

**THE EFFECTIVENESS OF PRINT-BASED INFORMATION, EDUCATION
AND COMMUNICATION MATERIALS IN COMMUNICATING NEW
AGRICULTURE TECHNOLOGIES TO FARMERS IN MITUNDU AND
CHILEKA AREAS IN LILONGWE, MALAWI**

**MASTER OF ARTS (THEATRE AND MEDIA FOR COMMUNICATION IN
DEVELOPMENT) THESIS**

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DECLARATION

I declare that the work contained in this dissertation is my own and has never been presented for any award anywhere before. Acknowledgements have been given wherever other people's work has been used.

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CERTIFICATE OF APPROVAL

The undersigned certify that this thesis represents the student's own work and effort and has been submitted with our approval.

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DEDICATION

This paper is dedicated to my Late father Blackwell Sanida Chipeta for he always encouraged me to aim high.

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ABSTRACT

This research assessed the effectiveness of print-based Information, Education and Communication (IEC) materials in communicating new agriculture technologies to farmers in Mitundu and Chileka areas in Lilongwe, Malawi. The general understanding is that using print IEC materials drives end-users into desired practices in a wide range of sectors including agriculture. In this study, fifty-seven participants with different educational levels responded to the questions. The study adopted three research methods; randomised block design (RBD) experiment with farmers, focus group discussions (FGDs) with farmers and key informant interviews (KIIs) with extension workers and representatives from agricultural communication branch. The study is founded on the theory of strategic communication. The findings revealed that print materials on agriculture technology promotion, were suitable for the rural audience since the materials were designed in an attractive manner but also written in farmers' mother tongue, *Chichewa*. The study discovered that there was inclusivity in the dissemination methods since materials are pasted or placed in tearooms, trading centres, village resource centres, and notice boards in EPAs. Farmers also engage in discussions facilitated by either extension workers, lead farmers, neighbours or children in order to assist illiterate farmers. However, results also showed that there were other challenges including producing and distributing low quantities of printed IEC materials, extension workers low knowledge of dissemination mechanisms and approaches. Furthermore, there was minimal consultation between agriculture extension workers and Agriculture Communications Branch on the content of print materials suiting farmer needs. The overloaded content in most leaflets brought confusion during interpretation of the messages. The findings are expected to help agriculture print-based IEC material developers and users to adhere to processes recommended by communication for development (C4D) experts in material production and dissemination modes for better results.

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LIST OF ABBREVIATIONS

ACB:	Agriculture Communication Branch
ADD:	Agriculture Development Division
AGCOM:	Agriculture Communication
ACO:	Agriculture Communication Officer
AEDC:	Agriculture Extension Development Coordinator
AEDO:	Agriculture Extension Development Officer
ASWAp:	Agriculture Sector Wide Approach
CA:	Conservation Agriculture
C4D:	Communication for Development
DADO:	District Agriculture Development Officer
DAES:	Department of Agriculture Extension Services
DAPP:	Development Aid from People to People
DARS:	Department of Agriculture Research Services
DevCom:	Development communication
EPA:	Extension Planning Area
FGD:	Focus Group Discussions
GDP:	Gross Domestic Product
IEC:	Information, Education and Communication
KII:	Key Informant Interviews
LUANAR:	Lilongwe University of Agriculture and Natural Resources
NASFAM:	National Smallholder Farmer's Association of Malawi
NGO:	Non-Governmental Organisation
NRC:	Natural Resources College
NSO:	National Statistics Office
PRO:	Public Relations Officer
RBD:	Randomized Block Design
SMS:	Short Message Service
SBCC:	Social and Behavior Change Communication
TfD :	Theatre for Development
VH :	Village Headman
VRD:	Village Resource Centre

CHAPTER ONE

1.1 Introduction and background of study

This is a development communication (DevCom) study in Agriculture development extension sector. DevCom is communicating information to specific groups, to influence stakeholders' voluntary change or action (Mefalopulos, 2008 and Servaes (ed.), 2008). It emphasises on audience participation in development processes so that people are empowered to make own decisions. Another researcher, Tamilselvi (2019) describes development communication as aspect that brings positive change in the society in the field of education, culture and economics with the help of media such as print, radio, and internet. On the other hand, agricultural development extension is the application of scientific research and knowledge to agricultural practices through farmer education (Janani, et, al., 2019). It plays a crucial role in promoting agricultural productivity, increasing food security, improving rural livelihoods, and promoting agriculture for the economic growth of every country. The study looks at agriculture extension as a programme that applies research knowledge while development communication employs participatory methodologies for positive change socially and materially.

