and others (2) got to know about the video show events after hearing the sound coming from the video being played. One of the male FGD participant from Karere village said that;

I first heard some voices of people talking and laughing. When I saw a sign post with wordings such as “one stop centre”, it was enough motivation to force me to go and see what was taking place where people were talking and laughing. To my surprise, I found the rice video being shown there. That is how I got to learn about the video shows.

More robust publicity mechanisms to create awareness about video shows are needed to allow for equitable participation. For example, using a mobile van to drive through the community playing local music was cited by farmers as one of possible means to create awareness before the video event to attract distant people to attend (also see Karubanga, 2013; Miir, Williams & Kisauzi, 2015). Use of local means to create awareness about video events such as through radios, local leaders and announcements on social events are also paramount. These allow for wider spread of information; thus, a likelihood to attract more women and youth (Miir et al., 2015).

Occupation of respondents and land allocated under rice production

Results in Table 2 further indicate that nearly all farmers (98%) who were involved in on-farm activities attended and learnt from the video shows. This is because the video attracts and enables access to information by people at random (also see Karubanga et al., 2016). This is better explained by the location of Mahyoro sub-county in Kamwenge district which is surrounded by Kyambura wildlife reserve and being near Queen Elizabeth National Park denying farmers the opportunity for off-farm activities. On average, farmers who watched the video had the farm size of 3acres of which 1.5 was allocated to rice production. This means that farmers allocate more land to rice production besides other crops being grown in the area. This is explained by the fact that all farmers (100%) grew rice for sale because of its growing importance as a commercial crop which triggered information seeking (Kijima et al., 2008; Dandedjrohoun et al., 2012). This partly explains the positive significance of land under rice production at 1% level of significance ($t=18.587$, $p<0.05$, $r=0.88$). It therefore implies that the farmers gave more importance to rice production and consequently same attention to training on rice. Even though the farmers were rather operating on a small scale with small total land owned.

1.3.2 Use of video-mediated agricultural information

Comprehension of key messages communication through video

At the time of conducting this study, rice farmers in Kamwenge district were not yet exposed to rice videos translated in their respective local languages. Experiences presented here are based on opinions of informants who watched the English version of the rice videos produced in Benin and shown by SG 2000 to farmers in the period 2007-2010. Results indicate that majority (90%) of the farmers expressed concerns regarding the language in which the video was documented

and shown to them. They described the language (English) used in the video as being a barrier to their learning yet majority (79%) of the farmers who attended and accessed information from the video spoke Runyankore-Rukiga. Others spoke Rufumbira-Runyarwanda (18%), Luganda (2%) and Rukonjo (1%). Seeing what is being demonstrated in the video is not enough to claim that the farmers have understood the practice. The technical language used affects the comprehension by farmers of the information communicated in the video (Bentley, 2016); thus, affecting their eventual learning (MacGregor, 2007). Notwithstanding, there are efforts by AccessAgriculture, an international NGO to promote video-mediated learning in Africa and Asia by distributing translated versions to organizations to train farmers on rice production practices.

Besides the technical language used, the speed at which the video was playing was fast for the viewers to follow. Thus, the technical language coupled with the speed of the video which denied the viewers an opportunity to follow the video very well and comprehend the message easily. This explains why 33% of the farmers recommended the need for pausing and translating the video during the show. Attempts were made by SG staff to translate what was being communicated in the video. Surprisingly, the translator only provided the summary of what was being demonstrated in the video other than giving the detailed information of what was being demonstrated. Overall, while video was able to communicate to farmers because of its perceived attributes of clear and attractive images, its efficiency would have been enhanced if it was translated in the local and specific languages spoken by most farmers (79%) in the area. This calls for the need to translate or even document the video on local farmers in their native languages for easy identification with actors and comprehension of messages as affirmed by Mphahlele (2007) and Van Mele (2011).

Application of information/practice

Production of locally appropriate and regionally relevant videos enhances access to information and learning among farmers through enhancing modification of technologies and farmers adding their own creative ways (Bentley et al., 2013c; Van Mele, Bentley, Harun-ar-Rashid, Okry & Mourik, 2016). Reportedly, farmers approved the information got from the videos as being useful in fostering change of rice production practices and technologies as well as solving their production needs. Because of the complexity, unavailability, affordability and feasibility of the information communicated in the video, farmers endeavored to adapt and apply the practices and

technologies through making modifications. Results indicate that most farmers (92%) planted rice in lines using the forked rake. This allowed use of lower seed rates (25kgs were planted in an acre using a forked rake compared to broadcasting where 40kgs were being planted); thus, controlling the plant population in the field. In addition, weed control, spraying chemicals and movement through the field are easy when rice is planted in lines. However, use of a forked rake besides being tedious it was also difficult to penetrate hard and stony soils. Farmers innovatively adapted and used the fork method by mounting a 20kgs load of sand/soil on the rake for deeper and better penetration in the ground while others would have the children to sit on it as they pulled. This allows deeper penetration (2cm) for better tillering as communicated in the video. However, this required farmers to first carryout secondary tillage to provide a fine tilth for easy penetration of the forked rake. Thus, use of video to convey extension messages allow for eliciting farmers' innovativeness to suit the different production context (also see Bentley et al., 2015a).

1.4 Conclusion

The study has revealed that video seems to be an effective extension communication tool in enhancing access to and use of agricultural information especially among farmers without formal level of education. However, the organizational factors such as distance to the video sites, publicity and timing of video shows compromised the videos ability to enhance access to and use of information by different social groups. Long distances to the video show sites and showing the videos late in the night denied females and other farmers from distant places from accessing the video-mediated agricultural information. While video as an audio-visual aid is expected to appeal to people of different languages and social back grounds, the results have shown that the language in which it was presented was a key access and use issue. Hence, the modalities suggested by the farmers with particular efforts on intensifying awareness creation through local channels, adjusting the timing of video shows and operating the videos on a rotational basis are vital if VMEA as an extension approach is to foster inclusive service delivery. Finally, documenting the video on local farmers in their native languages would allow for easy comprehension of messages and even identification with actors; thus, the need to customize videos to suit the local context.

CHAPTER THREE

A SOCIAL LEARNING APPROACH TO VIDEO-MEDIATED EXTENSION IN ENHANCING INNOVATION AMONG RICE FARMERS: PROSPECTS FROM EXPERIENCE OF SG 2000 IN UGANDA

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3.1 Introduction

Farmers learn and innovate to improve their practices for better living through social learning processes (Kibwika, 2007; MacGregor, 2007). Social learning refers to a participatory process whereby individuals interact, jointly reflect and learn from each other (Bandura, 1997; Kiptot, 2007). Interaction and exchange between farmers and knowledge experts is the basis for experimentation and adaptation of practices and technologies, and processes leading to innovation (Kibwika, 2007; Chowdhury, Van Mele & Hauser, 2009; Danielsen et al., 2015). This phenomenon is even more critical in developing countries where the majority (60%) of the population depend on farming (UBOS, 2012) and have limited access to expert knowledge because of weak or dysfunctional extension systems. For example, in Uganda one extension worker is expected to serve about 3189 farmers (Danielsen et al., 2015) but farmers continue to learn new ways to meet their changing needs and demands (Kibwika, 2007). Information and Communication Technologies (ICTs) including videos provide opportunities for improving access to information by farmers and other stakeholders in agriculture but their effectiveness in extension will depend on how well they enhance learning. It is therefore imperative that such ICTs are integrated in the social learning processes of the target communities (MacGregor, 2007).

The ICTs are increasingly playing a significant role in the dissemination of knowledge and information in different spheres of life including agricultural related knowledge and information. Videos, radio, mobile phones and television are among the ICT tools that are gaining popularity in enhancing farmer access to agricultural related knowledge and information (Van Mele et al., 2010a). Effective use of such tools needs to be considered as they can stimulate social learning. Videos in particular have a high potential to stimulate social learning because they combine

visual and audio elements that enhance internalization and contextualization of knowledge or information which enables farmers to share and learn from experiences (MacGregor, 2007; Van Mele et al., 2010b; Bentley et al., 2013a). If properly used, video as a communication tool is powerful in creating awareness, enhancing knowledge acquisition and retention, application and sharing of high-quality information with a large audience (Bentley, Van Mele & Harun-ar-Rashid, 2013b; Bentley et al., 2015a). However, how videos can do this under specific farmer circumstances is the subject of investigation in this paper. The paper explores how videos used in dissemination of knowledge and practices of rice production in Uganda trigger social learning processes to enhance farmer innovations. In this context, innovations are defined as various modifications, adaptations and creative ways of learning how to do things differently - a form of creative behavior and practice developed by farmers to understand and customize the learned knowledge and practices or technologies (Kibwika, 2007; Danielsen et al., 2015).

Basing on the potential of videos, AfricaRice has since 2005 been recording farmers with innovative practices and/or knowledge and using the videos to disseminate and share experiences and knowledge (Bentley & Van Mele, 2011; Zossou, Van Mele, Wanvoeke & Lebailly, 2012; Bentley et al., 2013a). There is evidence in literature pointing to the view that videos influenced change of farmer behaviours and practices (MacGregor, 2007; Tumwekwase, 2013; Bentley et al., 2014b) but how this happens is not explained. In 2007, Sasakawa Global 2000 (SG 2000), a Non-Government Organization (NGO) piloted use of videos to disseminate rice related information to smallholder farmers in 14 districts of Uganda. Kamwenge district in Western Uganda is one of the districts where use of videos is reported to have been successful after three years of implementation and that the learning has been sustained even without the NGO (Tumwekwase, 2013). The case of Kamwenge district is used to determine how the videos were integrated in the social learning processes to enhance innovation among rice farmers?

3.2 Conceptual Framework

Social learning is central to farmer learning and innovation. All approaches and methods aimed at change in farmer' knowledge, attitudes and behaviors need to be situated within the social learning concept. As illustrated in Figure 4, learning through videos in this case is conceptualized in the context of social learning processes and focusing on awareness creation; knowledge acquisition and retention; knowledge use through experimentation and adaptation; and

localization of knowledge through sharing. Social learning theory is used to explain the farmer learning processes in a video-mediated extension in Uganda using experiences of SG 2000. The visual power of the video arouses interest and attracts farmers to get exposed to information contained in the videos and thereby creating awareness (Bandura, 1997; MacGregor, 2007; Bede, 2016). What farmers see and hear in the video is translated into knowledge acquired and retained for use. On evaluation of the knowledge acquired against other available options, the farmers consider to apply what they consider relevant often with adaptations to suit their peculiar circumstances. They experiment and make necessary adjustments and whether it works for them or not, they will have generated additional knowledge and experiences which are shared with others (Kibwika, 2007). Social learning is emphasized here because the farmers live in a social environment characterized by interactions, sharing and co-influencing each other based on knowledge and experiences either introduced from outside or generated by themselves. In such processes, critical reflections are the basis for choice of what is being experimented or used. The interactions, discussions and joint reflections that follow video shows enhance common understanding and repackaging of knowledge for localization and adaption to the specific needs and context of the farmers (Bandura, 1997; MacGregor, 2007).

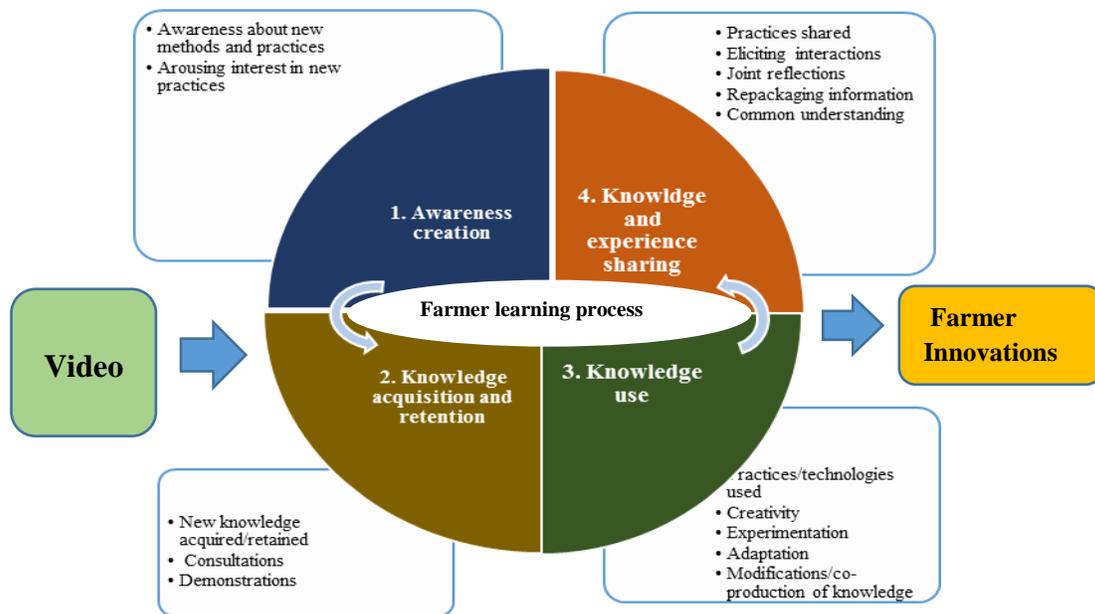


Figure 4: A framework for assessing the farmer learning processes through videos

A basic premise of social learning theory is that people learn not only through their own experiences but also by observing the actions of others and the results of those actions (Bandura, 1997; Tilbury, 2007; Glanz et al., 2008). The video exposes farmers and elicits interest and curiosity on new knowledge and practices (Van Mele, 2011; Bentley et al., 2015a). Farmers watch a video with intentions of learning new practices and technologies that can improve their farming practices. Thus, individuals that watch videos acquire, retain or remember what they saw even after a long period (Tumwekwase, 2013; Bentley et al., 2014a; Bentley et al., 2014b), which is a key attribute for social learning (Bandura, 1997; MacGregor, 2007). However, the farmers' ultimate interest is not to acquire knowledge for the sake of it but to use it to improve their situations. After internalizing the knowledge acquired, farmers adapt and experiment what they have seen in the videos to suit their peculiar circumstances (Shaw & Kristjanson, 2014; Bentley et al., 2014b).

Knowledge and experience sharing involves forms of interactions, joint reflections and creativity leading to repackaging of information for common understanding (Cai & Abbott, 2013). In addition, knowledge and experience sharing lead to development of creative ways of understanding more technical information (Kibwika, 2007). It is the learning and adaptation and modifications through sharing own experiences that lead to innovation (Danielsen et al., 2015). Videos are believed to stimulate social learning by eliciting information sharing among farmers (Asenso-Okyere & Mekonnen, 2012). Bentley et al. (2014b) emphasize that effective farmer learning processes can only occur when farmers can engage with each other and later discuss and implement what has been observed. Viewing a video together is the basis for farmers to interact and clarify to each other what they have learnt and to lay a foundation for further interaction and sharing through experimentation. Scholars such as Zossou et al. (2010) and Cai and Abbott (2013) claim that videos stimulate active communication and self-learning among participants, in this case farmers.

3.3 Methodology

The cross-sectional study was conducted from August 2015 to February 2016 in eight villages (Figure 5) in Mahyoro sub-county in Kamwenge district, Uganda where videos were used by SG 2000 to disseminate rice related information for three years (2007 - 2010). The selected villages were those with records of farmers who participated in video shows during the intervention of

video-mediated extension by SG 2000. Multiple data collection tools were used in phases. The first phase involved conducting six focus group discussions (FGDs) comprised of eight participants to gain insights in the experiences of farmers with regard to how videos influenced their awareness, knowledge acquisition and retention, knowledge application and sharing of knowledge related to rice production. The FGDs also explored the learning that took place as reflected by modifications and adaptations farmers made in their experimentation of the knowledge acquired. A total of 48 farmers (19 males and 29 females) participated in FGDs (Table 3). The FGD participants were selected with the assistance of Mahyoro Rice Farmers Association (MARFA) chairperson. The outcomes of the FGDs were used to frame items for the individual semi-structured interviews to determine the influence of video on farmer learning processes.