Malawi's economy is predominantly agricultural based. Agriculture accounts for 30 percent of Gross Domestic Product (GDP) and generates over 80 percent of national export earnings. The agriculture sector employs 64 percent of the country's workforce and contributes to food and nutrition security (JICA Malawi, 2021 & Chirwa et. al, 2008). The principal crops grown in Malawi are maize, tea, sugarcane, groundnuts, cotton, wheat, coffee, rice and pulses Chirwa et al (2008). The major exports include tobacco, tea and sugar. Except for tobacco, multinational companies mainly grow tea and sugar on commercial estates, with the smallholder sector producing less than 15% of total tea and sugar production.

The agricultural sector encounters some challenges in its farming operations. These include vulnerability to weather shocks; poor management of land, water and soils; low adoption of scientifically proven agricultural technologies; low access to finance and farm inputs; low mechanization and technical labor skills (JICA Malawi, 2021; Masambuka-Kanchewa et al, 2020). To address challenges of low adoption of agriculture technologies among farmers, the Ministry of Agriculture uses different communication channels including print IEC materials, theatre performances and radio programmes. Ndilowe (2013) attests that:

The Ministry of Agriculture in Malawi communicates its messages to the farmers through the Agricultural Communication Branch (ACB), which is in the Department of Agriculture Extension Services (DAES). Through DAES the ministry communicates using varied methods including print (leaflets, posters, magazines) and electronic (radio, cinema).

The common agricultural technologies promoted among farmers include Conservation Agriculture (CA), Integrated Homestead Farming (IHSF) and fall armyworm control (DARS, 2014). Fall armyworm, migratory in nature, is among the priority pests that the Government focuses on controlling. The pest has affected many crops and is posing a huge threat to the country's agricultural sector, states Amanzi (2022).

Conservation agriculture is a concept of resource saving production that strives to achieve acceptable profits together with high-sustained production crop yield while concurrently serving the environment (FAO, 2008). CA minimises soil disturbance by tillage, maintains soil cover through retained residues from the previous crops and rotation or intercropping of cereals with legumes. In CA, there is Mulching (refer to Figure 1), that farmers are encouraged to use. The other technology being promoted is double row planting where planting is done on two lines on one ridge; legumes like groundnuts on one line and soybeans on the other. There is also '*sasakawa*' where you plant maize 25 centimeters apart.



Figure 1: Mulching

On the other hand, integrated homestead farming refers to food production system that combines vegetable growing; small livestock (chickens, goats) and fish production to improve household nutrition. Kennedy, Friedrich and Rota (2015). Households are encouraged to have backyard gardens and keep small livestock. These technologies are promoted to increase crop and animal yields, supplement income of farmers and meet ecological and nutritional conditions for better living (Dahiru 2018; Singh, Singh, Mrinmoy and Ngachan 2012).

Agriculture Extension Development Officers (AEDOs) promote the technologies using electronic media as well as Interpersonal communication employing the following formats: extension worker-farmer communication meetings, village meetings and demonstration on new farming technologies according to Ndilowe (2013). AEDOs are field staff that manage (agriculture) sections with ten villages or more in Extension Planning Areas (EPAs) supervised by Agriculture Extension Development Coordinators (AEDCs) who head the EPAs and report to District Agriculture Development Officer (DADO). DADO is responsible for all agricultural programs in the district, including extension (Ragasa & Mthinda 2020). Lead farmers, based in the villages, assist the AEDOs to train farmers in the new farming technologies. A lead farmer is defined as an individual farmer who has been elected by the community to perform technology specific farmer-to farmer extension and is trained in the technology (DAES 2010).”

Historically, agricultural extension services in Malawi were developed in the early 1920s by the British Colonial administration to address issues focused on soil erosion or soil protection (Green, 2009). The system aims to reduce information imbalance between users and service providers. In this study, the focus is on print-based IEC materials. The

AEDOs, according to DAES (2010:14) have a responsibility “to source information and disseminate to farmers.” In Mitundu and Chileka EPAs, Agriculture Extension Development Officers help farmers improve their agriculture methods and techniques using different programme interventions to increase production of quality crops. The EPAs receive print-based IEC materials from Agriculture Communication Branch for distribution to farmers and extension workers.

1.2 Background

The Information Education and Communication (IEC) materials are tools vital in stimulating awareness, participation and capabilities of the intended beneficiaries (GoM, n.d:iii). World Health Organisation (2001) defined IEC as an approach that attempts to change or reinforce a set of behaviours in a target audience regarding a specific problem in a predefined period. Print materials are an example of IEC materials. They consist of all written materials, which convey planned course information to assist in promoting positive behaviour. Examples of print resources include, newspapers, newsletters, posters, leaflets, stickers and magazines (de Jong & Parker 1993; Hossain, Quaiyum & Jakariya 2003).

The materials assist in mobilising people for action, for instance, adopting new agriculture innovations or technologies. The print-based IEC products used in the agriculture extension services, among others, include local newsletters like *ZA ACHIKUMBE* (About farmers), posters, brochures and leaflets that ACB produces (Ndilowe 2013). The agriculture extension workers use the print-based IEC materials to among others; introduce new farming technologies to farmers in Malawi’s 28 districts. Other countries, in Africa, America and Asia also put print IEC materials into similar use.

However, some farmers are literate while others are illiterate. According to the definition adopted by the Malawi’s census of literacy (GoM 2019), a person is considered literate if he or she is reported to be able to read and write a simple sentence in any language. Both literate and illiterate farmers need to access and apply contents of the IEC materials designed to promote practices that can contribute to technology adoption and increased

productivity in agriculture. Maize stalks are traditionally burnt, whereas CA advocates laying them on the ground and planting new maize through them, thus retaining soil moisture and forming a natural compost Kumwenda et.al (2013). With this background, it is the aim of this study to assess the effectiveness of such print-based IEC materials in communicating CA and other technologies to farmers. The farmers in the study, are mostly doing subsistence farming, that is, producing crops mainly for personal consumption. Most of such farmers own less than one hectare of land. The farmers grow maize as the main food crop but supplement maize with groundnuts and soybeans to improve soil fertility and boost household nutrition Kumwenda et.al. (2013).

1.3 Literature Review

1.3.1 Benefits of print-based IEC materials

“Going through past literature relating to an issue of importance is essential because knowledge is not static. It is dynamic,” argues Mimansa (2010:4). This implies that reviewing works of other scholars help modify some negative norms, perceptions or beliefs that undermine the power of print-based IEC materials as tools to promote new farming technologies. Kakhobwe (2009:11) argues, “The media provide a realm where people can express their views and can also reach consensus on issues that affect them.” From the author’s argument, any medium depending on how they are used can bring about desired change; however, their effectiveness depends on utilisation.

Cherie et.al (2005:68-9) who conducted a study to assess perceived sufficiency and usefulness of IEC materials and methods related to HIV/AIDS among high school youth, found that “the second most common source of information (80%) was posters in health facilities and schools. The effectiveness of IEC messages is a more important indicator than frequency of exposure.” According to Cherie et.al (2005), students listed a wide variety of preferred sources of information indicating that it is appropriate to continue pursuing a multimedia approach, as none of the sources was highly preferred. Acunzo et.al, (2014:167) also argues that printed mass media are used to raise awareness about an innovation or product, discuss and investigate critical issues or problems.”

Scholars, within and outside the field of development communication have recommended the use of IEC materials in developmental campaigns. For example, scholars such as Cephed (2005) and Mwenesi (2007) recommend making print materials interactive, making them a tool focusing on utilisation of target group's indigenous language. Some development communication researchers (Thorseth n.d; Mukenge 2020 and Bruce 2013) commend print materials for carrying accurate messages so long as producers follow laid down production steps, which include, correct translation of target language, pre-testing, revising, finalising and distributing.

Furthermore, Birham, Godesso, Jira and Morankar (2011) who assessed material production and utilisation, found that "About 48 percent of the participants rated IEC materials (especially posters and leaflets) as very good with respect to understandability and 10 percent appreciated the extent to which it takes account local context."

On the contrary, other scholars deem print materials as passive, not interactive with users for easy understanding. To them, posters, brochures and leaflets can be barriers to audience that does not read and write. Their contents or messages are interpreted differently. Natalia Helen (2008) argues, "Findings of the in-depth interviews indicate that people of different genders and from different social classes do interpret print advertisements in different ways." Low literacy levels is among the key reasons for this. Malawi's literacy rate, as of 2018, was at 68.6 percent. There were more literate men than women; 71.6 percent and 65.9 percent respectively (GoM 2019:21).

1.3.2 Content and design of print-based IEC material

Describing some print material guidelines, Paul, Redman and Sanson-Fisher (2003) argue that a large number of studies have been undertaken to explore the content and design characteristics associated with print material effectiveness. They have studied 'content characteristics,' use of short words and sentences and 'design characteristics', such as the use of headings, organising material into paragraphs, using a sufficiently large font and the use of colour. Most materials users don't need print with too much detail but short to

the point. Coloured materials are encouraged to attract readers. Words with large fonts allow people with sight challenges to read letters with minimal problems.

The members of audience that the IEC messages target have different abilities and characteristics, which makes them have differing preferences. While agriculture becomes increasingly knowledge intensive, new development responses need to be site-specific and driven by local communities. For this reason, more than ever, rural communities require access to up-to-date and reliable information,” Acunzo, Pafumi, Cleofe, Torres, and Tirol (2014:xiii).