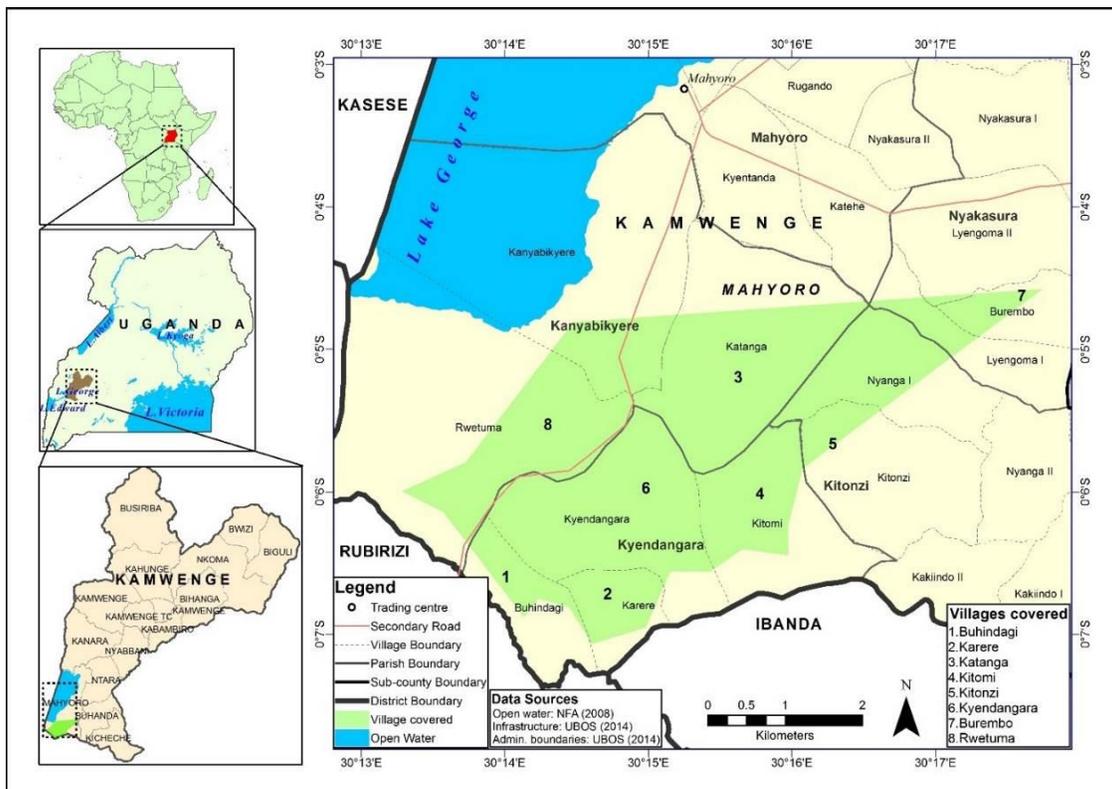


Figure 5: Villages selected for the study in Mahyoro sub-county, Kamwenge district

The second phase involved conducting the semi-structured interviews with individual farmers to assess enhancement of awareness, knowledge acquired and retained, knowledge used and experiences shared with other people. Because of lack of baseline data, the main focus was on

what the farmers could tell regarding what they were aware of, knowledge acquired and retained, knowledge used and shared before and after the video shows. The videos addressed twelve practices and technologies related to rice production. The semi-structured interviews gathered quantitative data on farmers who were exposed to the practices and technologies through video regarding what they acquired and could remember, and what they applied and shared with others. Precisely;

- Awareness about particular rice production practices and technologies was determined by the difference between number of practices and technologies farmers were aware of after and before watching the video. Of the practices and technologies disseminated in the video, farmers indicated how many they were aware of before the video and how many they remembered watching in the video. This was for ease of measurement but not to ignore the fact that the videos could have enabled more awareness of even the practices and technologies they knew before.
- Knowledge acquisition and retention was measured by considering the details on relevance and application of the specific practices and technologies. The difference of what farmers knew after and before watching the videos was an indicator of the knowledge acquired and retained.
- Knowledge use was about what farmers applied in their own context (including modifications made) influenced by what they learnt in the videos. What farmers were able to apply indicates the proportion of knowledge put into use compared to what they learnt from the video.
- Knowledge sharing was indicated by the acquired knowledge that was shared with others (farmers and extension workers) after watching the videos. This was determined by asking farmers what particular rice production practices and technologies they learnt and shared after watching the video based on relevance and applicability. The purpose was to determine whether video increased knowledge and experience sharing among farmers on particular rice production practices and technologies viewed in the video. This was purposely done to ease the measurement but not to ignore the fact that the videos could have enabled more experience sharing resulting from joint interactions, reflections and evaluations (verification) of even the practices and technologies farmers knew before.

The semi-structured interviews involved all the 100 farmers who participated in watching the videos and whose records were available in the MARFA register. Out of these, 71 were males and 29 females.

The third phase was conducting the individual home/farm visits to ascertain through observations the practices and technologies that were being used. Six home/farm visits were made as cases for observation. The farms were selected from the FGD participants who exhibited more knowledge and experiences in rice production practices and technologies. The observations focused on the practices and technologies farmers applied and the adaptations (innovations) and creative ways they employed to localize the acquired knowledge.

The fourth phase involved conducting key informant interviews with 16 farmers to generate more deep understanding of how the organization and other logistical issues (timing and location of video shows) affected the learning through videos as well as what they considered to be the success/failure factors for video mediated extension. Sixteen key informants were also purposively selected during FGDs based on their location and sex.

Table 3: Tools of data collection and number of respondents

Tools used for data collection	Number of respondents
Focus group discussions (6)	48
Semi-structured individual interviews	100
Home/farm visits	6
Key informant interviews	16
Total	170

Thematic-content analysis was applied to the qualitative data generated through FGDs, key informant interviews and observations based on the variables of interest, regarding how the video influenced social learning among farmers. Data from the semi-structured interviews were analyzed using Statistical Package for Social Sciences (SPSS) version 18.0. The paired samples t-test was performed to test for significance of mean differences in the practices and technologies farmers were aware of, knowledge acquired and retained, and knowledge used and shared before and after the video shows. The effect sizes (r) were indicated to illustrate the influence of VMEA on awareness, knowledge acquisition and retention, knowledge use and sharing of experiences.

3.4 Results and Discussion

3.4.1 Farmer Learning through the Videos

Through videos, farmer learning about the rice production practices and technologies was measured by change in awareness, knowledge gain, application of knowledge gained and change in extent of sharing the knowledge and experiences between farmers. Figure 6 presents the change in farmer learning (before and after) on twelve parameters that were disseminated through the video.

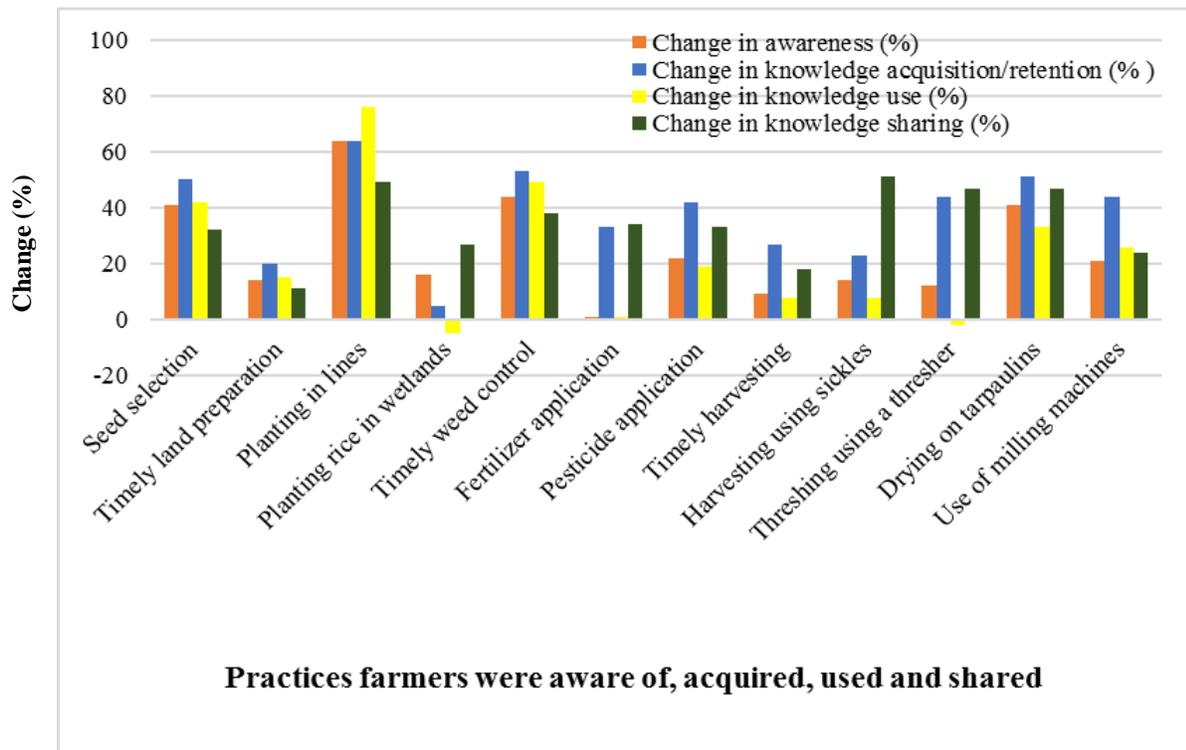


Figure 6: Farmer learning and application of practices and technologies disseminated through the video

Figure 6 above indicates that video enhanced awareness creation, knowledge acquisition and retention, use and sharing about planting in lines, timely weed control, seed selection and use of tarpaulins for drying rice. These were perceived by farmers as key practices and technologies in enhancing both quantity and quality of rice produced. More awareness creation enhanced more interest and curiosity in using particular rice practices and technologies where farmers had experiences and were able to share and apply it. This explains why more farmers planted in lines, controlled the weeds on time and selected their seed for planting. This could also be explained by

the clarity and attractive nature of images which created a long lasting impact on the memory of viewers; thus triggering continued use and sharing of knowledge on aspects that appear interesting and relevant (also see Rogers, 1995; Danielsen & Kelly, 2010).

The limited use of technologies such as threshers could be attributed to increased knowledge and learning among farmers in terms of their availability, affordability and feasibility to use in attempts to experiment and adapt. In most cases, farmers are aware, learn and share more about the practices and technologies they think are relevant to them and they can use the limited available resources to implement what they have acquired as stated by Rogers (1995). For example, threshers besides being heavy and unavailable, they were perceived by farmers as being expensive in terms of the costs involved in transporting and fueling. In addition, through joint discussions and reflections, farmers shared more information about using the wetlands as one of the possibilities to produce rice during drought. However, there was limited use of these wetlands because they were locally unavailable. They also added that rice production in wetlands is only possible for farmers shown in the video with ox-ploughs because it is easier for them to till and level the wetlands prior to planting (Figures 7 and 8). Wetlands are associated with heavy soils and floods which make hand hoeing and leveling of soils difficult. Thus, cultivation of rice in such soils requires ox-ploughs as illustrated in Figures 7 and 8.



Figure 7: Using ox-ploughs to till a wetland

Figure 8: Using ox-ploughs to level a cultivated wetland

Overall, through knowledge sharing, farmers go through an evaluation process whereby they assess the feasibility of particular practices and technologies before they are used. In the process,

they experiment through modifications and adaptation to localize the acquired knowledge on practices and technologies. This confirms what Kibwika (2007), Van Mele et al. (2010a) and Shaw and Kristjanson (2014) said that farmers gain interest, learn, use and share more about what they can experiment and adapt. In general, the results reveal that if knowledge sharing through video is well facilitated, it is likely that many farmers would be more aware about the new practices. Through sharing of knowledge and experiences farmers are likely to acquire and use more knowledge they perceive to be relevant in solving the farming needs.

3.4.2 Influence of Video on Awareness Creation, Knowledge Acquisition and Retention, Use and Sharing

Table 4 presents results of a paired t-test of significance on the extent to which videos influenced awareness; knowledge acquisition and retention; knowledge use and sharing of what was learnt by farmers.

Table 4: Awareness created, knowledge acquired and retained, used and shared

Attribute	Mean difference	t-test	Sig.	df	95% CI of the difference	
					Lower Limit	Upper limit
Awareness creation	3	7.468	0.000***	99	2.42323	4.17677
Knowledge acquisition and retention	5	10.694	0.000***	99	4.21889	6.14111
Knowledge use	3	9.187	0.000***	99	2.21094	3.42906
Knowledge and experience sharing	5	13.076	0.000***	99	3.98681	5.41319

*** p<0.01

Awareness creation

Rice farming in Mahyoro sub-county started in the late 1990s. Before then, farmers were mainly growing other crops such as maize, millet, beans, soya beans, cassava and groundnuts for both income and food. Whereas rice is a relatively new crop in the farming system of the area, farmers have accumulated knowledge and experience on rice production over time which has in turn influenced changes in practices and technologies.

As part of the promotion of rice production in the area, SG 2000 in collaboration with Mahyoro Rice Farmers Association (MARFA) used videos (2007-2010) developed in Benin to influence change in rice production practices and technologies. The videos were developed in French and translated into English. In the FGDs, farmers acknowledged that the videos created awareness about new practices and technologies in rice production. Because of the growing importance of rice as a cash crop, farmers were curious and interested to learn about the new practices and technologies. Table 4 shows that the difference in knowledge as a result of awareness creation about new rice production through videos was highly significant among the participating farmers at 1% level of significance ($t=7.468$, $p<0.05$, $r=0.60$). This is attributed to the visual power of the video because farmers would see the practices and technologies demonstrated and relate it to their context even though most of them could not fully understand the explanations in English (also see Zossou et al., 2010; Bentley & Van Mele, 2011; Waddington et al., 2014). Most farmers (92%) who watched the videos for example appreciated the value of planting rice in rows. The videos are powerful in influencing learning especially among the less educated people because of the attractive and clear images (David & Asamoah, 2011; Bede, 2016). Indeed, all farmers who watched the videos wished they had been more frequent than it actually was. For instance, most of the video participants (78%) said that the video shows were rarely organized.

About 61% of the farmers perceived the frequency of video shows as being inadequate while 39% thought it was adequate. Those who thought the frequency was adequate based their argument on the time they needed to internalize and experiment what they had learnt before learning new things. About half of those who watched videos only once (49%) indicated they learnt something that they wished to implement to improve their own practices and technologies. This points to the view that the information in the videos was clear and relevant to most farmers as they grasped the information after watching the video only once. For the appropriate frequency, 76% of the farmers who participated in videos wished that the same videos could be shown at least twice a month. With regard to duration of a video show, farmers thought 2-3 hours was adequate. This is about the maximum time farmers are able to concentrate and be able to retain the knowledge acquired. This is so especially if the video is presenting a variety of practices and technologies. However, they preferred that a particular video should present one practice/step and thereafter allow them to reflect and discuss what they have learnt in the context of their experiences. Besides creating awareness, critical reflection before sharing of experiences

which is essential in social learning processes requires adequate time. Chowdhury, Van Mele and Hauser (2011) pointed out that running videos on a regular basis allows farmers to understand the contents and the benefits associated with a particular farmer innovation. This provides farmers enough confidence to experiment what they have learnt on their own (Gandhi, Veeraghavan, Toyama & Ramprasad, 2009).

Knowledge acquisition and retention

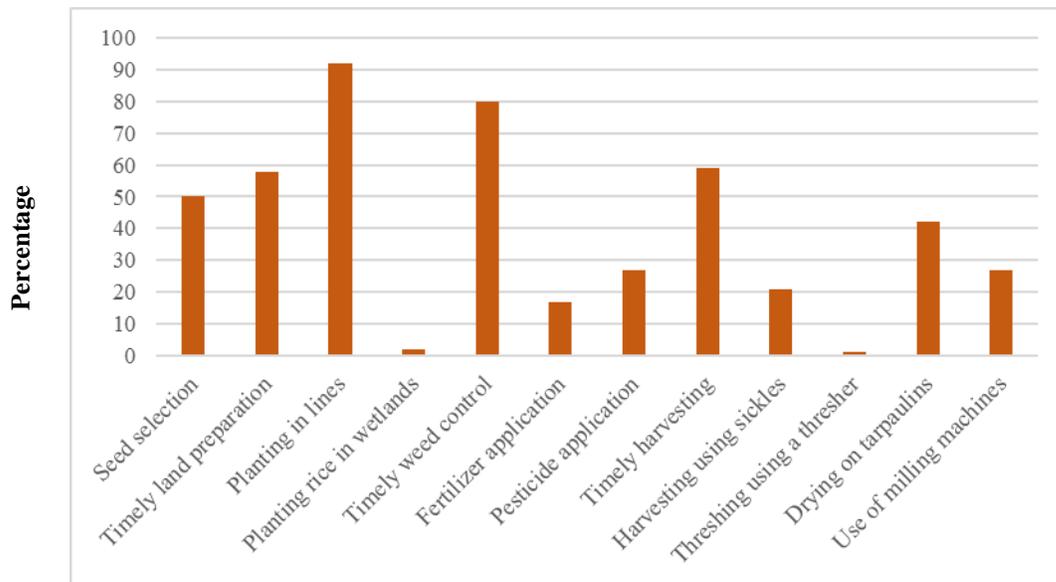
Exposing farmers to new knowledge is only a step in the social learning process. Farmers need to further internalize and appreciate the knowledge acquired; something that is sometimes referred to as knowledge retention (Bandura, 1997; MacGregor, 2007). With regard to the practices and technologies that were conveyed in the videos, farmers acquired and retained averagely 5 out of 12 practices and technologies. However, this finding does not mean that all farmers acquired and retained the same practices and technologies because of their different interests. A paired samples t-test indicates that the knowledge that the farmers acquired and retained and could recall after nine years was statistically significant at 1% level of significance ($t=10.694$, $p<0.05$, $r=0.73$). This indicates a high level of knowledge acquisition and retention facilitated by sharing with fellow farmers and consultations with extension workers. The clarity and the visual power of the videos enhance memory as a near real situation is simulated. Farmers concurred that the steps were well demonstrated allowing them an opportunity to clearly see, hear and understand what was being demonstrated. Although 89% of farmers did not have formal education and could not read or write, the videos enabled such a high level of knowledge acquisition and retention.

To enhance memory of the knowledge acquired, some farmers discussed and shared the information with others (52%) for purposes of clarifying the information to themselves, others (34%) chose to immediately apply what they had seen in the videos in their own context, others (12%) consulted extension workers (experts) for clarification or seeking a second opinion while some (2%) went to watch the videos more than once. Immediate application of what was learnt by farmers was due to lack of trustworthy people that they could consult e.g. extension workers and yet about 89% of farmers could not write what they learnt for future reference. Similarly, follow-up visits by extension workers would have successfully enhanced more learning and application of knowledge acquired as these provide more guidance and increase confidence of

the farmers. Because of the limited access to extension workers, farmers who watched the videos wished to consult the SG 2000 staff immediately after the video shows but the timing could hardly allow that as the videos ended late at night (10:00pm). Though farmers acquire and retain the knowledge they consider important in addressing their production needs (Tumwekwase, 2013; Bentley et al., 2014b), behavioural change in social learning processes is enhanced by sharing and copying from one another (Bandura, 1997; MacGregor, 2007).

Knowledge use

Not all that was learnt and retained by farmers was implemented. The farmers on average implemented 3 out of 12 practices and technologies they learnt about in the videos. Despite the low average of practices and technologies used, paired samples t-test indicated a statistically significant influence of video on the use of knowledge acquired about the practices and technologies at 1% level of significance ($t=9.187, p<0.05, r=0.68$). Figure 9 shows the proportion of farmers who implemented the various practices and technologies they learnt about in the videos.