1.3.3 Illiteracy versus interactivity/discussion of print-based IEC materials

Other scholars like Adebimpe (n.d) argues that effectiveness of IEC materials largely depends on relevance, appeal, simplicity of content and language familiar to target audience, availability and modes of dissemination, targeting specific groups. The researcher adds, "Not all IEC materials are created equal." However, Cherie et al (2005:67) argues, “Providing mere information alone is not enough to bring about the desired behaviour change.” Effective usability methods of print-based materials need to be applied to have a deeper understanding of the messages they carry to result into innovation adoption. There are also other scholars who have revealed that use of written words for message dissemination, can also be difficult at times as the majority of people in the developing world are illiterate (35 to 55 percent) (Foloyan 2004; Ariel & Avidar 2015; Wegner 1990).

To address this challenge, Van Ruler (2018) proposes for a discussion model where users are able to share and clarify innovation promotion messages to each other. Similarly, Mefalopulos (2008), he argued interactivity enables sharing of perception and creating new knowledge. Interactivity in this study shall mean a medium that enables message accessibility by audience both literate and those disadvantaged. It highly involves the users and their inputs and triggers face-to-face conversation (Ariel & Avidar 2015). It uses targets’ spoken language and influences higher adoption rate of modern technologies, skills and ideas.

Employing print material user language is one of the ways that promotes idea sharing among print material consumers thereby promoting participation or interactivity. “Interactive media involves the viewer as a source of input to determine the content of the message” (Foloyan, 2004:20). This means that print IEC materials have the potential to empower their target audience through discussions or conversations.

Most scholars recommend that IEC materials be able to use languages spoken by the beneficiaries of the channel. Kamlongera (2004:58) argues:

Print visual materials are particularly effective when used to stimulate discussion (an image appeals to everybody and its meaning can be interpreted by anybody in variety of ways) or to draw attention to a specific subject, either by appealing to their curiosity, desires or fears.

Mukenge (2020) who conducted a study on communicative efficacy of HIV/AIDS IEC materials among secondary school teenagers using focus group discussions and self-administered questionnaires, found out that “although HIV and AIDS IECs were generally believed to be (credible, acceptable) appealing and to significantly increase awareness among teenagers, these were also considered somewhat unclear and inaccessible.” Mukenge and Chimbarange (2012) argue that what were considered taboos could not be addressed through the IEC materials, especially on topics about sex. The language used was for specific class of people from which the teenagers could not get meaning out of them. The meanings could sometimes be hidden. This demonstrates a gap in measures that need to be applied by behavior change promoters so that the materials are effective. Thorseth (n.d) and Bliss (2017) argue that as development communicators “Keep in mind how far your viewers will be from the sign (poster) when they see it.”

For instance, Ndilowe (2013) conducted an investigation of the role of communication in the Malawi Agriculture Sector Wide Approach-Special Project (ASWAp- SP). The author claims that leaflets are effective towards communicating to literate farmers alone. Yet. Van Ruler (2018) writes that discussion model allows users to share and clarify innovation promotion messages to each other. Ndilowe’s finding implies that the onus of

understanding the print materials is on an individual user not group responsibility and the design of the materials favours the literate.

However, Hossain, Guaiyumi and Jakariya (2003) argue, “Special attention should be given to the vast segment of illiterate people when designing any poster or other printed material.” This argument is applicable to Malawi and other countries which have low literacy levels and requires that the illiterate be considered to understand the print materials promoting agriculture technologies. Masambuka-Kanchewa et al. (2020) examined factors influencing choice of content and communication channels used in communication interventions either print materials, press releases, radio and television. It was found out that the agricultural calendar influenced choice of information that was disseminated. The information delivered to farmers according to Masambuka-Kanchewa et al. (2020), does not address farmer needs in most cases. Hassan, et al. (2010) who studied mass media and farmers in Malaysia put much emphasis on newspaper effectiveness but found out that the publications were delayed to reach the grassroots (the farmers). Timeliness, appropriateness and relevance of the materials are often ignored.

1.3.4 Monitoring usage of print materials

One other important element according to Adebimpe (n.d) is monitoring the use of print materials to maximise their impact. The scholar proposes that there is need for setting guide for the monitoring and criteria for assessing impact. Monitoring addresses a number of questions, which includes: Can materials on their own be effective in persuading target groups to adopt new scientifically proven technologies? How best can IEC developers and users effectively utilise the print materials for positive results? That is, to achieve high technology adoption. Mefalopulos & Kamlongera (2004:58) testify that materials, which use texts, are very useful when the stakeholder wants to provide the users with technical knowledge on specific issues. The words provide accurate understanding of concepts and instructions. Following the claim made by these authors it will be important to understand how agriculture extension workers have adopted the monitoring model when disseminating print materials and following up with their farmers on CA and other technologies.