Practices and technologies implemented

Figure 9: Proportion of farmers who implemented the practices and technologies learnt

The practices and technologies that were taken up by most farmers included planting in rows (92%), timely weed management (80%), timely harvesting (59%), timely land preparation

(58%), and seed selection (50%). In the FGDs, farmers acknowledged that rice planted in rows made other operations e.g. weeding and fertilizer application easier and it also yielded more per unit area due to optimum plant population. Although farmers may have known about row planting before, it is the appropriateness of the technology for doing so that made farmers take up the practice more. To ensure timely weed control, farmers used herbicides and completed it with hand weeding as opposed to hand weeding alone. Uptake of timely harvesting was enhanced by realization that if rice is not harvested on time, the post-harvest losses would be higher due to attack by birds and shattering and spillage due to over drying in the field. Because farmers depended on the rain fed agriculture, it was important that they prepare their land in time so as to plant early. Reportedly, timely land preparation enabled farmers to benefit from better market prices since they were able to plant on time and harvest early when the prices are high (averagely USD 0.3 per kilogram of unmilled paddy rice). Planting clean seed translates into good quality of rice produced. Exposing farmers to video allowed them learn more how they could select seed for planting. However, selecting seed by floatation and sorting using hands were respectively perceived as being costly and tiresome. Having been made more aware of quality aspects, about 42% of farmers dried rice on tarpaulins as opposed to drying rice on bare ground, though the cost of tarpaulins (about USD18) was prohibitive.

The application of knowledge was enhanced because of the sharing of information among farmers (96%) on particular knowledge which they deemed useful (85%) in addressing their production needs. They collectively evaluated the relevance and application of some of the practices and technologies in their own situation (also see Rogers, 1995; Danielsen & Kelly, 2010). The videos depicted a desired situation which inspired the farmers to want to get to those levels of practices and technologies (also see Van Mele et al., 2011; Van Mele et al., 2016). It is important to note that social learning facilitates behavioural change especially where the learners are motivated to learn. Kibwika (2007) and MacGregor (2007) asserted that learners sometimes put in practice what they have learnt to demonstrate new ways of doing things. This confirms the assumption about social learning that people utilize the practices and technologies copied from others through their own creative ways towards gaining returns (MacGregor, 2007).

One of the strong motivation for learning in this case was the commercial value of rice. Nearly all farmers interviewed grew rice mainly for cash. The demand for rice is rapidly increasing due

to increasing populations and changing food preferences (Kijima, Otsuka & Sserunkuuma, 2008; Dandedjrohoun et al., 2012) and so is the price of rice. The commercial value of rice was the basis for farmers to create mental images and imaginations and to adapt the learnt practices and technologies. Social learning theory affirms that learners need to be emotionally, intellectually and financially capable in order to model someone else's behaviour (MacGregor, 2007; Van Mele et al., 2011; Shaw & Kristjanson, 2014) which is portrayed in the videos. Videos therefore if fully integrated in social learning processes can enhance farmers' capability to learn and innovate (also see Van Mele, et al., 2007; Cai & Abbott, 2013).

Knowledge and experience sharing

Sharing and copying from one another is the hallmark for behavioral change in social learning processes. The farmers on average shared 5 out of 12 practices and technologies with fellow farmers after watching the video. The new knowledge and experiences observed in the videos increased the sharing of knowledge among farmers. The difference between shared knowledge before and after watching videos was statistically significant at 1% significance level ($t=13.076$, $p<0.05$, $r=0.79$). New knowledge alone is a stimulus for sharing among farmers as the process builds mutual acceptance and confidence to experiment. The videos presented real-life experiences from farmers which re-echoes the fact that farmers learn best from fellow farmers (Van Mele et al., 2010b; Bentley & Van Mele, 2011), even in the virtual circumstances that the videos present (MacGregor, 2007). For this reason and to broaden influence, the videos were translated into five major languages of Uganda by AccessAgriculture, namely; Ateso, Luganda, Lugbara, Luo and Runyakitara and distributed over 7500 copies of the Digital Versatile Disc (DVD) (Bentley et al., 2015b). Through experimentation, farmers localized the acquired knowledge and generated additional knowledge which they informally shared through songs and/or drama. Such knowledge can enrich the videos and enhance relevance. Nearly the same proportions of farmers who considered the knowledge gained from videos to be useful (85%) also shared the knowledge acquired with other farmers (96%). Contrary to Kibwika (2007) where vanilla farmers hesitated sharing information because of the fear of competition, sharing of information among rice farmers was not constrained by competition for market.

Conversely, the videos were shown at night (7:30pm-10:00pm) and this constrained participants to immediately share their knowledge and experiences on what they had learnt. The influence of

learning from the videos would have been even more if there was time for farmers to discuss and exchange knowledge and experiences immediately after the video shows. However, the videos ended late (10.00pm) and at this time every one rushed to get to their homes. In this regard, a female farmer in Burembo village said; *“it would have been more beneficial if farmers discussed immediately after the video show because at that time the messages are still fresh in their mind and can easily relate what they saw and their own practices.”* The real learning, however, does not take place during the video shows but thereafter when farmers reflect on what they saw and evaluate it in their own context and start to experiment. This is typical of social learning processes (MacGregor, 2007; Danielsen et al., 2015). If video shows are followed up with activities that facilitate farmer interaction and exchange of knowledge, the effectiveness of videos in behavioral change can be greatly enhanced.

The powerful images in the video incited participants to share what they saw starting with immediate family members (85%) and group members (70%). This represents a broad network of sharing and learning from one another (also see Mochizuki, 2007; Koppen, 2007; Danielsen et al., 2015) unlike the conventional extension approach (Cai & Abbott, 2013). To ensure effective knowledge sharing and learning among actors, such forms of interactions need to exist (Danielsen et al., 2015). More coherent interactions can create awareness and learning through strengthening social relations between community members (ODonoghue, et al., 2007), especially the women and youth who are usually marginalized in accessing information (David & Asamoah, 2011; Bentley et al., 2015a).

Effective social learning results from a well facilitated interactive dialogue (Kibwika, 2007); but the findings also show that well framed knowledge in video format can trigger self-directed learning. The process is interactive and thus occurs on a platform for exchanging knowledge and experiences. Conversations with farmers revealed that knowledge sharing mainly occurred in their respective homes and during group meetings as they met to discuss group-based activities such as revolving funds. Others shared knowledge while at church/mosque/hospital. Through video, the learning therefore is not only limited to people who watch the videos but it extends to other people through the various networks.

3.4.3 Reinforcing social learning beyond Video

As is common in extension, a variety of methods and approaches are more effective in influencing behavioral change if integrated in the social learning processes. To complement the videos and ensure continued learning among farmers, SG 2000 used demonstrations, field days and exchange visits. The social learning that takes place through these methods can reinforce effectiveness of videos and conversely a video recording of those processes can likewise enhance the effectiveness of demonstrations, field days and exchange visits. The discussion here is about how SG 2000 used these methods to reinforce learning acquired in the videos and also highlight how videos could have further strengthened effectiveness of the complementary methods. All this happens through social learning processes.

Demonstration sites

With the follow-up of the videos, SG 2000 encouraged farmer controlled demonstrations at parish level for purposes of experimentation and collective learning to enhance utilization of the knowledge acquired. However, individual farmers also experimented on their own farms. In the demonstrations, among other things, farmers established a 5mx5m plot and compared some of the practices and technologies learnt in the videos against their common practices. For example, yield of rice that was broadcast was compared with that rice planted in rows while maintaining other factors the same. In addition to the ease of operations such as weeding and fertilizer application, rice planted in lines yielded double that broadcast; a clear evidence of the comparative advantage of planting in lines. The farmers organized themselves to meet every week at the demonstration sites to make their observations, exchange ideas and learn together. The role of extension workers in this case was to facilitate the interactive learning process and come to consensus on key learning points and their implications to rice production in those areas (also see Kibwika, 2007; ODonoghue et al., 2007). Aside from the scheduled weekly meetings, farmers freely visited the demonstration sites to learn anytime even without the facilitation of extension workers. The farmers themselves became experts in explaining what happened at the demonstration sites.

A video recording of these learning processes at the demonstration sites would have been a valuable learning resource. When farmers watch a video in which a farmer they are well familiar with explaining why and how things are done, the information is likely to be more acceptable

and carries stronger motivation for wider uptake. Videos need not to end with introducing new knowledge or practices and technologies. It would be even more effective if it is used to provide feedback in which knowledge generated through the interactive processes in the demonstration. The adaptations are integrated and made part of the knowledge system that is shared to influence more farmers towards behavioral change. Thus, the videos have the potential to trigger social learning processes driven by farmers themselves.

Field days

Field days were another method used by SG 2000 to follow up and provide additional support to farmers who participated in the videos. This was another platform for sharing knowledge and experiences for purposes of learning from each other. In the field days, farmers shared the knowledge they had internalized from their own experiences through songs and drama, another medium for strengthening social learning. The songs and drama were in a local dialect (Runyankore-Rukiga) understood by most farmers (79%). The songs and drama were composed based on critical reflection, evaluation and experimentation. Through this, they repackaged the acquired knowledge including what they generated through their own experimentation and shared it with the wider community of farmers and other stakeholders. In this way, adapting and localizing the knowledge becomes easier (Danielsen et al., 2015).

During field days, farmers demonstrated what they learnt via video and compared their practices alongside the new practices learnt. The real-life experiences of the field days complemented with videos were used to influence attitude change among farmers. A missed opportunity however was that these experiences in the field-days including the songs and drama were not video recorded and used for further dissemination of knowledge to other communities. These would enhance learning process through well adapted messages communicated in the local languages of the farmers. The songs for example could be disseminated through other media such as radios which have become more accessible everywhere in the country (also see Okry et al., 2014).

Exchange visits

Like demonstrations and field days, SG 2000 also used exchange visits to enhance farmer exposure and learning from each other. The exchange visits were organized by MARFA and the farmers who were visited explained the practices and technologies they used and exchange of

knowledge and experiences ensued. Video recording of the interactions and learning through exchange visits would have further strengthened the power of videos to influence change in communities outside the intervention area. In this regard, Okry et al. (2014) explain how expertise developed by farmers using videos was sold to farmers in neighbouring villages in Benin.

In the case of SG 2000, priority to participate in exchange visits was given to leaders of farmers with the view that they would later share their experiences with other farmers in their respective groups and beyond. Such visits tend to capacitate leaders and other farmers as change agents to provide technical guidance to other farmers (also see FAO, 2014). This is fundamental for initiating and sustaining social learning at a more local level. Because of the value of the learning that takes place through such social interactions, the farmers were willing to cost-share expenses of the exchange visits. Whereas cost-sharing may exclude the marginalized people particularly women and youth, it is an indication of the value that farmers attach to learning from such events. Experiences gained from the visits enhance adaptation and localization of knowledge and practices to suit the peculiar situations that farmers find themselves. Like it is argued before, a video recording of experiences of exchange visits would have triggered more social learning across communities and cultures (also see Van Mele et al., 2010b).

3.4.4 Farmer Innovations resulting from video-mediated learning

Through experimentation of what farmers learnt in the videos, they modified the technologies and practices to suit their conditions. Some of the farmer innovations that emerged out of the video-mediated learning were related to seed sorting, planting, weeding, pest and disease management and harvesting.

Seed selection

To get good yields, farmers have to start with good seed. The videos demonstrated the floatation and hand picking methods to sort the seed for planting. The entire process of seed preparation using the two methods and the resultant outcomes in this case the visual appearance of rice fields (of course with anticipation of higher yields) are illustrated in (Figure 10). In the floatation method, farmers were required to add salt to water (to increase the density) and then pour rice into the salt solution which separates good seed from the bad one. The bad seed floats on water as good one sinks. Farmers in Kamwenge district thought that the two methods demonstrated

were not appropriate. The floatation method was perceived to be very expensive because of the cost of buying salt and the hand picking method was considered to be too tedious and time consuming. About the cost of salt, one of the female farmer from Karere village exclaimed;

If for example, I have to plant 3 or 4 acres of rice, I would have to spend a lot of money on salt which is unnecessary. Such methods could be affordable by rich farmers like those in the video looked to be! (Key informant interviews, 17 December 2015).

Having realized (from the videos) the importance of good seed, they started selecting seed for planting when the rice was still in the field. They selected what they considered the best panicles which matured uniformly and kept that for seed. This also ensured uniformity of variety planted unlike before. Farmers did not trust the source of seed sold in the local shops and preferred to do careful selection of their own seed. This illustrates how the knowledge gained in the videos was creatively used to think about new practices which farmers were not doing before.

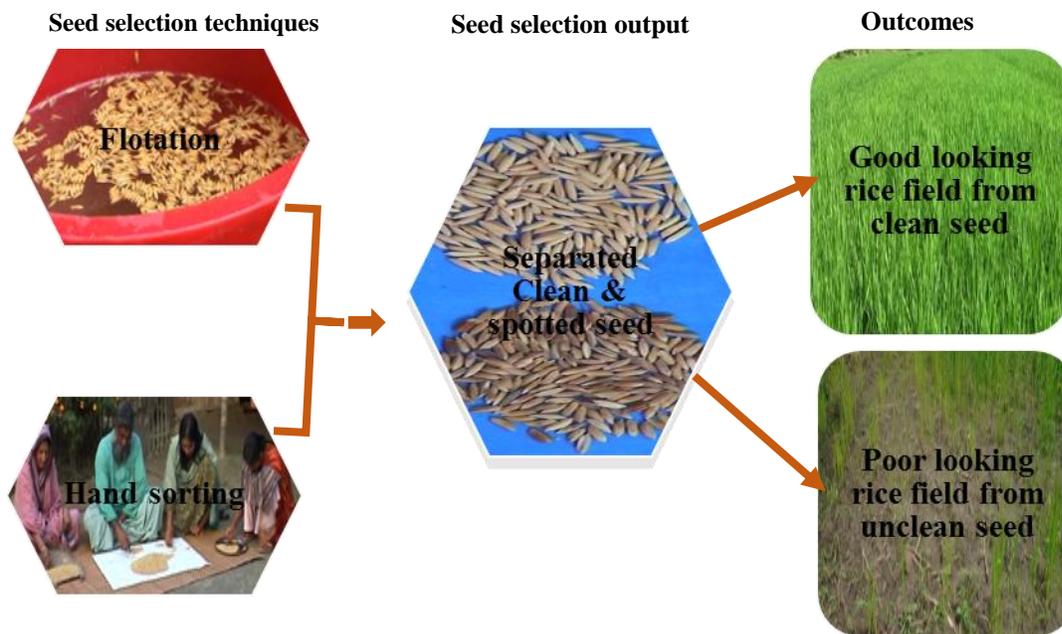


Figure 10: Seed selection process and the associated outputs and outcomes

Planting

In the videos, farmers were exposed to two ways of planting rice in rows, namely using ox-driven planters and using a string (Figure 11) to make furrows to plant rice. The use of oxen was not a common practice and so it was unavailable. The use of a string to make furrows was also considered tedious and required more labour. The important thing is that the video made farmers

appreciate the value of planting rice in rows. Through their own creativity, farmers improvised a fork rake method (Figure 12) with fork-like pieces of metal mounted on a piece of wood or metal. The forks are placed at the row spacing. When the weight is applied on the piece of wood or metal and dragged in the field as shown in Figure 12, it makes furrows where the rice seed is dropped and covered. In Figure 12, a child sitting on the piece of wood or metal applied the needed weight to make the furrows.

After planting in rows, the subsequent operations like weeding, application of chemicals and harvesting became much easier. However, fork rake method had some challenges. Pulling the implement was also tedious but the advantage was that it made several furrows at a go as compared to using a string and hand hoe. This method was therefore not appropriate for the elderly and female farmers. In some instances, it was also difficult to penetrate 2-3 inches depth especially in heavy soils and thus may leave some rice seed exposed to birds. Some farmers applied about 20kgs of sand/soil or a child of equivalent weight on the forked rake to make the appropriate furrow. To use this technology, farmers needed to have a fine seedbed. Thus, video stimulated farmers to develop creative and adaptive innovations through social interactions and sharing (also see Van Mele et al., 2010a; Van Mele, 2011; Zossou et al., 2012).



Figure 12: Planting rice using a string-farmers in the video



Figure 11: A child seated on a forked rake to apply weight for penetration into the ground to make furrows

In the videos, two weeding methods were demonstrated; the use of manual weeders and use of herbicides. Farmers considered the manual weeders to be expensive, time consuming and tedious to push (Figure 13). They preferred use of herbicides (Figure 14), which was less labour intensive than manual weeders. The use of herbicides to control weeds in rice has spread very

fast and at the time of the study, 80% of the respondents used herbicides in combination with hand weeding.



Figure 14: Using manual weeders to weed rice



Figure 13: Spraying herbicides to control weeds in rice fields

Through social learning processes, farmers jointly evaluate and share experiences to inform their choice of practices and technologies to apply. There is however a risk that such social learning process could be dominated by influential people and could deny the shy and less vocal ones from effectively participating and contributing to the learning processes. For example, in learning to apply herbicides, one illiterate farmer who applied a wrong herbicide lost her entire crop. She narrated;

I saw in the video how chemicals were used to control weeds in rice. I saw my neighbor spraying his rice field with the chemical to control weeds and without asking to get guidance on what chemicals to use, I bought a non-selective herbicide (Weed Master) and sprayed my rice too. To my disappointment, all my rice was scorched and dried. My mistake was that I did not ask to know the right chemical I should have applied (Female farmer, December 2015).

As farmers interact and learn from each other through their social networks, more technical support is needed for effective application of the acquired knowledge (Van Mele, Wanvoeke, Rodgers & McKay, 2013; Bentley et al., 2015b). Such technical support helps to clarify issues and provide follow-up guidance to those who may not have fully grasped the knowledge and its application.