1.4 Problem Statement

Analyzing the literature review, one may note that most scholars especially in Malawi have concentrated on investigating appropriateness or effectiveness of agriculture communication (AGCOM) organizations and programmes and identifying most common communication channels used by farmers in Malawi. There are other studies that have looked at effectiveness of print-based IEC materials (Cherie et.al, 2005 & Mwenesi, 2007) but not necessarily on farmers, this presents a challenge especially when looking at the issue of levels of literacy. Malawi already faces a challenge in agriculture technology adoption by farmers. And the current practice is that some small-scale subsistence farmers are inclined to native methods of farming, have negative attitudes, norms, practices or perceptions towards the “scientifically proven new agricultural technologies.” These acts are core drivers of practices preventing new technology adoption. Changing these attitudes is a key challenge to scaling up CA. Agriculture extension uses IEC Materials to address this practice and knowledge gap. The study looks at the communication aspect of the printed materials to audience of different educational levels, an area that has been ignored for a long time.

1.5 Main Research Question

How effective are the print-based IEC materials in communicating new agriculture technologies to farmers in Mitundu and Chileka areas in Lilongwe, Malawi?

1.5.1 Specific Research Questions

1. What processes do agriculture communications branch employ in producing, distributing and disseminating print-based IEC materials on agriculture technologies?
2. How do farmers access and use print based IEC materials on new conservation agriculture technologies or methods?
3. How do farmers process information from print-based IEC material packages promoting adoption of agriculture technologies?

1.6 Theoretical framework

1.6.1 Strategic Communication Theory

The study is guided by Strategic Communication Theory, which is “defined as purposeful or carefully planned communication of an organization to advance its mission, (vision, values and programmes, innovations)” (Hallahan, Holtzhausen, Van Ruler, Vercic and Sriramesh 2007).

According to Van Ruler (2018) strategic communication posits that communication is a process that is interactive by nature and participatory at all times. Another scholar, Phillips (2012) emphasises that communication strategy must reach intended audiences through customized message that is relevant to those audience. It has to influence audience attitudes and behavior through communication strategies, which ensure the "right audience, right message, right time, and right place."

Piotrow, Kincaid, Rimón and Rinehart (1997:14) agree with the rest of the scholars and describe strategic communication as a “steering wheel” that can provide direction for program activities (like new technology promotion). In the elaboration of the strategy, Piotrow et al. (1997), came up with the theory’s 6 key elements which guide discussions in this study.

The first element is emphasis on audience involvement and participation throughout the project a dialogue between program managers and their intended audiences that includes focus-group research, pretesting, sample surveys, interactive counseling approaches, the second is, listening to and obtaining feedback from the audience and the third element is that communication programs need to reach multiple audience segments-including family members, elders and young people, fourthly use of multimedia channels not only to increase awareness and to influence community norms but also to provide specific information, legitimization. The fifth element is sharing costs with other donors and through institution building and skills development. The sixth and last element is appreciation of the crucial role of entertainment, through mass media and at the

community level, to capture the attention, the interest, and, above all, the emotions of an audience and thus to make learning.

The study focused on the extension workers creativity in applying the theory elements or parameters to assess effectiveness of print-based IEC materials. Among such elements are one, employment of user interactivity or group discussions and use of language familiar to target audience, two, strategic placement or pasting of materials, three, using appropriate sizes for posters in terms of picture and texts four, checking if materials used are identified with target audience and understood. Lastly, whether monitoring visits on the correct usage are done or follow-ups on results print materials bring to users.

The aforementioned principles were used to collect and analyse research data.

1. 7 Research Methodology

This was a qualitative study which Silverman (2013) describes as ‘construction of narratives’ answering the How and Why questions, capturing people’s stories, debates, interests and feelings. The researcher engaged two research assistants to collect data from farmers, extension workers and agriculture communications officers. During interviews, the responses by research participants were voice recorded and written in note pads. The researcher also made observation as the interviewees provided responses especially during an experiment.

The qualitative method was chosen because of several factors. It allowed the researcher to be face to face with respondents in their own environment. The method permitted the researcher and the assistant to freely gather data from print based-IEC material developers and end-users. It provided an opportunity to the researcher to ask probing questions if responses given by participants were unclear. In this qualitative study, purposive sampling was applied. According to (Sarantakos 2005:164) purposive sampling is when “researchers intentionally choose subjects who, in their opinion, are relevant to the project.”

1.7.1 Study physical location

The study was carried out in Lilongwe West Agriculture District, particularly, in Mitundu EPA which is 40 kilometres (km), South of Lilongwe City and Chileka EPA is 50 km, West of the City on the road to Mchinji district. In Mitundu EPA, the study was specifically done in Chiwiri and Ching'oma sections, Mkoche and Kalumba villages while in Chileka EPA, the study was done in Umodzi and Mtete sections in Maenje and Katimba villages. Mitundu EPA was chosen because it is close to agriculture district headquarters and Chileka EPA far from the headquarters. Both were identified, in the preliminary findings from agriculture development officers, as potential recipients and users of print-based IEC materials, which are a focus of the study.