Pest and disease management

Incidences of pests and diseases such as rice stalk borers and root rot were prevalent. Much as farmers appreciated the use of pesticides as being essential in controlling pests, only 27% of them applied the pesticides largely due to the cost of pesticides. All farmers interviewed

identified birds as the most serious pest in rice production. However, to their disappointment the videos never presented any method for controlling bird damage in rice. Farmers used several methods to scare birds including making noise and use of scarecrows (Figure 15), but these were not very effective. Near Lake George, some farmers trapped birds using fishing nets (Figure 16) but this is not acceptable from an environment/ecological conservation point of view. To control bird damage in rice, some farmers intercropped millet, maize and rice (Figure 17). The millet was planted two weeks earlier meaning that it matured a bit earlier to attract the birds and divert them from rice. Millet is also grown in the area as a food crop but rice had a higher commercial value than millet. Also to reduce damage by rodents, some farmers planted sweet potatoes around the rice fields to attract and divert rats away from attacking rice (Figure 18). Whereas videos did not provide solutions to all the challenges in rice farming, farmers continued through their interactions to come up with new practices and technologies to address a variety of challenges. What the videos do in this case is to deepen the social learning that allows farmers to explore several potential solutions to the problems experienced including those not addressed by the videos.



Figure 15: Use of scarecrow to scare birds in rice fields



Figure 16: Use of fishnets to trap birds in rice fields



Figure 17: Intercropping rice with millet to divert the birds from eating the rice



Figure 18 Sweet potatoes planted around rice fields to prevent rats from cutting the rice

Harvesting

The use of sickles to harvest rice demonstrated in the video was not generally taken up. Farmers argued that they found the technology not appropriate because their rice varieties do not mature uniformly and yet a sickle would harvest everything including the immature rice (Figure 19). Further, using a sickle meant that they had to bend for long which was uncomfortable and caused back pains. They preferred to continue using hand serrated knives to harvest rice (Figure 20). Similar to rice, they also use hand serrated knives to harvest millet. At the time of the study, only 20% of the farmers interviewed used sickles to harvest rice. As some scholars (Zossou et al., 2009) argue, getting exposed to new ways through video does not mean that people should abandon old ones but use them as a basis for assessing the effectiveness of new ones for efficient adaptation.



Figure 15: Harvesting rice using sickles



Figure 16: Harvesting rice using serrated knives

3.5 Conclusion

Farmer video is among the ICT tools promoted to enhance the effectiveness and efficiency of agricultural extension systems especially in the Sub-Saharan Africa where access to knowledge and technology is a major constraint to agricultural development. The videos are inherently anchored in social learning processes, which is the mechanism for effective farmer learning and change. It is a well-known fact that farmers learn best from fellow farmers (Van Mele et al., 2010b; Zossou et al., 2012) through social learning (MacGregor, 2007). The combination of the audio and visual elements in a video triggers a conversational exchange between farmers who watch the video and extending to those who do not watch the videos. In the conversations, farmers exchange what they have learnt and reflect together to evaluate the feasibility and relevance of the knowledge acquired and technologies observed (See Shaw & Kristjanson, 2014). Through such collective and critical reflections, they experiment and adapt the technologies and practices seen in the videos and even innovate to generate new knowledge and technologies or practices.

This study provides evidence that videos have a high potential to enhance awareness, knowledge acquisition and uptake of technologies. But even more important, the strength of social learning embedded in the video and its triggers on social exchange (See Bandura, 1997; MacGregor, 2007) further enhances collective learning and innovation among farmers. The use of videos in extension however is more effective when combined with other follow-up extension methods which build on and deepen social exchange and learning among farmers. These complementary extension methods offer greater opportunities for developing more videos that could be even

more powerful tools in scaling-up the impact of video-mediated extension as the knowledge and technologies are adapted and new knowledge and innovations have been generated through experimentation. In this way, the video becomes a tool that is continuously used in extension not only to introduce new knowledge and practices but to scale-up technologies and practices that have been adapted through sharing.

Videos are not promoted as substitutes to extension workers in the field but rather as a tool that enhances their effectiveness. Effective use of video-mediated extension points to new competences required on the part of extension workers. First the extension workers will have to have excellent facilitation skills to support social learning processes and secondly be able to record videos of how farmers experiment and innovate to share with other farmers. They will have to learn how to apply the video as a tool for life-long learning rooted in social exchange. Proponents of video-mediated extension will also require a comprehensive assessment of competences required by the extension workers to support the learning processes.

CHAPTER FOUR

EFFECTIVENESS AND RELATIVE ADVANTAGES OF INTEGRATING VIDEOS IN EXTENSION TO ENHANCE INNOVATIONS AMONG RICE FARMERS IN UGANDA

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4.1 Introduction

The Face-to-Face Extension Approaches (F2FEA) targeting individual farmers and farmer groups have been the most dominant in extension service delivery in Uganda (Bashaasha et al., 2011; Cai & Abbott, 2013) and many other African countries. This could be attributed to reasons such as high levels of illiteracy of the farmers, inadequate alternative communication infrastructure development, and historical design of extension services. Among the approaches that have been employed include; Farmer Field Schools (FFS) and Training and Visit (T&V) (Anderson, 2007; Cai & Abbott, 2013; Waddington et al., 2014). These approaches aim at giving first-hand information and on-spot tailored advice to farmers. However, they are expensive in terms of human resource and facilitation needed to reach the many and often widely distributed smallholder farmers. In Uganda, for example, the extension worker to farmer ratio is estimated at 1:3189 (Danielsen et al., 2015), making the face-to-face contact between extension worker and farmers nearly impossible (Chepkoech, 2015).

Even the recent National Agricultural Advisory Services (NAADS) program founded under the strategy for modernizing agriculture did not offer alternative approaches for providing advisory services to farmers apart from the F2FEA. With 72% of the working population engaged in agriculture (UBOS, 2015), effectiveness of extension is critical to national food security and general economy. Recent reforms and restructuring of government service delivery systems such as the structural adjustment programmes (SAPs) promoted by the World Bank and International Monetary Fund (IMF) have been contradictory to their intentions. The intention has been to enhance national food and income security (Development Strategy and Investment Plan [DSIP], 2010), increasing efficiency of service delivery and reducing government expenditure. Yet, the high cost associated with face-to-face extension constrain effective delivery of the service to the

farmers leading to limited access to agricultural information on improved technologies and practices (Chowdhury et al., 2009; FAO, 2014). Food and income security cannot be achieved if farmers have limited access to agricultural information and technologies.

FAO (2014) indicated that only about 18% of smallholder farmers in Uganda access information through conventional extension. Communication channels such as televisions (TVs), radios, videos and telephones can greatly enhance access to information and stimulate learning among farmers (Cai & Abbott, 2013; Bentley et al., 2014a; FAO, 2014). The low extension worker to farmer ratio calls for more innovative ways of delivering extension services effectively to reach large number of smallholder farmers. Alternative approaches to extension service delivery not only need to take advantage of the increasingly available information and communication technologies (ICT) but also emphasize the social interactions among farmers that lead to learning for change i.e. social learning (See Cai & Abbott, 2013). The challenge however is how to integrate these ICTs in the conventional extension approaches given the diversity of socio-cultural contexts and infrastructural development.

In particular, a video-mediated extension approach (VMEA) is believed to foster learning by enhancing knowledge sharing among smallholder farmers (Van Mele et al., 2010a). Videos are appealing to audio and visual senses (MacGregor, 2007; Bentley et al, 2014b) and stimulates joint reflection as farmers discuss what has been observed in the video. The video therefore has a high potential to complement the F2FEA and increase efficiency in terms of influencing learning and innovation among farmers as well as widening coverage and yet minimizing the cost of facilitating extension service delivery. VMEA has been experimented by SG 2000 in promoting learning about new innovations among rice farmers in Kamwenge district in Uganda. In other rice growing areas, the F2FEA was used to promote similar innovations. The contents of VMEA and F2FEA were similar but only differed in the mode of delivery. Irrespective of the training approach, farmers attach similar importance on rice production as the source of food and income (Kijima et al., 2008; Dandedjrohoun et al., 2012). This chapter explores the comparative advantages of VMEA and F2FEA with a view of seeking appropriate integration for complementarity. Cai and Abbott (2013) noted areas of complementarity especially with regard to awareness creation, knowledge acquisition and retention, knowledge use and fostering experience sharing.

4.2 Organization of VMEA and F2FEA

Sasakawa Global 2000 (SG 2000), a Non-Government Organization (NGO) piloted VMEA in Kamwenge district, western Uganda from 2007 to 2010. The videos used were originally developed in Benin. The purpose was to promote better practices and technologies in rice production. Among the practices promoted were; seed selection, land preparation, row planting, weed management, fertilizer application, pesticide application, harvesting technologies using a sickle, threshing using a thresher, drying rice on tarpaulins and quality management. The video shows were open for all people interested to attend. Mobilization for attendance was through churches/mosques, farmer groups and associations like Mahyoro Rice Farmers Association (MARFA), and posters in strategic places. The video shows located at MARFA run on specific days (commonly Fridays) from 7:30pm-10:00pm. The VMEA experiment was in Mahyoro sub-county in Kamwenge district.

In another district (Hoima district) the F2FEA was exclusively used to promote similar practices and technologies among rice farmers mainly with the support of Hoima District Farmers' Association (HoDFA) since late 2007. The extension workers targeted farmers in groups (20-30 farmers) as well as individual farmers. Different from the SG 2000, HoDFA targeted farmers with at least one acre of rice or more but also met specific requirements such as commitment to participation in training and having subscribed to HoDFA membership. Unlike the videos that were shown in a central place, the face-to-face trainings were organized in convenient places close to the farmer groups.

4.3 Conceptual Framework

The core element of any extension approaches is to influence farmer learning to change their practices and technologies more efficiently. The farmer learning processes involve raising awareness; knowledge acquisition and retention; knowledge evaluation; knowledge use through experimentation and adaptation; and sharing of experiences including newly generated knowledge. Each extension approach aims at triggering these processes though in different ways. The needs of the farmers become the organizing principle for content delivered through particular extension approaches (Bentley et al., 2015a) but ultimately the learning follows the process. The farmer innovations which are the principle outcomes are a result of farmer learning processes triggered by various influencing mechanisms embedded in the extension approach (Zossou et al., 2010; Cai & Abbott, 2013). The extension approaches may vary in strengths with

regard to influencing different stages of the learning process. On this basis, a framework for comparing the relative advantages of VMEA and F2FEA is illustrated in Figure 21.

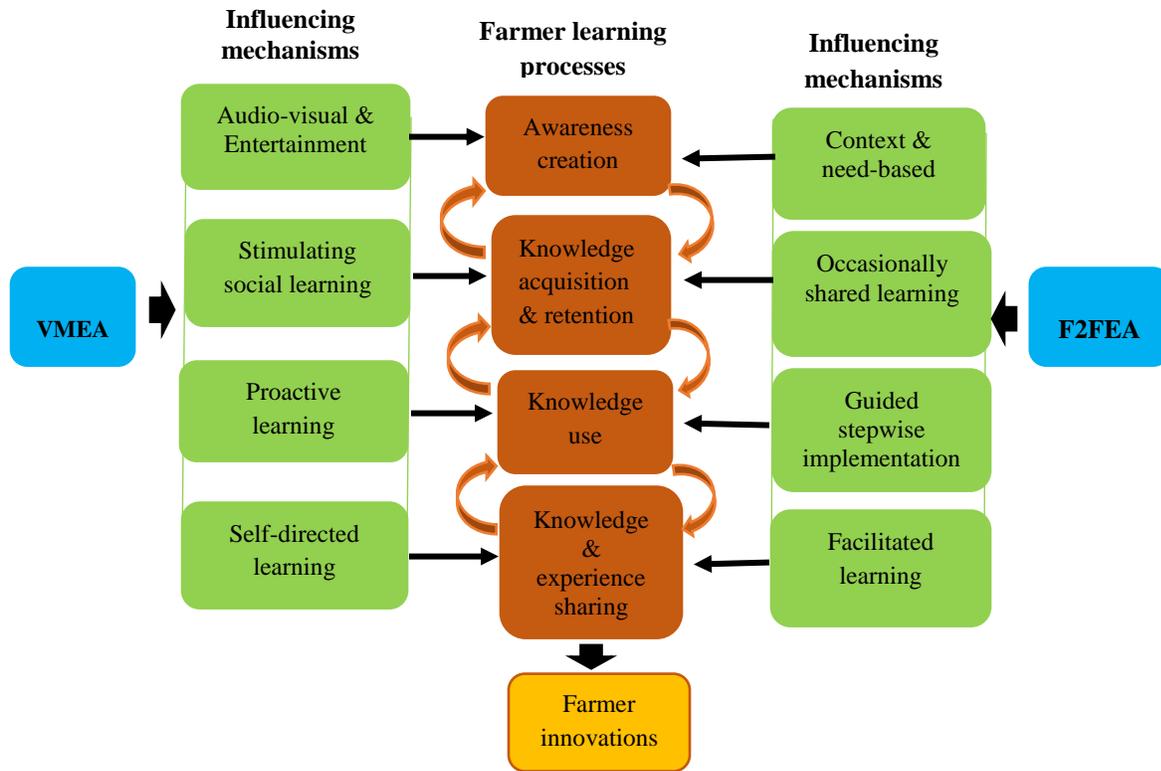


Figure 17: A framework for assessing farmer learning to enhance innovation through VMEA and F2FEA

In addition to dissemination, the videos have an entertainment element which attracts many people (including non-farmers) to be exposed to the knowledge and information contained in the video. It is therefore a powerful tool in creating awareness whether the people who attend will need to use the information or not. It is known from literature that videos have the power to stimulate discussions among the viewers leading to acquisition and co-generation of knowledge; thus enhancing the memory (Bandura, 1997; MacGregor, 2007; Bentley et al., 2015a). This indicates the power of video to trigger proactive learning among farmers. Proactive learning here refers to a situation where farmers take initiative and explore ways of learning whatever they wish to learn in an interactive manner. This kind of engagement is situated in social learning concept based on exchanges and co-influencing each other to co-create knowledge and experiences. The relevance of social learning concept and theory in farmer learning processes has been explored in detail in Chapter 3. Interactive videos allow for farmer-driven interactions known as self-directed learning; important in enhancing farmer learning processes (Van Mele,

2011; Chepkoech, 2015). When learners have control over their learning they tend to exhibit more engagement; a key attribute of video-mediated extension.

The F2FEA involves a guided step-wise organization and delivery of information with inherent opportunity for individual farmer monitoring and technical backstopping. This is different from VMEA where the learning triggered by the video is driven by the farmers themselves who may occasionally seek for technical support depending on perceived need. The individual monitoring and follow-up is a strong element of the F2FEA (also see Cai & Abbott, 2013). In F2FEA where the knowledge sharing is basically guided and facilitated by the extension worker limits the social learning process (Chepkoech, 2015). Still, the importance and relevance of social learning concept and theory in farmer learning process has been discussed in detail in Chapter 3. Though sometimes the knowledge delivered in F2FEA is based on the needs of farmers, the content is largely determined by the extension worker.

Conceptually, VMEA and F2FEA if applied in combination can enhance innovation (Shanthy & Thiagarajan, 2011; Cai & Abbott, 2013; Chepkoech, 2015). The two approaches influence the farmers to innovate in different and complementary ways. While VMEA has comparative advantage of creating awareness through audio-visual power and stimulates social learning, F2FEA is better suited for context based needs and individual follow-up with technical support. If the self-directed learning stimulated by VMEA is complemented by good facilitation by the extension worker, the results will be even greater. Figure 21 provides the developed framework for discussing the potential complementarity of VMEA and F2FEA in the context of SG 2000 and HoDFA in Kamwenge and Hoima districts respectively.

4.4 Methodology

A cross-sectional study of two non-equivalent groups preceded by focus group discussions were conducted in Mahyoro sub-county, Kamwenge district and Buhimba sub-county, Hoima district to assess the effectiveness of VMEA and F2FEA with regard to enabling access to agricultural information and learning among rice farmers. The descriptive features of the two districts are presented in Appendix 2. The semi-structured individual interviews were followed by home visits of purposively selected farmers from each category to assess how the farmers applied the learnt knowledge and establish the innovations. The two approaches were used separately in the two sub-counties to promote better rice production practices and technologies. Eight villages

were covered by VMEA in Mahyoro sub-county and the same number of villages were covered using the F2FEA. These villages were purposively selected because it is where the interventions on rice production were implemented. Respondents were selected from two local farmer organizations: Mahyoro Rice Farmers Association (MARFA) in Mahyoro sub-county in Kamwenge district and Katweyambe Farmers' Cooperative Society (KAFACOS) in Buhimba sub-county in Hoima.

The study was conducted in three phases. The first phase involved conducting 12 focus group discussions (FGDs); six for Kamwenge district and six for Hoima district. A total of 96 farmers participated in the FGDs. The purpose of the FGDs was to gain insights from farmers exposed to VMEA and F2FEA about the influence of the two approaches on learning and use of new practices and technologies in rice production. Specifically, the focus was on access and awareness creation; acquisition and retention; application and sharing of rice related knowledge and experiences. The insights gained from the FGDs were used in the formulation of the semi-structured individual interview instrument to quantify how the farmers were impacted by the two approaches. Out of 100 farmers who were on record to have participated in VMEA implemented by SG 2000, a Non-Government Organization (NGO) in Kamwenge district, 48 participated in the FGDs. Equal number of FGDs were selected for farmers in Hoima district from a total of 96 farmers. These were selected based on location from their homes to the video or training venues (Figures 22 and 23) and experience in rice production. Farmers who had grown rice for at least 15 years were preferred for the FGDs.