In this study conducted for one week, farmers, extension workers and agriculture communication officers were intentionally selected, as materials' end-users and developers respectively, to respond to the research questions through three prioritised research tools. Extension workers are the most common source of information received by farmers especially on crop production, livestock, forestry and post-harvest management (Ragasa and Niu 2017).

1.7.2 Data collection techniques

To answer the main research questions in the study, three research tools were employed namely Focus Group Discussions (FGDs), Key Informant Interviews (KIIs) and Randomised Block Design (RBD) Experiment. The experiment targeted individual farmers that responded to the prepared semi-structured questions. Each tool was aligned to a specific research question. KI Interviews were aligned to question 1, FGDs to question 2 and experiment was aligned to question 3. FGD and RBD experimental questions were translated into local language Chichewa for easy administration with participating farmers that spoke the language. Below is a description of each tool.

First was the Key Informant Interview tool guide a set of semi-structured questions that were administered to 4 agriculture extension development officers (AEDOs) and 2 Agriculture communications officers one from Lilongwe ADD and the other from

Agricultural Communications Branch which is the office responsible for developing and distributing print and electronic agricultural messages DAES (n.d). Among the four participating AEDOs, two were from Chileka EPA and two from Mitundu. Each of them was managing an agriculture section with over 2,000 farmers according to Sigman (2014).

The tool was used to source responses to the first research question: How are print-based IEC materials on agriculture technologies produced, distributed and disseminated by Agriculture Communication Branch? The responses informed the researcher on the processes and approaches employed in the production, distribution and dissemination of the materials to targeted farmers. Responses were written on A4 size paper, note pads and recorded the audios which were later transcribed for analysis.

Second tool was focus group discussion (FGD). It is “a way of collecting data, which usually involves recruiting a small group of people (often between six and eight) who usually share a particular characteristic” (for instance extension workers or farmers) (Silverman 2011:207). The tool answered to the research question: How do farmers access and use print based IEC materials on new agriculture technologies or methods? Focus group discussions also found how the materials reached intended audience or where the materials ended up to once received from extension workers.

Focus Group Discussions were administered to 4 groups of farmers, 8 members in each group (4females and 4 males). the groups were composed of participants with different backgrounds in terms of gender, age, marital status, level of education (literate or illiterate) and source of livelihoods. The tool was chosen because it permitted the researcher to seek views of farmers who are the end users of the print-based IEC materials on agriculture technology promotion.

The last was the Randomised Block Design (RBD) Experiment that targeted individual farmers that responded to the prepared semi-structured questions whose main question was: How do farmers process information from print-based IEC material packages promoting adoption of conversation agriculture technologies? It also evaluated farmers

understanding of messages on the designs exposed to both illiterate and literate respondents. The experiment was conducted with 20 individual farmers, 10 females and 10 males. Out of the 20, 11 were illiterate and 9 were literate farmers. Refer to the Figure 3 below:

Gender	Literate	Illiterate	Totals
Males	5	5	10
Females	4	6	10
Totals	9	11	20

Figure 2: Participants to RBD Experiment

There was no control variable in the study since the researcher compared three types or categories of printed IEC materials (photos only, text only and text with photos) independent variables while the dependent variable were the farmers understanding/interpretation of print-based IEC materials.

The experiment design was influenced by a C4D study conducted by Mendelson and Darling-Wolf (2009). The scholars were interested in the perceptions readers formed about Saudi Arabia based on three versions of the story they read, which version prompted more stereotypical thoughts about the country and Arabs, in general, and which prompted more nuanced or complicated thoughts.

The authors created three versions of the story for the study: photos only, text only, and both photos and text. A trained graduate-student moderator led discussions, whereas another graduate student observed and took notes.

Results showed that the group that saw the entire package recognized the photo story and the text as composed of two competing narratives, which made them uncomfortable. The two groups that examined the photographs stressed more stereotypical views than the group that examined the text only, focusing on the deserts, camels, and oil. The photographs appeared to cause a distraction from the text's ability to generate a more complex understanding of Saudi culture.

For the purposes of this experimental study, a print material on CA technology produced by ACB, was slightly modified by removing pictures, text (words or narrative) and put them separately as independently designed materials. This resulted into having 3 CA material categories of photo only, text only and a combination of photo and text.

The semi-structure questionnaire was used to collect data from individuals who were involved in the experiment. Their responses helped determine farmers understanding of the print-based IEC materials they receive from Government. The interviews were used to determine the link between farmers' understanding of materials and their demographic characteristics. The findings were coded into themes that represented common idea and a narrative of each theme and taken into the “findings” section of a study or for a general summary that went into the “discussion” section as the overall findings according to Creswell and Creswell (2018:272). The experiment tested farmers on the print material designs they best understand based on their individual characteristics. The participants were given five minutes to browse through the materials and identify key messages from CA print material design with either photo only, text only or with a combination of photo and text.