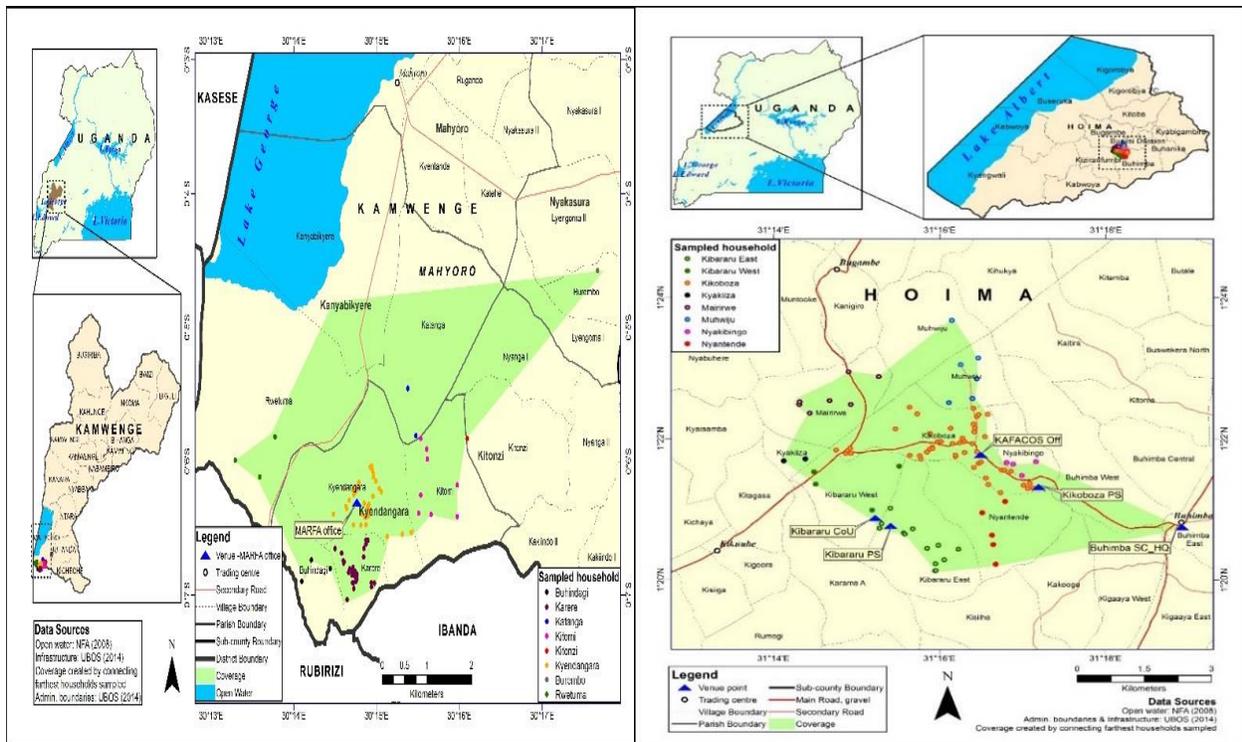


Figure 19: Catchment area and distribution of video farmers

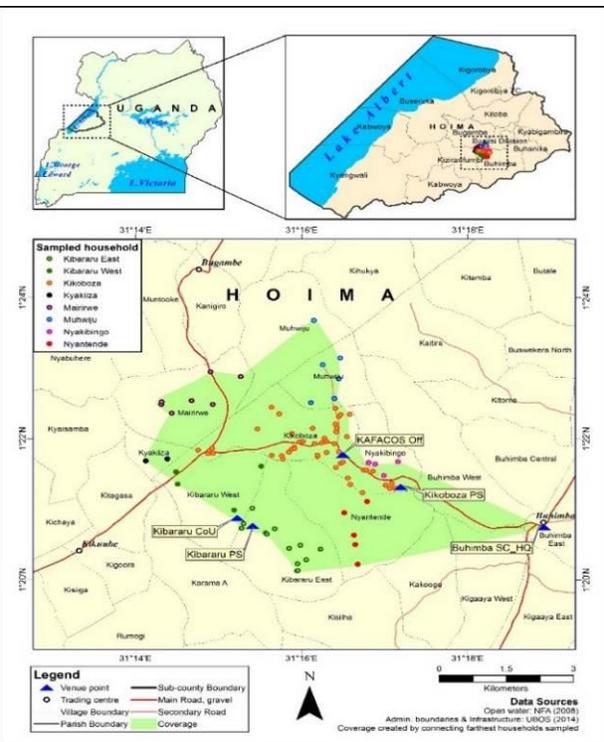


Figure 18: Catchment area and distribution of face-to-face farmers

The second phase of the study involved conducting semi-structured individual interviews with 196 farmers from the two districts for purposes of comparison of the influence of the VMEA and F2FEA to farmer learning. The 100 farmers (71 males and 29 females) who were exposed to VMEA and the 96 (61 males and 39 females) who were exposed to F2FEA were all subjected to the semi-structured individual interviews. Because of the nature of data, comparison of the two approaches in influencing various levels of learning were measured as follows:

- Awareness creation was measured by the new practices and technologies that farmers were exposed to through VMEA and F2FEA. Farmers indicated how many new practices and technologies they were aware of as a result of exposure to video shows and face-to-face trainings. However, I was aware that VMEA and F2FEA could have enabled more awareness of even the practices and technologies the farmers knew before.
- Knowledge acquisition and retention was measured by the details on relevance and application of the specific practices and technologies communicated through VMEA and F2FEA. The difference between the two approaches was an indicator of the knowledge acquired and retained.

- Knowledge use was measured by the number of new practices and technologies farmers applied after watching the video or attending the face-to-face trainings. What farmers were able to apply indicates the proportion of knowledge put into use in relation to what they learnt from the video or face-to-face trainings.
- Knowledge sharing was measured by farmers' confessions on sharing what was learnt in video or face-to-face trainings with other farmers before and after application.

The third phase involved conducting eleven home/field visits (six in Kamwenge district and five in Hoima district) to observe the practices and technologies implemented by farmers and the context in which they were applied. The farmers visited were identified by the researchers during the FGDs. Farmers who expressed outstanding knowledge and practices were preferred for the home visits.

Qualitative data generated through FGDs and field observations were analyzed using content analysis to extract related information on the major themes of the study. The data generated through semi-structured individual interviews were analyzed using the Statistical Package for Social Scientists (SPSS) version 18.0. Descriptive statistics and inferential statistics such as independent samples t-tests (for awareness creation, knowledge acquisition and retention and knowledge use) and Chi-square (for knowledge and experience sharing) were used to compare the two groups studied. The effect sizes (r) were indicated to illustrate the influence of VMEA and F2FEA on awareness, knowledge acquisition and retention and knowledge use.

4.5 Results and Discussion

4.5.1 Socio-demographic Characteristics

Table 5 summaries the profile of farmers exposed to VMEA and F2FEA.

Table 5: Socio-demographic characteristics of farmers

Variable	Type of approach	
	VMEA (n=100)	F2FEA (n=96)
	%	%
<i>Sex</i>		
Males	71	62
Females	29	38
<i>Age</i>		
Below 30 years	25	20
Between 31-50 years	54	52
Above 50 years	21	28
<i>Level of education</i>		
No formal education	89	45
Formal education (not beyond primary)	11	55
<i>Distance to place of training or video show</i>		
Less than one kilometer	27	72
One to two kilometers	53	19
Three to four kilometers	17	9
More than four kilometers	3	0
<i>Major occupation of respondents</i>		
On-Farm activities	98	74
Off-farm activities	2	26
<i>Group membership</i>		
Yes	30	75
No	70	25
Land allocated to rice production (Acres)	1.5	1.9

Source: Household survey 2015

The sample comprised of more males served by both VMEA and F2FEA than females though F2FEA involved more females than VMEA. Nearly equal proportions of farmers that participated in the VMEA and F2FEA were in the middle age category of 31-50 years. It is however important to note that more youth (below 31 years) attended the VMEA compared to the F2FEA. This is possibly due to the entertainment element in the VMEA which attracts more youth. The majority of farmers who attended VMEA travelled one kilometer or more to the venue of the video shows, while for the F2FEA, 72% travelled only less than one kilometre to the training venue. This illustrates the power of video in attracting farmers including those from far to get exposed to the information and knowledge constrained in the videos. The distance however coupled with the timing of the video can be a constraint to the female farmers because of their multiple gender responsibilities. Because the video was non-discriminative, the diversity of farmers in VMEA was greater in terms of membership to groups, distance from the point of action (video show or training venue) and age mix. This diversity is also very important in social learning as knowledge and experiences are generated and shared from a wider scope. The F2FEA has the tendency to target people with specific characteristics like in this case membership to HoDFA and other related conditions. Surprisingly, nearly all farmers (98%) who attended the VMEA had no other off-farm activities as compared to only 74% in the F2FEA that were not engaged in off-farm activities. This is surprising because the VMEA attracts people at random and the reverse would have been expected as compared to the F2FEA who were already preselected on the basis that they were farmers. This is better explained by the location of the two study sites rather than a characteristic of the extension approach used. Mahyoro where VMEA was experimented in Kamwenge district is surrounded by a national park and so had less opportunities for off-farm activities as compared to their counterparts in Hoima district. In the F2FEA, 26% of the respondents did not consider farming to be their major occupation, the off-farm activities were more important to them such as brick making and motor cycling (locally known as *boda boda* riding). On average land area allocated to rice production for farmers who participated in VMEA and F2FEA were 1.5 acres and 1.9 acres respectively.

4.5.2 Effectiveness of VMEA and F2FEA

Table 6 shows the comparison between VMEA and F2FEA in fostering learning with regard to the 12 rice production practices and technologies promoted by both approaches. Because of the

nature of data, comparison of the two approaches are compared using the t-test for the parameters on awareness creation, knowledge acquisition and retention and knowledge use. The other parameter (knowledge and experience sharing) is compared using the Chi-Square.

Table 6: Comparison by awareness creation, knowledge acquisition and retention, and knowledge use

Attribute	Mean difference of practices		Comparison between VMEA and F2FEA		
	VMEA	F2FEA	t-test	Sig.	df
Awareness creation	73	5	2.802	0.006***	194
Knowledge acquisition & retention	9	8	1.819	0.071	194
Knowledge use	4	6	-3.586	0.000***	194

*** $p < 0.01$

Source: Household survey

Awareness creation

The difference in awareness creation about the practices and technologies was significant for the two approaches at 1% level of significance ($t=2.802$; $p < 0.01$, $r=0.19$). The VMEA exhibited more awareness about the practices and technologies than the F2FEA. Other scholars namely; Cai and Abbott (2013) and Chepkoech (2015) reported similar findings. Ninety five percent of the farmers who participated in VMEA attributed their awareness to some attributes of the videos such as clarity and attractiveness of images, and interest stimulated in an entertaining way. One of the farmers in Katanga village explained his experience as follows;

We were very attentive while watching the video because the images were clear and attractive. The demonstrations and explanations in the videos keep one interested and entertained as well. The farmers demonstrating in the videos make the messages relevant and learning from a fellow farmer makes it interesting (FG interviews, Mahyoro sub-county, Kamwenge district, 23 August 2015).

The F2FEA relies on the facilitative skills of extension worker (trainer) who may not be clear and humorous to enhance memory. Further the content to be delivered is determined by the extension worker, though sometimes it may be based on the farmer needs. Farmers served by

F2FEA revealed that the trainings were more theoretical while farmers preferred to learn by engaging in real-life activities such as demonstrations. Sustaining interest throughout the learning process was difficult as some farmers felt bored even with some energizers to keep the farmers alert. Observations of some training sessions (in Muhwiju village, Buhimba sub-county) by the researcher noted that some farmers dozed during the training session, an indication of boredom or failure to sustain attention on the part of the trainer.

The video even if it is not in the local language can easily be understood by people with no formal education because of the visual element. Farmers can see the practices and relate with what they do in their own situations. This explains why over 89% of the farmers most of whom had no formal education were aware of the new practices and technologies demonstrated in the videos as compared to 45% of face-to-face trainings (Table 6). What is essential to make VMEA effective at this stage is to ensure that the announcements for the video shows is as wide as possible. The target people will come by themselves as compared to the mobilization required for a village based training. In terms of creating awareness therefore the VMEA is more effective and yet cheaper in terms of mobilization compared to the F2FEA. In this respect, VMEA created more awareness even though videos in Kamwenge district were shown less times than the trainings in Hoima. Specifically, 19% of the farmers who participated in VMEA were aware of all the practices and technologies promoted after attending the video only once, and this increased to 49% when farmers attended the videos twice. To the contrary only 13% of the farmers were aware of all the practices and technologies promoted after attending the training once, and this increased to 25% after attending training the second time. Farmers suggested that they would have wished to watch the video at least twice a month partly to internalize the messages and learning, and widening the scope of exposure/awareness but also as a form of entertainment in the community.

Knowledge acquisition and retention

As results in Table 6 show, there was not significant difference in knowledge acquisition and retention between VMEA and F2FEA approaches. Knowledge retention is more of a personal attribute though the learning approach could enhance it. This is possibly why there is no significant difference between the two approaches. Knowledge acquisition and retention is reinforced by the level of sharing among the farmers. More than half of the farmers who

participated in VMEA reported sharing their understanding of what they had watched with fellow farmers as compared to only 12% in the F2FEA. However, farmers who participated in the F2FEA had more opportunities to consult with the extension worker (22%) than their counterparts in VMEA (12%). Thus, video allows farmers to create mental images, through imagination, attach labels to things and voicing verbal description of what was observed, thus demonstrating its ability to enhance memory of farmers compared to F2FEA. These findings provide a clear justification why VMEA and F2FEA should be integrated to complement each other in order to cause technical change among farmers as affirmed by Zossou et al. (2010), Cai and Abbott (2013), and Chepkoech (2015).

Knowledge use

Irrespective of the type of approach that is used to train farmers, not all that is acquired and retained was applied. Results in Table 6 show that farmers who participated in VMEA applied less of the acquired knowledge than those who participated in F2FEA. The difference was highly significant at 1% level of significance ($t=-3.586$, $p<0.01$, $r=0.25$). This was because in F2FEA, farmers were followed up either in groups or as individuals after the training to offer them more technical support to enable use of the acquired knowledge. This was less in VMEA as the SG 2000 extension staff could not provide similar follow up support. In this respect, F2FEA is more effective in enabling application than VMEA. This explains why 82% of farmers who participated in F2FEA were able to properly select and sort their seed prior to planting as compared to 50% who participated in VMEA to do the same. However, VMEA inspired farmers in Kamwenge district to come up with their own way of obtaining better seed than using what was demonstrated in the videos. Sorting of seed prior to planting as demonstrated in the video was considered very tedious and instead farmers having realized the importance of good seed, they selected the best heads (panicles) which matured uniformly in the field before harvesting and reserved these for seed. Here, the awareness had gone a step further to explore appropriate ways of obtaining better seed than they were using before.

The field days used as a follow-up method in VMEA enabled farmers to contextualize, adapt and repackage the knowledge including what was generated through their own experiences in a manner that it can easily be shared with others through songs and drama in the local language. The songs/drama were sung or acted on the field-days which were attended by many other

farmers including those who never watched the videos. How these were organized and implemented are clearly explained in Chapter 3. Therefore, the strong social learning element in VMEA if integrated with the technical back-up in F2FEA, the application and adaptation of practices and technologies, hence innovation is likely to be higher. The songs documented on farmers organized in groups through F2FEA, for example, could be disseminated through other media such as radios which most extension workers employ and have become more accessible everywhere in the country and elsewhere (also see Okry et al., 2014).

Knowledge and experience sharing

Analysis showed an association between the extension approach used and level of sharing knowledge among farmers ($X^2(194) = 9.265, p < 0.05$). A large proportion (86%) of farmers who participated in VMEA reported to have shared the knowledge they acquired and or generated through their own practice compared to 67% of those who participated in F2FEA. The audio-visual nature of video coupled with its potential to entertain, triggered the viewers to continue reflecting, innovating, experimenting and adapting what they learnt (MacGregor, 2007). This implies that the video because of its interesting and motivating images, enhances self-directed learning associated with knowledge and experiential sharing among farmers themselves. Seeing farmers from Benin struggling by devising possible means surprised farmers in Kamwenge district and this was enough to motivate them to start sharing information with each other. Videos thus offer better opportunities for farmers to initiate and direct their own learning through sharing experiences compared to F2FEA. Video can elicit spreading of knowledge through social networks in situations where extension workers are scarce because of its ability to foster proactive and self-directed learning among farmer (Chepkoech, 2015). The results suggest that if video is complemented with F2FEA more knowledge sharing among farmers would be enhanced; thus making learning more permanent because farmers will be learning from their experiences. Integrating video with F2FEA provides an opportunity for farmers to promptly seek clarification and guidance on particular aspects shown in the video; thus allowing for more facilitated self-directed learning.

4.6 Summary comparison of VMEA and F2FEA

VMEA and F2FEA are complementary approaches which could be integrated for better efficiency of extension services delivery. Table 7 presents a summary comparison of the relative

strengths of VMEA and F2FEA at the different stages of the farmer learning process as established in this study.

Table 7: Summary comparison of relative advantages of VMEA and F2FEA

Learning stage	VMEA	F2FEA
Awareness creation	<ul style="list-style-type: none"> • The entertainment element attracts wider range of audience from a wider coverage • Arouses and sustains interest and curiosity throughout the process • Cheaper in terms of mobilization and outreach since one extension worker can reach many farmers at a time 	<ul style="list-style-type: none"> • The content delivered is predetermined and based on context and sometimes the farmer needs • If well-organized it is a good approach for targeting information to specific individuals or groups
Knowledge acquisition and retention	<ul style="list-style-type: none"> • Farmers learn from fellow farmers demonstrating in the video • Video enhances the memory of farmers because of the audio-visual images 	<ul style="list-style-type: none"> • Localization of content to suit local context • Localization of language to enhance comprehension • Provides clear and specific information easy to acquire and retain
Knowledge use	<ul style="list-style-type: none"> • Stimulate and encourages proactive learning among farmers • Video fosters creativity through experimentation and adaption • Through creative means, video fosters repackaging of messages for common understanding before full application • Fosters demand driven technical backstopping 	<ul style="list-style-type: none"> • Training is complemented with follow-ups for more technical support • Application of acquired knowledge is effective at individual farmer level
Knowledge and experience sharing	<ul style="list-style-type: none"> • Audio-visual nature of video elicits and triggers self-directed learning • It allows for experiential learning as farmers can see and relate what is being demonstrated in their own context • Through creative knowledge sharing mechanisms, video allows a wider sharing of information even beyond the scope 	<ul style="list-style-type: none"> • Topic of discussion is pre-determined by extension worker for effective facilitated learning • It allows for immediate knowledge sharing as it is planned and well-guided by the extension workers

An analysis of comparison of relative strengths between VMEA and F2FEA in raising awareness, enhancing knowledge acquisition and retention, knowledge application and sharing of knowledge and experiences between farmers indicate that, the two approaches can work best in combination. Through video, farmers employ both seeing and hearing senses in order to learn better, which is often lacking in face-to-face training (Chepkoech, 2015; Zossou, Van Mele, Vodouhe, & Wanvoeke, 2009; Zossou et al., 2010). Because of the clear and attractive images coupled with demonstration of practices and technologies in the video, farmers' attention and curiosity are enhanced (Bentley, Van Mele, Harun-Ar-Rashid, & Krupnik, 2015) and if integrated with F2FEA would be more interesting and less boring (Bede, 2016; Chepkoech, 2015). Even with the use of video, farmers are able to get better motivated to learn about new experiences from other farmers including those from foreign countries compared to F2FEA.

Overall, the findings suggest that video can effectively complement the F2FEA in Uganda especially in targeting marginalized resource poor farmers mobilized in groups particularly women, youth and those with relatively low prior knowledge about new practices and technologies. In general, use of video in extension enhances more awareness, stimulate demand for technical support, foster farmer-to-farmer learning and enhance innovativeness, and creativity among the farmers. Appropriate integration of the two approaches implies that ICT developers and policy makers need to acknowledge that the two approaches cannot produce a desired farmer learning to enhance innovation in isolation but complement each other to ensure more effective and self-directed learning

4.7 Conclusion

A comparison of effectiveness of both the VMEA and F2FEA in fostering learning and innovation among rice farmers indicate that, on one hand, VMEA is more effective in arousing awareness and enhancing self-directed learning through fostering knowledge and experience sharing. The F2FEA, on the other hand, better supports knowledge application through a guided technical backstopping. This illustrates perfect complementarity in the farmer learning framework to foster innovations and adaptability to the myriad of challenges in farming practices exacerbated by climate change phenomenon. A social learning concept is central to the learning framework, empowering farmers to play a central role in their own learning and innovation but also drawing on external knowledge and practices to adapt to their own peculiar conditions and

needs. Whereas VMEA and F2FEA are currently fronted and practiced as alternative approaches, they have greater potential for effectiveness and efficiency when integrated. On the contrary, the notion that ICTs can replace the human face (in this case, the extension worker) is rather misplaced as this study reinforces the critical importance of enough and competent extension workers than ever before. The diversity of enterprises of the smallholder farmers and increasing complexity of environmental, economic and social factors demand for more and competent extension workers. However, the roles of the extension workers may shift more towards facilitation of social learning processes and brokerage of knowledge, practices and technologies. Videos can make extension workers more effective but the extension workers will need to be more versatile in the use of videos including producing informative video clips and appropriately utilizing them in various aspects of their work. Appropriate institutional arrangements and technical capabilities will be essential for meaningful integration of VMEA and F2FEA towards a holistic and integrated extension service delivery system.

CHAPTER FIVE

GENERAL DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

Agricultural extension plays an important role in disseminating knowledge, technologies and agricultural information through appropriate extension approaches and tools (MAAIF, 2016). Despite other commonly used ICT tools such as computers, TVs, radio, telephone, video is one of the communication tools used by extension workers to disseminate information to farmers (Bentley et al., 2015a; FAO, 2014). In Sub-Saharan Africa (SSA), the use of video is recognized as a key communication tool to catalyze effective knowledge transfer to rural areas. However, effectiveness of video is based on whether it enhances access to information and foster social learning to elicit innovation among farmers. The study points out whether videos could make an effective complement to other conventional extension approaches in enhancing extension service delivery by enhancing access and social learning among rice farmers in Uganda. This chapter presents a synthesis of the role and potential of farmer videos like any other ICTs in making extension system more effective. The chapter also gives the general conclusions and recommendations for practitioners, policy and future research.

5.2 Enhancing Access and Use of Agricultural Information

The introduction and use of ICTs such as video was intended to reduce some gaps in the conventional extension approaches in attempts to enhance access to information and fostering more integrated social learning to enhance innovation among farmers (Cai & Abbott, 2013). However, the findings in Chapter 2 reveal that the use of video has the potential of reaching majority of the marginalized rural poor and illiterate people amidst the structural and logistical challenges faced by the extension. Evidently, use of videos like any other ICT tools open new windows of opportunity for leveraging the already constrained extension systems in SSA including Uganda (David & Asamoah, 2011; FAO, 2014). Video presents a promising extension communication tool with a potential to enhance access and use of information among farmers because of its capacity to arouse awareness and learning about new practices and technologies (Zossou et al., 2009; Vidya & Chinnaiyan, 2010). But its effectiveness as an extension tool is compromised by the way the video shows are organized and operated to enhance a more inclusive service delivery. For example, the investigation in Chapter 2 indicated that the physical

location and timing of video shows tended to favour attendance by more males and nearby people than their counterparts. Thus, the place and time where and when videos are shown is crucial to allow for inclusive participation (Van Mele et al., 2011); as this would prevent the selection bias against participation by females who culturally and by their low social status are limited in their movements (Zossou et al., 2010; Bentley et al., 2015b). Yet, females are the majority (70%) providing most of the agricultural labour force (MAAIF, 2016). Therefore, if videos are publicly held in villages where females reside at the convenient time, they are likely to reach more females (Bentley, Boa & Salm, 2016). This clearly confirms the findings in Chapter 2 where farmers suggested that redesigning the mode of video operations by rotating them across parishes or villages and starting early at midday or later in the evening would allow more involvement of females, elderly and distant farmers. This demands use of local languages in documenting videos on local farmers (people watching the video in their own context) to enhance easy comprehension and utilization of messages and also foster easy identification with actors for further consultations and learning. It also requires more effort and resources to make learning videos accessible to farmers in their respective local languages (Bentley, 2016; Bentley et al., 2016). Therefore, in Uganda and elsewhere, efforts to reform the agricultural extension service delivery need to target approaches and tools that enhance access to information; of course with implications of fostering a more integrated social learning among farmers.

5.3 Triggering social learning: Implications for integration of VMEA in F2FEA

In developing countries, enhancing farmers' access to agricultural information through ICTs is not enough. It is vital for these ICTS especially video to foster social learning to enhance farmer innovation for social development (Kilelu, 2013; Bentley, Van Mele, Zoundji & Guindo, 2014a). This means that extension methods for behavioral change among farmers need to embrace the basic principles for social change illustrated in the social learning theory in Chapter 3. Thus, access to information by farmers must translate into triggering social learning and thus development of the agricultural sector (Bentley, Van Mele, Okry & Zossou, 2014b). However, effective social learning that leads to enhanced farmer innovations requires an integrated extension approach to service delivery. Failure to embrace social learning principles in any agricultural information delivery system in this case the face-to-face extension approach (F2FEA) limits interactive, self-guided learning and experiential sharing. In chapters 3 and 4, results indicate that videos seem to have potential in enhancing social learning by fostering self-

initiated and directed knowledge and experiential sharing among farmers; which are key elements for integration into the F2FEAs. Evidently, results indicate that videos shown to farmers in Kamwenge district influenced farmer learning by arousing awareness, enhancing knowledge acquisition and retention knowledge application and knowledge and experience sharing in practices and technologies like planting in lines, timely weed control, use of tarpaulins and seed selection (Chapter 3). In this case, video through its powerful, attractive and clear images triggered social learning processes; which is cardinal for farmer learning in order to innovate (Van Mele et al., 2016). Hence, the power of video to create and sustain the attention and curiosity of viewers and eventual sharing of information to foster peer learning among farmers makes it an effective complement of F2FEA (Van Mele et al., 2007; Cai & Abbott, 2013).

Similarly, establishment of complementary extension methods such as demonstrations, field-days and farmer exchange visits provide greater opportunities for making videos that contain adapted technologies and farmer innovations for future scaling-up. If these complementary methods are well facilitated and video recorded they can clearly illustrate the strengths of social learning which are necessary for effective integration of videos in extension. In the social learning process, farmers' innovations are likely to be shaped by the social interactions and networks that emerge as farmers attempt to experiment the acquired knowledge and experiences (Kibwika, 2007; Danielsen et al., 2015).

Analysis of effectiveness and relative advantages between VMEA and F2FEA in Chapter 4 clearly indicate that the two approaches are complementary in making extension service delivery more effective. In particular, VMEA seem to have potential of mobilizing more people because of its entertainment nature. Thus, if video is integrated in extension, more awareness creation can be achieved by only one extension worker reaching many farmers at once (David & Asamoah, 2011; Shanthy & Thiagarajan, 2011). As earlier pointed out, the audio-visual attributes in the video are key aspects in building and deepening social learning among illiterate farmers (Newell, Dale & Winters, 2016); thus offering greater opportunities for extension workers to be more efficient (Cai & Abbott, 2013). The follow-up visits from extension workers through F2FEA are crucial for promoting knowledge application and if integrated in video, more proactive learning can be achieved. Finally, when deciding on the type of extension approach with characteristic

features of fostering self-initiated and directed learning among diverse groups of rural people, video seem to have potential (Mehrabian, 1981).

5.4 General Conclusion

The introduction and use of videos by SG 2000 in Kamwenge district of Uganda from 2007-2010 was meant to enhance access and learning among rice farmers about better rice production practices and technologies. The results revealed that VMEA seems to present an alternative extension approach in enhancing access to agricultural information particularly among the illiterate farmers. However, the physical distance to where SG 2000 showed videos and the timing when the video shows commenced and ended tended to compromise attendance by different social groups especially the females, elderly and distant farmers.

Conversely, the video created more awareness about new rice production practices and technologies because of its powerful, attractive and clear images that attracted the attention and curiosity of participants. These positive attributes seem to be effective in enhancing knowledge acquisition and retention, application and sharing of knowledge and experiences among farmers. Thus, if videos are integrated in farmer trainings, the farmers are likely to acquire more knowledge and even trigger sharing of knowledge and experiences to enhance innovation.

The use of videos in extension is being fronted as an alternative to the conventional F2FEA. However, the results challenge the independent use of the two approaches. The results indicate greater potential for integration of VMEA and F2FEA as the two are complementary in the various stages of the farmer learning framework developed (Chapter 4). On one hand, VMEA is significantly better in awareness creation and sharing of knowledge and experiences. On the other hand, F2FEA is significantly better at enhancing knowledge acquisition and retention and application. The relative advantages of VMEA and F2FEA can best be harnessed through integration of the two approaches. Though, the integration may not solve the problem of large farmer to extension worker ratio common in developing countries but will rather make the extension workers more effective. Evidently, when video is integrated into face-to-face trainings, it can promote proactive learning among farmers and also initiate and sustain self-directed learning through triggering interactions and sharing of knowledge and experiences. However, the integration calls for rethinking of institutional arrangements, roles of the extension worker, and

pragmatic retooling of the extension workers to embrace the social learning principles that empower farmers to be more self-directed learners and innovators.

5.5 Recommendations for practitioners, policy and future research

a) Practitioners - Sasakawa Global 2000 and other implementing organizations

The timing of video shows that accommodates different categories of community members should be considered. This is because the suggested time by farmers for showing videos (midday) may again exclude some categories of people. So, maintaining dialogue and consensus coupled with flexibility to ensure equity sounds to be a better option for effective video-mediated learning.

Other than locating the video shows at one central place, there is need to rotate the video shows across the respective villages or parishes where farmers reside to enhance more access and coverage of video services especially by women, elderly and distant ones. The first action should be to target farmers organized in groups at village or parish level for more inherent social learning to occur.

For integration purposes, the study revealed that there are strategies that can be tapped into and employed to reinforce social learning beyond video such as demonstrations, field days and exchange visits. There is need for a video recording of the learning processes that occur at these complementary methods that provide a valuable learning resource for farmers to share their real-life experiences to influence attitude change. Besides the cost implications, experiences shared through songs and drama need to be video recorded and used for further dissemination of knowledge to other communities.

Any future scaling out strategy of video events should target to include mechanisms aimed at gathering farmers' feedback on a regular basis to ensure that video operations are more effective in targeting the right audience by meeting their production needs. This may involve having local change agents per parish charged with gathering feedback from farmers and later submit it to the organizational staff for better improvement in the implementation of videos.

There is need to record the video on local farmers in their specific native languages to allow for easy comprehension of messages and aid in identification with actors to quickly adapt and customize the messages got from the videos to their local context.

b) For policy makers

For more out-scaling and up-scaling of videos in Uganda, technical support from AccessAgriculture is needed for MAAIF through the Department of ICT to provide a retooling training in monitoring and evaluation of video events to extension staff. This helps to equip them with the necessary knowledge and skills to ensure more effective video-mediated learning. This will as well provide extension workers more excellent facilitation and monitoring skills to support social learning processes.

c) Future research

As there are new directions towards reforming extension service delivery in Uganda, further research needs to be undertaken to establish the optimum financial requirements needed to integrate and operationalize video-mediated extension to ensure optimal access and farmer learning in Uganda.

An integrated extension service delivery needs to ensure that gender issues and related factors are addressed to ensure more equitable access and learning among the targeted communities. Therefore, further studies need to be designed and conducted in gender related issues focusing on rural institutions and their implications on access, learning and adoption of technological innovations.

It is important that future projects are preceded by the baseline studies to assess behavioral changes associated with the role of video in taking up practices and technologies on diverse crop enterprises perceived to be of commercial value in enhancing food and income security of smallholder farmers.

Future research should be designed for a comprehensive assessment of institutional arrangements and technical competences required by the extension workers to support the video-mediated learning processes. This will pave way for effective integration of videos in extension to guarantee more sustainable implementation at local government level.

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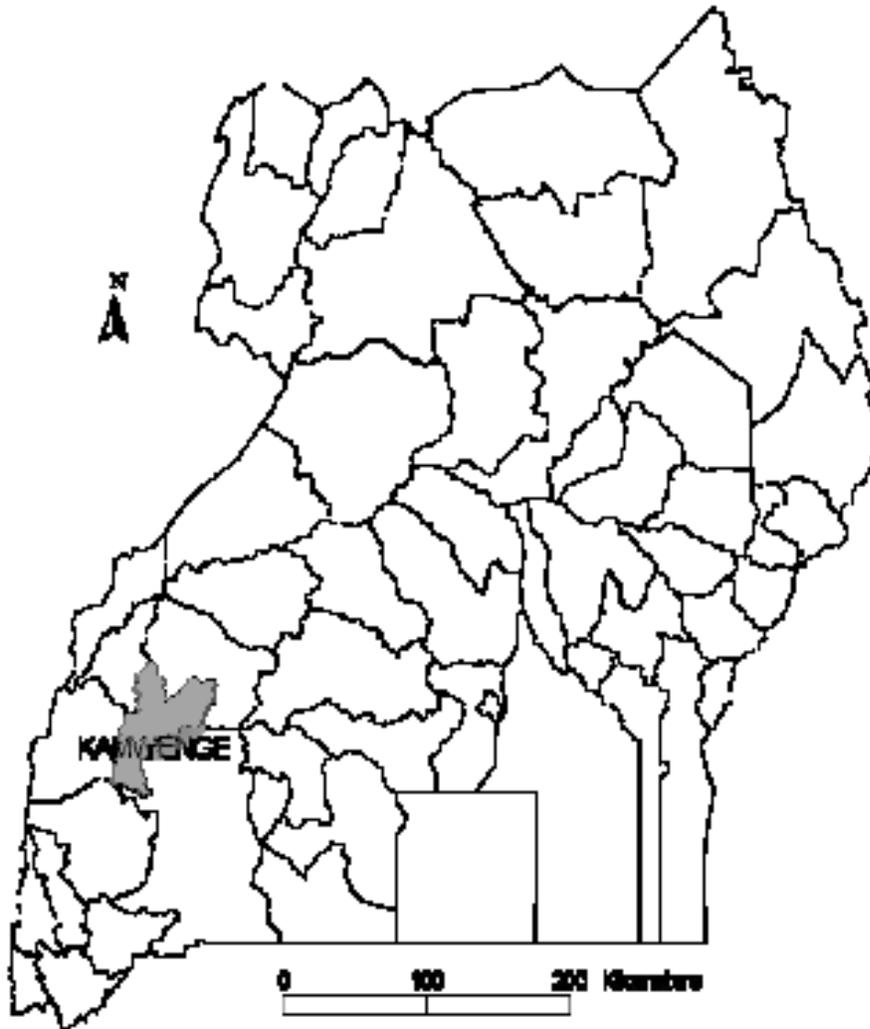
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APPENDICES

Appendix 1: Kamwenge district where video was shown by SG 2000 in Uganda



Kamwenge district where the videos were shown by SG 2000

Appendix 2: Descriptive features of Kamwenge and Hoima districts

Kamwenge district

Aspect	Description
Sub-counties	Kamwenge, Kamwenge T/C, Ntara, Kicheche, Mahyoro ¹ , Kahunge, Bwizi, Kabambiro, Nkoma, Nyabani, Buhanda, Busiriba
Counties	Kibale and Kitagwenda
Population	Densely populated with 421,470 people, 49% males, 51% (UBOS, 2014)
Location	Latitude in decimal degrees of 0.186066 and a longitude in decimal degrees of 30.451209
Climate	Bimodal annual rainfall averaging 1200mm throughout the year. Rainfall incidents greatest in the Northeast and southern parts of the district in areas of Kahunge, Kamwenge, Ntara, Kicheche and Nyabbani and the greater part of Mahyoro
Boarders	Kasese in the west, Ibanda in the south-southeast and Rubirizi in the south, Kabarole in the Northwest and Kyenjojo in the North and Northeast.
Land use	The district occupies an estimated land area of 2439.3 square kilometers. The total farm land is 1,200 square kilometers (49.19%).
Economic activity	Agriculture - major food crops include Maize, bananas, beans, millet, cassava, groundnuts and sweet potatoes; major cash crops include coffee in Kitagwenda and parts of Kibale county while cotton is grown in Mahyoro sub county. Upland rice grown in Mahyoro, Busiriba and Nkoma sub counties. Farmers are also involved in livestock production i.e. cattle, goats, pigs and chicken; fish catch

¹ The sub-county were the assessment study of video-mediated extension approach (VMEA) was conducted

	(from lake George)
Ethnic composition	Bakiga (46%), Banyankole (14%), Bafumbira (16%), Batangwenda (14%), Batooro (6%) and Others (4%)

Hoima district

Sub-counties	Bugambe, Buseruka, Kabwoya, Kitoba, Kyangwali, Buhanika, Busiizi, Kigorobya, Kiziranfumbi, Buhimba ² , Hoima T/C, Kigorobya T/C, Kyabigambire
Counties	Buhaguzi and Bugahya
Population	Densely populated with 573,903 people, 49.9% males, 50.1% (UBOS, 2014)
Location	Latitude in decimal degrees of 1.416667 and a longitude in decimal degrees of 31.083333. located within the Albertine Region and borders lake Albert
Climate	Bimodal annual rainfall averaging 1400mm throughout the year.
Boarders	Kibale to the south, Buliisa to the North, Masindi to the Northeast, Kyankwanzi district in the East, Ntoroko district the Southwest and Democratic Republic of Congo across lake Albert to the west
Economic activity	Agriculture - major food crops include Maize, bananas, beans, millet, cassava, groundnuts and sweet potatoes; major cash crops include coffee and tobacco; fish catch (from lake Albert)

Sources: UBOS, (2009), UBOS 2011), UBOS (2014)

² The sub-county where the assessment study of face-to-face extension approach(F2FEA) was conducted

Appendix 3: FGD interview guide for video participants

Makerere University

Department of Extension and Innovation Studies

EFFECTIVENESS OF VIDEO-MEDIATED EXTENSION APPROACH IN INFLUENCING SOCIAL LEARNING AMONG RICE FARMERS IN UGANDA. THE CASE OF SASAKAWA GLOBAL 2000

FGD checklist

Introduction

Good morning/afternoon, I am Gabriel Karubanga, a student in the field of Agriculture from Makerere University. I would like to learn how you perceive the use of videos in influencing social learning, access to and use of reliable agricultural information. The information you will provide in this interview will be treated with utmost confidentiality. I therefore request for your valuable time.