The participants also did analysis of the materials in terms their designs and came up with what could be their most preferred designs and what was not appropriate with the designs. They were observed on their reactions during the experiment by the researcher.

1.8 Data analysis

Data analysis is a process of cleaning data to keep relevant one that is, omitting useless data, doing statistical analysis, answering questions in the research study etcetera, according to Durcevic (2020). A narrative based on responses or content gathered, in form of texts and statistics from various sources are provided. The feedback from KI interviews, farmers' focus group discussion, AEDOs and the RBD experiment provides findings on the effectiveness of print-based materials. Responses from both KII and FGDs were written down and recorded on audios, which were later, transcribed for

analysis. The responses were coded. Those that frequently came out from the tools were considered for analysis that resulted into classifying responses into thematic categories.

1. 9 Ethical considerations

Bearing in mind that the proposed methods of data collection needed working with farmers in Mitundu and Chileka EPA study sites, working with copyrighted material and institutions, the researcher adhered to the University of Malawi ethical guidelines for conducting research at every stage of the research process. The researcher sought permission from Agriculture Extension Development Coordinators in both EPAs and agreed on specific dates to carry out the FGDs, KI interviews with farmers and AEDOs respectively.

A researcher's letter of introduction from the college refer to Appendix c: Letter of Introduction, was carried during the study for identification. Prior to the study, the researcher explained to the respondents that the purpose of the study was purely academic.

The researcher then, sought clearance from Lilongwe West District Agriculture Office and some lead farmers using the print materials. Consent to participate in the research, was also sought from individual or group interview respondents to be provided as evidence in future, in case it (consent) was questioned. Refer to Appendix b. Consent Forms and Question Guides 1 to 3.

1.10 Significance of the Study

The preliminary analysis conducted with Agriculture Extension Methodologies Officer, Webster Jassi (2021) revealed that print-based IEC materials were among the communication tools used in Lilongwe EPAs. Their purpose is to influence desired behaviours, practices and norms including adoption of new farming technologies as a new solution to an existing problem, which is low productivity in agriculture according to JICA Malawi Office (2021).

It is critical to know material effectiveness in terms of usage gaps, preventive behaviours and practices and surface ways to improve material outputs. The study aims at assessing effectiveness of print-based IEC materials when communicating new agriculture technologies to farmers in Lilongwe, Malawi. Effectiveness of IEC materials would ensure no farmer is left behind where taking positive action or skill adoption that is acquired upon receiving messages prepared by communication initiatives. The materials will have to serve all including those with barring conditions like semi-literacy or illiteracy challenges.

The assessment study aims to suggest modes of printed material usage that social and behavior change communication (SBCC) facilitators can apply in their new technology promotion drive and attain anticipated communication results. These findings could be increasing popularity, demand, and usage of new technologies in areas of agriculture, nutrition, education and economy among others. The study will above all, add to the body of knowledge through some new research findings and results including proposed future research areas. It could further act as a reference providing information and recommendations to readers and stakeholders involved in promotion of agriculture technologies through printed materials.

1.11 Study limitations

Print based IEC materials are used by farmers and AEDOS in 28 districts in Malawi. The study is not representative of all Malawian districts. This study was conducted in Lilongwe particularly in two EPAs out of 36, which are also subdivided into 596 sections (Lilongwe ADD, Annual Report 2015). During the study period, there was great fear of contracting COVID-19 which forced the investigator to buy and provide masks to respondents. Farmers' limited access to print materials on CA affected their understanding and interpretation as others indicated that instead of accessing them in Chileka EPA in Malawi, they saw the materials in the neighbouring country of Zambia.

1.12 Chapter Breakdown

Chapter 1 provides an introduction to the research, definition of study terms like IEC materials, lead farmers and interactivity. It presents the problem statement, main and

specific research questions, literature review which comprises arguments made by other scholars in relation to the topic under study, and the rationale of the study to the field of development communication. The chapter further provides study methodology including description of theoretical framework to guide the study processes, drawing of results and conclusions.

Chapter 2 presents detailed research discussions and conclusions on findings from KI Interviews focusing on how Government through agriculture extension workers distributes various print-based IEC materials on agriculture technologies to farmers. Chapter 3, through farmers FGD findings, analyses processes used for farmers to access and practice printed information on the agriculture technologies. The chapter also explains how print-based IEC materials reach the end-users- the farmers once received from extension workers.