Questions

1. Trend of changes in rice production and post-production practices and farmer learning

- a) When did rice production start in this area?
- b) What are the main reasons people grow rice in this area?
- c) From your experiences, what has changed in practices during production and after post production over the years? (Attach timelines to the changes)
- d) Why have the changes explained above taken place?
- e) What has been the drivers of those changes/ or what has been the main reasons farmers have taken up those changes?
- f) Was there any agency that promoted those practices that farmers have been changing over time
- g) How do farmers learn about those practices in order to change?

- h) Generally, how do farmers get knowledge related to rice production/post production and the practices used? (can rank them in terms of importance with explanations why they are important)
- i) What are the main challenges that farmers face in rice production? (These could be ranked)
- j) What are some of the possible solutions to those challenges?

2. **Learning from the Videos**

- a) When were the SASAKAWA videos on rice shown in this area?
- b) What were the main learning points/messages from the videos?
- c) How did the videos help you to address the challenges you face in rice production and post production processes? Which challenges did you solve as result of the video and why did that happen?
- d) What were the good things about the videos shown by Sasakawa?
- e) What were the challenges of utilizing the knowledge disseminated in the videos?
- f) After watching the videos, is there anything you would do as farmers to help you better understand and apply the knowledge disseminated in the videos?
- g) What do you think would have been done to enable you better utilize the knowledge disseminated in the videos?

3. **For variables related to access**

- a) What challenges did you as farmers experience in participating in watching the videos?
- b) What kind of people attended the videos more and why?
- c) Tell me about the clarity of the messages disseminated in the videos (did you experience any challenges of understanding the messages?)
- d) What was the role of the extension worker during and after the video shows?

Closing

Thank you very much for sharing with me your experience regarding effectiveness of VMEA in influencing social learning, access to and use of agricultural information

Appendix 4: FGD interview guide for non-video participants

Makerere University

Department of Extension and Innovation Studies

FGD checklist for non-video participants

Introduction

Good morning/afternoon, I am Gabriel Karubanga, a student in the field of Agriculture from Makerere University. I would like to learn how you perceive the use of videos in influencing social learning, access to and use of reliable agricultural information. The information you will provide in this interview will be treated with utmost confidentiality. I therefore request for your valuable time.

Questions

1. Trend of changes in rice production and post-production practices and farmer learning

- a) When did rice production start in this area?
- b) What are the main reasons people grow rice in this area? Are there other crops grown? Compare with rice in terms of priority
- c) From your experiences, what has changed in practices during production and after post production over the years? (Attach timelines to the changes)
- d) Why have the changes explained above taken place?
- k) Which agencies that promoted those practices that farmers have been changing over time?
- l) How do farmers learn about those practices in order to change?
- m) Generally, how do farmers get knowledge related to rice production/post production and the practices used? (Can rank them in terms of importance with explanations why they are important) or in case you wanted to learn about rice production practices, where do you go for advice/information on rice production? Which specific advice do you get there? What are the advantages of each of the sources you go to?

- n) Specifically, what key production practices/technologies did you learn about rice production?
- o) As community or group members, how do you share the information which you acquire from the sources you have given above?
- p) What are the main challenges that farmers face in rice production? (These could be ranked)
- q) What are some of the possible solutions to those challenges?

2. For variables related to access

- e) What challenges did you as farmers experience in participating in trainings?
- f) What kind of people attended the trainings more and why?
- g) What was the role of the extension worker during and after the training?
- h) In case a new technology is introduced in your community/area with the purpose of providing you with information, what do you consider before you decide whether to take it or not? Why so?

Closing

Thank you very much for sharing with me your experience regarding effectiveness of VMEA in influencing social learning, access to and use of agricultural information

Appendix 5: Semi-structured individual interview tool for video participants

Makerere University

Department of Extension and Innovation Studies

**DETERMINATION OF EFFECTIVENESS OF VIDEO-MEDIATED EXTENSION
APPROACH IN INFLUENCING SOCIAL LEARNING AMONG RICE FARMERS IN
UGANDA: THE CASE OF SASAKAWA GLOBAL 2000**

Questionnaire 1. Video participant individual interview

Date:	Start time:	End:
Name of enumerator:		

A. Respondent biodata

Name of interviewee [_____] Tel. No: [_____]

District [_____] Sub-County [_____]

Parish [_____] Village (Zone) [_____]

B. Access and Operational Attributes

B1. Gender 1. Male [] 2. Female []

B2. Age (years) [_____]

B3. Your mother tongue? [_____]

B4. Level of education [_____] State the class attained

B5. Marital Status

1. Married [<input type="checkbox"/>]	2. Single [<input type="checkbox"/>]	3. Widowed [<input type="checkbox"/>]	4. Divorced [<input type="checkbox"/>]
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B6. Are you the Household Head 1. Yes [] 2. No []

B7. Major occupation of the respondent

1 Farming [<input type="checkbox"/>]	2. Civil Servant [<input type="checkbox"/>]	3 Personal Business [<input type="checkbox"/>]	4. Others (specify).....
--	---	--	--------------------------

B8. What was your primary reason to come and attend the video shows? (Choose all that applies)

1. To get information on agricultural markets []	2. To buy inputs sold []
3. To socialize []	4. In transit to another place []
5. Information & advice on crop problems []	6. Access to free seed []
7. Access to free plant medicine (chemicals) []	8. Get general information about rice
9. Was invited as a group member to attend []	10. To improve quality of rice
11. Others, specify:.....	

B9. Where did you watch the rice videos from?

1. Community hall []	2. MARFA office []
3. Town hall []	4. Private video hall []
5. Fellow farmers home []	6. Church hall []
7. At school []	8. At the market place []
9. Others, specify:	

B10. Was the location/place of video shows appropriate? 1. Yes [___] 2. It is fair [___] 3. No [___]

If 'No, why? (Choose all that applies)

1. Too far away from home []	2. Too congested []	3. It is invisible to locate []
4. Inconvenienced by the community activities []	5. A lot of noise from the neighborhood []	
6. Other [], specify:		
7. N/A		

B11. How far away do you live from your home to the location of the video shows? (km) [_____]

B12. What are the common means used by video participants to come to the video shows? (Choose all that applies)

1. I walked []	2. Hired Boda Boda []	3. By taxi []
4. Own bicycle []	5. Own motorcycle []	6. Own car []
7. Other: specify:		

B13. How did you get to know about the video shows? (Choose all that applies)

1. On radio []	2. From extension worker []	3. From a neighbor []
4. From MARFA chairman []	5. From lead farmer []	6. From HH member []
7. I saw the banner []	8. Megaphone []	9. Church/mosque []
10. Community meeting []	11. Group members []	12. Sign post []
13. During field day []	15. Others, specify:	

B14. In case more than one means is used to advertise the video shows, which one do you consider as being most appropriate?

B15. Why do you think the above means you have identified is the most appropriate for advertising video show events?

B16. What can you comment about organization/contextual set up of video site/venue when you watched the video shows?

Sitting arrangements? 1. Good [___] 2. Fair [___] 3. Not good [___]

Comment _____

Cleanliness of venue? 1. Good [___] 2. Fair [___] 3. Not good [___]

Comment _____

Space for video viewers? 1. Good [___] 2. Fair [___] 3. Not good [___]

Comment _____

B17. What challenges did you face as a farmer in attending and participating in watching rice videos? (Choose all that applies)

1. Limited publicity []	2. Busy with garden work []	3. Sickness []
4. Death of relative []	5. Attending other domestic work []	6. Conflicting schedules []
7. Long distance []	8. Video shown at night []	9. Scaring birds []
10. Nobody to leave home []	11. No seats for participants []	12. Noise from people []
13. Video ended late []	14. Threat of wild animals []	15. Too much coldness []
16. Irregular video shows []	17. No time to discuss []	18. Others, specify:

B18. What kind of people do you think attended the video show more?

Category of people	Reason why that category
1. Men []	
2. Children []	
3. Youth []	
4. Children []	

C. Timeliness

C1. On what day(s) were the rice video shown? (Choose all that applies)

1.Mon		2.Tues		3.Weds		4.Thurs		5.Fri		6.Sat		7.Sun	
-------	--	--------	--	--------	--	---------	--	-------	--	-------	--	-------	--

C2. Was the day of video shows appropriate?

1. Yes [_____] 2. It is fair [_____] 3. No [_____]

If 'Yes, explain why: [_____]

If 'No, explain why: [_____]

C3. If not appropriate, in your opinion, which day(s) do you think are most appropriate for the video operation?
(Choose all that applies)

1.Mon		2.Tues		3.Weds		4.Thurs		5.Fri		6.Sat		7.Sun	
-------	--	--------	--	--------	--	---------	--	-------	--	-------	--	-------	--

Why this day(s)? [_____]

C4. At what time were the videos shown? [_____]

C5. Was the hour of video shows appropriate? 1. Yes [____] 2. It is fair [____] 3. No [____]

If 'Yes, explain why: [_____]

If 'No, explain why: [_____]

C6. In your opinion, what hour do you think is most appropriate for the video shows?

1. In the morning [____] 2. In the afternoon [____] 2. In the evening [____]

Why this hour? [_____]

C7. For how long was the video shown [____] hours

C8. How often was the video shown on rice production?

1. Every day []	2. Once a week []	3. Twice a week []
4. Fortnightly []	5. Once a month []	6. Rarely []

C9. Was the frequency of the video shows appropriate?

1. Yes [____] 2. No [____]

If inappropriate, explain why: [_____]

C10. How often do you want the video shows to take place? (Choose all that applies)

1. Every day []	2. Once a week []	3. Twice a week []
4. Fortnightly []	5. Once a month []	6. Rarely []

Comment _____

C11. Basing on the advertisement, at what time were the video shows supposed to start?

[_____]

C12. Roughly, at what time did you arrive at the video show site? [_____]

If the respondent arrived at the venue before or at exact time of the advertisement, go to question C12

C13. How long did you wait from the time you came to the video show until the video started?

[_____]

C14. In case you waited for other farmers to arrive, what were you doing as you waited for the video shows to start?

D. Attributes of Use of Knowledge/information got from video shows

D1. What are the challenges you face in rice production? (Choose all that applies)

1. Birds []	2. Counterfeits (seed & chemicals) []	3. Inadequate land []
4. Lack tarpaulins []	5. Inadequate advisory services []	6. Pests and diseases [] Specify:
7. Poor storage facilities []	8. Lack of equipment/tools [] Specify:.....	9. Wild animals [] Specify:.....
10. Theft []	11. Drought []	12. Massive weeds []
13. Low prices []	14. Poor timing of infor. []	15. Exhausted soils []
16. Expensive chemicals []	17. No local agro-input shops []	18. Others,

D2. When you faced the above challenges where did obtain knowledge/information to solve them? (Choose all that applies)

1. NGOs []	2. Print media []	3. Radio []
4. Saw a video []	5. District /sub-county extension staff []	6. Drama []
7. Songs []	8. Consult fellow farmers []	9. From demo sites []
10. Tours []	11. Community meetings []	12. Group meetings []

D3. Specifically, how many times did you watch the rice videos? [_____]

D4. What were the good things about the rice videos you viewed? (Choose all that applies)

1. Attractive []	2. Enhances memory []	3. Clear images []
4. Clear steps in rice production []	5. Demonstration of practices []	6. Good for illiterates []
7. The words were clear []	8. The person in the video was audible	
9. Showed experience from other countries []	10. Others, specify:	

D5. Which of these practices of rice production did you know, use and share before you watched the video?
(Choose all that applies)

Practice	Practices known before watching the video	Practices used before watching the video	Practices known and shared before watching the video	Practices used and shared before watching the video	Practices shared after watching the video
1. Seed Selection					
2. Planting in lines					
3. Planting in wetlands					
4. Timely land preparation					
5. Timely weed control					
6. Fertilizer application					
7. Pesticide application					
8. Timely harvesting					
9. Harvesting using sickles					
10. Threshing using threshers					
11. Drying on tarpaulins					
12. Use of milling machines					

D6. What key things/messages did you learn from watching the rice videos? (Choose all that applies)

1. Planting in lines []	2. Timely weed control []	3. Drying on tarpaulins []
4. Use of milling machines []	5. Threshing using a thresher []	6. Harvest using sickles []
7. Planting clean seed []	8. Timely pesticide application []	9. Timely harvesting []
10. Land preparation []	11. Fertilizer application []	12. Planting in wetlands []
13. Others, specify:		

D7. Was the information you received via video shows useful?

1. Yes, it was useful [____] 2. It was partially useful [____] 3. No, it was not useful [____]

D8. Did you put in practice what you learnt from the rice videos? 1. Yes [] 2. No []

If 'yes, what happened?

Practice	What happened?
1. Planting in lines	
2. Timely weed control	
3. Drying on tarpaulins	
4. Use of milling machines	
5. Threshing using a thresher	
6. Harvest using sickles	
7. Planting clean seed	
8. Timely pesticide application	
9. Timely harvesting	
10. Land preparation	
11. Fertilizer application	
12. Planting in wetlands	

If 'no (or 'partially), why not? (Choose all that applies)

1. Too expensive []	2. Impractical []	3. Not enough labor []
4. Inputs not available []	5. Stockists too far away []	6. Not yet, will do []
7. Didn't understand the practice []	8. Didn't know how to apply it []	
9. Didn't like the practice [], Why not?		
10. I preferred to apply my own practice [] specify?		
11. The practice was from a foreign country []		
12. Others, specify,		
13. N/A		

D9. What do you think are some of the challenges that limited your understanding and utilization of knowledge disseminated using the videos? (Choose all that applies)

1. Language barrier []	2. Lack of a translator []	3. Speed of video []
4. Limited time given []	5. Showing videos at night []	6. No asking questions []
7. No discussion after show []	8. Costs involved []	9. Irregular video shows []
10. Procedures were not clear to follow []		11. Others, specify:

D10. What do you think should have been done to enable you better understand and utilize the knowledge disseminated using videos? (Choose all that applies)

1. Use local language []	2. Need for a translator []	3. Move at a slow speed []
4. Allow time for discussion []	5. Show videos during day time []	6. Pause & ask questions []

7. Follow up visit by staff []	8. Capture local farmers []	9. Regular video shows []
10. Complement video with training []		11. Show to smaller groups []
12. Staff should tell farmers what is going to be screened []		13. Allow for energizers []

D11. Given another opportunity, would you come and watch rice videos? 1. Yes [] 2.No []

D12. In case you are left with a copy of the video, is it possible for you to watch?

1. Yes [] 2.No []

If 'Yes how can you organize yourselves to watch it?

If 'No, explain Why not.

D13. Generally, what do you recommend 2000 to change in the ways of operating the video shows for you benefit? (Choose all that applies)

1. Regular operation []	2. Move to parish levels []	3.To get free inputs there []
4. Staff should keep time []	5. Show video during day time []	6. To be able to buy inputs there []
7. Short waiting time []	8. Allow time for discussion []	9. Other:

E: Knowledge Retention as a Result of Viewing the Video

E1. What are the key rice production practices that were communicated in the rice video?

(Choose all that applies)

Practices communicated in the video	Which ones did you like?	Which ones are you practicing now?	Which ones are you planning to put in practice in future
1. Planting in lines []			
2. Timely weed control []			
3. Drying on turplins []			
4. Use of milling machines []			
5. Threshing using a thresher []			
6. Harvest using sickles []			
7. Planting clean seed []			
8. Timely pesticide application []			

9. Timely harvesting	[]			
10. Land preparation	[]			
11. Fertilizer application	[]			
12. Planting in wetlands	[]			

E2. Of the practices listed above, which one is the most important to rice production?

Reasons why the practice is important:

E3. Why is it important to ensure that you maintain your rice in good quality?

E4 How would you ensure that the message you learnt from the video is not forgotten?

E5. When you failed to understand or remember the information got from the video, where did you go for further guidance/consultation? (Choose all that applies)

1.Fellow farmers []	2. Family members []	3. Group members []
4. Group leaders []	5. Extension worker []	6. Visited the demo site []
7. MARFA chairman []	8. Others:.....	

E6. When you consulted those sources, did you get prompt feedback?

1. Yes [] 2.No []

If 'No, Why not?

E7. Did you share the knowledge/information got from the video with other people?

1. Yes [] 2.No []

If yes, who are those people you share with? (Choose all that applies)

1.Fellow farmers []	2. Family members []	3. Group members []
4. Group leaders []	5. Extension workers []	6. Others.....

E8. How or where do you share the information with the people you have named above? (Choose all that applies)

1. During meetings []	2. During field days []	3. At home []
4. When I visit a friend []	5. In Drama []	6. At the garden during group activities []
7. At church/mosque []	8. At the hospital []	9. Others, specify

E9. What caused/forced/triggered you to share the information with other people?

E10. What was their impression about your experiences with the video?

E11. Do you think they would be willing to come with you to the video shows in case they are organized next time?

1. Yes [] 2.No []

E12. What do you think might be the main reason for their coming to attend the video shows? (Choose all that applies)

1. To get information on agricultural markets []	2. To buy inputs sold []
3. To socialize []	4. To be entertained []
5. Information & advice on crop problems []	6. Access to free seed []
7. Access to free plant medicine (chemicals) []	8. Get general information about rice
9. Because invited as a group member to attend []	10. To improve quality of rice
11. Others, specify:.....	

E13. Explain how you can convince the rest of the farmers to take up the message/information you got from the video shows?

E14. Besides rice videos, what other methods have you obtained rice related knowledge/information? (Choose all that applies)

1. Fellow farmers []	2. District/sub-county extension staff []	3. NGOs []
4. Demo site []	5. Radio []	6. Drama []
7. Through songs []	8. Field days []	9. Tours []
10. Others, specify		

F. General Agricultural Related Activities

F1. Before you started growing rice, what 4 major crops were you growing on your farm and the reasons why they were grown?

Crop	Reason for growing it. 1) Food 2) Cash
1.	
2.	
3.	
4.	

F2. When did you first get to know about rice? [_____] Indicate the year

F3. From whom or where did you come to know about rice? [_____]

F4. When did you start growing rice? [_____] Indicate the year

F5. What are the main reasons why you grow rice? (Choose all that applies)

1. Source of income []	2. Source of food []	3. Source of seed []
-------------------------------	-------------------------------	-------------------------------------

F6. What varieties of rice do you grow on your farm? And why you chose that variety?

Variety	Reasons why chosen

F7. What problems have you experienced, if any, in growing the variety (s) you have mentioned above?

Variety	Problem with the rice grown

F8. From where do you get the seed you plant per season?

F9. How much land do you own? [____] (Acres)

F10. What is the total acreage you use for crop production [____] (Acres)

F11. Of the total acreage available, how much is under rice production [____] (Acres)

F12. How did you acquire the land under rice production? (Choose all that applies)

1. Inherited []	2. Purchased []	3. Hired []
4. Borrowed []	5. Others (specify)	

F13. Basing on your previous harvest (last season), how many bags of unprocessed rice did you harvest? [____] (bags). Estimated weight per bag: [____]

F14. Basing on your previous harvest (last season) please provide the information in estimated proportions (bags)

Purpose	Proportion (bags)
Selling	
Feeding	
Saved seed	
Others, specify	

G. Farmer organization

G1. Were you a member of MARFA? Yes [] 2. No []

G2. Do you belong to any farmer group in your village?

1. Yes [] 2. No []

G3. If you don't belong to the group, why not? _____

G4. If you belong to the group, what rice activities do you get involved in as a group? (Choose all that applies)

1. Planting []	2. Weeding []	3. Harvesting []
4. Drying []	5. Threshing []	6. Winnowing []
7. Storage []	8. Pest control []	9. Land preparation []
10. Milling []	11. Others, specify	

G5. In case you are left with a copy of the video, is it possible for you to watch it as a group?

1) Yes (go to 3) 2) No

G6. How possible is it for you to watch it as your group?

Thank you very much for your participation!

Appendix 6: Semi-structured individual interview tool for face-to-face farmers

Makerere University

Department of Extension and Innovation Studies

DETERMINATION OF EFFECTIVENESS OF VIDEO-MEDIATED EXTENSION APPROACH IN INFLUENCING SOCIAL LEARNING AMONG RICE FARMERS IN UGANDA: THE CASE OF SASAKAWA GLOBAL 2000

Questionnaire 2. Face-to-face farmers - individual interview

Date:	Start time:	End:
Name of enumerator:		

A. Respondent biodata

Name of interviewee [_____]

District [_____] Sub-County [_____]

Parish [_____] Village (Zone) [_____]

B. Access Attributes

B1. Gender 1. Male [] 2. Female []

B2. Age (years) [_____]

B3. Your mother tongue? [_____]

B4. Level of education [_____] Just state the class

B5. Marital Status

1. Married [<input type="checkbox"/>]	2. Single [<input type="checkbox"/>]	3. Widowed [<input type="checkbox"/>]	4. Divorced [<input type="checkbox"/>]
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B6. Are you the household head 1. Yes [] 2. No []

B7. Major occupation of the respondent

1. Farming [<input type="checkbox"/>]	2. Civil Servant [<input type="checkbox"/>]	3. Personal Business [<input type="checkbox"/>]	4. Others (specify).....
---	---	---	--------------------------

B8. What was your primary reason to come and attend the trainings? (Choose all that applies)

1. To get information on agricultural markets []	2. To buy inputs sold []
3. To socialize []	4. In transit to another place []
5. Information & advice on crop problems []	6. Access to free rice seed []
7. Access to free plant medicine (chemicals) []	8. Get general information about rice []
9. Was invited as a group member to attend []	10. To improve the quality of rice []

B 9. Where do you attend the HoDFA trainings? (Choose all that applies)

1. Community hall []	2. Classroom []	3. Under the tree []
4. Farmers home []	5. KAFACOS/MAFACOS offices []	
6. Others, specify:		

B10. Is the location/place of training sessions appropriate? 1. Yes [___] 2. It is fair [___] 3. No [___]

If 'No, why? (Choose all that applies)

1. Too far away from home []	2. Too congested []	3. It is invisible []
4. Too near the road []	5. Inconvenienced by the community activities []	
6. Other [], specify:		

B11. How far away do you live from your home to the venue of the training (km) [_____]

B12. What are the common means you use to come to the HoDFA trainings? (Choose all that applies)

1. I Walked []	2. Hired boda boda []	3. By taxi []
4. Own bicycle []	5. Own motorcycle []	6. Own car []
7. Others, specify		

B13. How do you get to know about the HoDFA trainings? (Choose all that applies)

1. On the radio []	2. From extension worker []	3. From Neighbour []
4. From KAFACOS chairman []	5. From lead farmer []	6. From HH member []
7. I saw the banner []	8. Megaphone []	9. At church []
10. Community meeting []	11. Group members []	12. Sign post []
13. During field day []	14. Others, specify	

B14. In case more than one means is used to advertise the HoDFA trainings, which one do you consider as being most appropriate?

B15. Why do you think the above means you have identified in the most appropriate for advertising the HoDFA trainings?

B16. What challenges do you face as a farmer in attending and participating in HoDFA trainings? (Choose all that applies)

1. No publicity []	2. Busy with garden work []	3. Sickness []
4. Death of relative []	5. Attending other domestic work []	6. Conflicting schedules []
7. Long distance []	8. Scaring birds []	9. Irregular trainings []
10. Nobody to leave home []	11. No seats for participants []	12. Trainings ended late []
13. Others, specify:		

B17. What kind of people do you think attend the HoDFA trainings more? Why such as category? (Choose all that applies)

Category of people	Reason why that category
1. Men []	
2. Children []	
3. Youth []	
4. Females []	

C. Timeliness of HoDFA Trainings

C1. On what day(s) are HoDFA trainings held? (Choose all that applies)

1.Mon		2.Tues		3.Weds		4.Thurs		5.Fri		6.Sat		7.Sun	
-------	--	--------	--	--------	--	---------	--	-------	--	-------	--	-------	--

C2. Is the day (s) of HoDFA trainings appropriate?

1. Yes [_____] 2. It is fair [_____] 3. No [_____]

If 'Yes, explain why: [_____]

If 'No, explain why: [_____]

C3. If not appropriate, in your opinion, which day(s) do you think are most appropriate for the HoDFA trainings? (Choose all that applies)

1.Mon		2.Tues		3.Weds		4.Thurs		5.Fri		6.Sat		7.Sun	
-------	--	--------	--	--------	--	---------	--	-------	--	-------	--	-------	--

Why this day(s)? [_____]

C4. At what hour of the day do you hold the HoDFA trainings?

1. In the morning [_____] 2. In the afternoon [_____] 2. In the evening [_____]

D. Attributes of Use of knowledge/information got from HoDFA trainings

D1. What are the challenges you face in rice production? (Choose all that applies)

1. Birds []	2. Counterfeits (seed & chemicals) []	3. Inadequate land []
4. Lack turplins []	5. Inadequate advisory services []	6. Pests and diseases [] Specify:.....
7. Poor storage facilities []	8. Lack of equipment/tools [] Specify:.....	9. Wild animals []
10. Theft []	11. Drought []	12. Massive weeds []
13. Low prices []	14. Poor timing of infor. []	15. Exhausted soils []
16. Expensive chemicals []	17. No local agro-shops []	18. Others,

D2. When you face the above challenges where do you go to obtain knowledge/information to solve them? (Choose all that applies)

1. NGOs []	2. Print media []	3. Radio []
4. Saw a video []	5. District/sub-county extension staff []	6. Drama []
7. Songs []	8. Consult fellow farmers []	9. From demo site []
10. Tours []	11. Community meetings []	12. Group meetings []
13. Others.....		

D3. Specifically, how many times have you attended the HoDFA rice trainings? [_____]

D4. What are good things have you learn from HoDFA trainings regarding rice production? (Choose all that applies)

1. Planting in lines []	2. Timely weed control []	3. Drying on turplins []
4. Use of milling machines []	5. Threshing using a thresher []	6. Harvest using sickles []
7. Planting clean seed []	8. Timely pesticide application []	9. Timely harvesting []
10. Land preparation []	11. Fertilizer application []	12. Irrigation of rice []
13. Others, specify:		

D5. Is the information you receive via HoDFA trainings useful?

1. Yes, it is useful [____] 2. It is partially useful [____] 3. No, it is not useful [____]

If 'partially or 'not useful, explain why: _____ **5.**

D6. Did you apply the technologies/practices you learnt? 1. Yes [] 2. Partially [] 3. No []

If 'yes, what happened? _____

If 'no (or 'partially), why not? (Choose all that applies)

1. Too expensive []	2. Impractical []	3. Not enough labor []
4. Inputs not available []	5. Stockists too far away []	6. Not yet, will do []
7. Didnt understand the practice []	8. Didnt know how to apply it []	
9. Didnt like the practice [], Why not?		
10. I preferred to apply my own practice [] specify?		
11. The practice was from a foreign country []		

D7. What do you think are some of the challenges that limited your understanding and utilization of knowledge gained during trainings about rice production? (Choose all that applies)

1. Language barrier []	2. Lack of a translator []	3. Trainer was speedy []
4. Limited time given []	5. Trainings start late []	6.No asking questions []
7. No discussion after training []	8. Costs involved []	9. Irregular trainings []
10. Procedures were not clear to follow []		11. Others, specify:

D8. What do you think should have been done to enable you better understand and utilize the knowledge gained through trainings? (Choose all that applies)

1. Use local language []	2. Need for a translator []	3. Train at a slow speed []
4. Allow time for discussion []	5. Trainings to start early []	6.Pause & ask questions []
7. Follow up visit by staff []	8. Allow for farmers experiences []	9. Regular trainings []
10. Complement with training demonstration []		11. Train particular groups []
12. Staff should tell farmers what is going to be trained []		13. Allow for energizers []

D9. Generally, what do you recommend HoDFA to change in the ways of conducting its training sessions? (Choose all that applies)

1. Regular operation []	2. Move to parish levels []	3. Provide free inputs materials []
4. Friendly staff []	5. Free service []	6. To be able to buy inputs there []
7. Short waiting time []	8. Provide sitting allowances []	9. Other:

E: Knowledge Retention as a Result of HoDFA Trainings

E1. What are the key practices that were communicated in the HoDFA training sessions?

(Choose all that applies)

Practices communicated in the video	Which ones did you like?	Which ones are you practicing now?	Which ones are you planning to put in practice in future
1. Planting in lines []			
2. Timely weed control []			
3. Drying on turplins []			
4. Use of milling machines []			
5. Threshing using a thresher []			
6. Harvest using sickles []			
7. Planting clean seed []			
8. Timely pesticide application []			
9. Timely harvesting []			
10. Land preparation []			
11. Fertilizer application []			
12. Irrigation of rice []			

E2. Of the practices listed above, which one is the most important to rice production? Explain why:

Reason why the practice is the most important

E3. Why is it important to ensure that you maintain your rice in good quality?

E4. How would you ensure that the message you learnt from HoDFA trainings is not forgotten?

E5. When you fail to understand or remember the information you gained through trainings, where do you go for further guidance/consultation? (Choose all that applies)

1.Fellow farmers []	2. Family members []	3. Group members []
4. Group leaders []	5. Extension worker []	6. Visited the demo site []
7. KAFACOS/MAFACOS coordinator []	8. Others.....	

E6. When you consulted those sources, did you get prompt feedback?

1. Yes [] 2. No []

If, NO, why not?

E7. Do you share the knowledge/information got from the HoDFA trainings with other people?

1. Yes [] 2. No []

If yes, who are those people you share with? (Choose all that applies)

1.Fellow farmers []	2. Family members []	3. Group member []
4. Group leader []	5. Extension worker []	6. Others.....

E8. How or where do you share the information with the people you have named above? (Choose all that applies)

1.During meetings []	2. During field days []	3. At home []
4. When I visit a friend []	5. In Drama []	6. At the garden during group activities []

F. General Agricultural Related Activities

F1. Before you started growing rice, what 4 major crops were you growing on your farm and the reasons why they were grown

Crop	Reason for growing it. 1) Food	2) Cash
1.		
2		
3		
4		

F2. When did you first get to know about rice? [_____] Indicate the year

F3. From whom or where did you come to know about rice? [_____]

F4. When did you start growing rice? [_____] Indicate the year

F5. What are the main reasons why you grow rice? (Choose all that applies)

1. Source of income	2. Source of food	3. Source of seed
---------------------	-------------------	-------------------

F6. What varieties of rice do you grow on your farm? And why you chose that variety

Variety	Reasons why chosen

F7. What problems have you experienced, if any, in growing the variety (s) you have mentioned above?

Variety	Problem with the rice grown

F8. From where do you get the seed you plant per season?

F9 How much land do you own? [____] (Acres)

F10. What is the total acreage you use for crop production [____] (Acres)

F11. Of the total acreage available, how much is under rice production [____] (Acres)

F12. How did you acquire the land under rice production?

1. Inherited []	2. Purchased []	3 Hired []
4. Borrowed []	5.Others (specify)	

F13. Basing on your previous harvest (last season), how many bags of rice did you harvest?

[] (bags) Acreage [] acres Estimated weight per bag [] kg

F14. Basing on your previous harvest (last season) please provide the information in estimated proportions (bags)

Purpose	Proportion (bags)
Selling	
Feeding	
Saved seed	

G. Farmer organization

G1. Do you belong to KAFACOS? 1. Yes [] 2. No []

G2. Do you belong to any farmer group in your village?

2. Yes [] 2. No []

G3. What is the name of the group you belong to? _____

G4. If you dont belong to the group why not? _____

G5. If you belong to the group, what rice activities do you get involved in as a group? (Choose all that applies)

1. Planting []	2. Weeding []	3. Harvesting []
4. Drying []	5. Threshing []	6. Winnowing []
7. Storage []	8. Pest control []	9. Land preparation []
10. Milling []	11. Others, specify	

Thank you very much for your participation!

Appendix 7: Home/field observation guide

Makerere University

Department of Extension and Innovation Studies

EFFECTIVENESS OF VIDEO-MEDIATED EXTENSION APPROACH IN INFLUENCING SOCIAL LEARNING AMONG RICE FARMERS IN UGANDA. THE CASE OF SASAKAWA GLOBAL 2000

Check list for home/field observation

General guidelines

The following guidelines were followed in conducting home/field observations.

- Identify farmers with rich information or experience during FGDs and individual interviews for follow up
- Explain to the farmer who I am, the purpose of the visit and what I am going to do
- Move with the local person to introduce you to farmers
- Observe, listen and take notes. Use of camera and voice recorder must be done after seeking consent
- The observations will include a description of what I will see as well as my assessment of how well it works. Keep it simple!
- The following will be observed while at the farmers home/field:
 1. What practices have been implemented by the farmers as shown in the video?
 2. What modifications have they done to adapt the practice/technology?
 3. What are the challenges farmers face in implementing the practices/technologies?
 4. What innovative ways do farmers employ to solve some of the challenges they face?
 5. How do different farmers implement what they saw in the video?
 6. What is the general assessment of what the farmer does in terms of feasibility and affordability?

Thank you very much for your participation!

Appendix 8: Key informant interview guide

Makerere University

Department of Extension and Innovation Studies

EFFECTIVENESS OF VIDEO-MEDIATED EXTENSION APPROACH IN INFLUENCING SOCIAL LEARNING AMONG RICE FARMERS IN UGANDA. THE CASE OF SASAKAWA GLOBAL 2000

Key informant guiding questions

Date:	Start time:	End:
Name of enumerator:		
Name and position of interviewee:		District:

Checklist

1. What was the source of the videos and what adaptations did they make to the videos to suit the Ugandan context?
2. How did SG 2000 think, the video would bring about the desired change (I.e. what was the desired change and how would the videos enhance achievement of that?)
3. How does the video mediated extension operate in the perspective of Sasakawa?
4. What were the follow-up arrangements or support system after people have watched the videos?
5. How were they monitoring the desired change?
6. From your experience, what do they see as the strengths of the video mediated extension?
7. What were the challenges experienced?
8. How can the video mediated extension be improved to make it more effective?
9. How were the video shows organized and operated? Timing, location, frequency?
10. What kind of feedback mechanisms are in place?

Thank you very much for your participation!