Chapter 4 examines and discusses experimental findings, on farmers' understanding of CA print-based IEC material. Depending on farmers characteristics the chapter discusses they interpret print materials to get the accurate meanings. Chapter 5 gives summaries of four chapters, highlights the key discussions and conclusions of the study, discusses areas of future studies or study implications based on the research findings and analysis.

It has been discovered by some scholars that materials were not totally kept in stock but rather thrown in unsafe and undetermined places (Godesso, Jira & Morankar, 2011). In their study, they found that there was no documentation, stock balance was being practiced, and it was evident that no follow up about the distribution and utilization of those materials, has been practiced. The claims are devoid of evidence on modes that make a medium effective in influencing audience to learn, memorise message content, change attitudes, sustain desired behaviors and fashions (Botan 2017).

CHAPTER TWO

PRINT MATERIAL PRODUCTION, PACKAGING AND DISTRIBUTION PROCESSES

2.1 Introduction

This chapter highlights some of the key findings from the first research question which is looking at how Department of agriculture extension services (DAES) through Agriculture Communications Branch (ACB) produces printed IEC materials and how agriculture extension development officers (AEDOs) distribute the print materials on conservation agriculture (CA) technologies to the targeted farmers. Key informant interviews (KIIs) were conducted with extension workers and Senior Agriculture Communications Officer for ACB and Agriculture Communications Officer for the ACB and Lilongwe Agriculture Development Division (ADD) respectively in order to understand how ACB produces, packages and distributes various print-based IEC materials on conservation agriculture (CA) technologies.

The chapter further presents results of an investigation on AEDOs expertise in relation to C4D recommended IEC distribution and dissemination mechanisms and methods.

2.2 Results and Findings

2.2.1 Print material development processes

This section highlights various steps and processes that are followed in developing print materials so that they meet required standards to address farmers' knowledge gaps on agriculture technologies identified during the needs assessment carried out by Agriculture Communications Branch. Among such processes are IEC content gathering and packaging, pretesting, refining and printing, distribution management and process financing.

2.2.2 Print material content gathering and packaging

KI interviews revealed that DAES, through ACB first does needs assessment with extension workers and farmers themselves in the field or consult agriculture research extension to identify where there is a knowledge gap like in conservation agriculture or pig production.

“Sometimes we do literature review from where message is crafted either for farmers or extension workers and agro dealers,” revealed senior agriculture communications officer. The messages are translated into target group languages such as Chichewa, Chitumbuka, Chiyao, Chisena, Lhomwe and English for extension workers.

Depending on size of content to be used in IEC products, ACB makes decisions to package them on booklets, brochures, posters or leaflets. Then, designing of materials is done followed by pretesting and refining of products and finally, they are printed for distribution. The content defines the pictures to use in the print material, for example, fertilizer application, double row planting. However, the agriculture experts from various fields such as land resource, crop or livestock production present content from their technical viewpoint from where messages are developed.

2.2.3 Distribution management and guiding principles

Besides development and printing, ACB distributes the print materials either, direct to EPAs or via agriculture development divisions and district agriculture development offices for distribution to farmers. The quantities of materials distributed depend on farmer population size in a particular district or EPA to be supplied. In ideal situation, the findings revealed that when produced in bulks, which is not always the case, the distribution is done by AEDOs, lead farmers including village heads and agro-dealers. Basically, distribution of materials is done monthly depending on funds availability and speed of processing them. It also relies on the season an area is, which determines type of material to distribute, rainy or dry, planting or harvesting time. If it is planting season then, messages on fertilizer application methods are distributed. Distribution through lead farmers has been the common method because the lead farmers are the ones who are in

direct contact with the extension workers. Since a section can have over 20 villages, the extension worker may not be able to go to each and every village so lead farmers who are the representatives of farmers take up that job.

Lead farmers have been very helpful in our line of work; one extension worker can have up to 20 lead farmers. We even need more because communities are growing every day and we have more farm families.
(AEDO Chileka EPA, 04/04/2022)

Village meetings, was also mentioned as one of the common channels by the PRO. It was reported that through these meetings the AEDOs carry printed IEC materials for distribution and discussions with farmers. Almost all the AEDOs confirmed that they really use the method. The method, extension workers said is effective because it gives them room for demonstrations and where farmers have questions they are attended to. In this method, they also promote translation of materials to illiterate farmers. In these meetings, they promote the behavior of letting others to help you; they encourage farmers to ask their children, neighbours and relatives to interpret material for them. However, there has been a limitation in practicing this because they can only do it if the materials have come in bulk, which rarely happens. Therefore, extension workers have decided to use the other modes of distribution to ensure that they do not bring enmity, during village meetings between those who have received the materials and those who have not.

Tearooms were highlighted to be another mode of distribution. It was found out that Chewa speaking farmers in the central region of Malawi especially Lilongwe, value tearooms as such it is their common practice to drink tea from tearooms rather than in their homes. This culture has upscaled the popularity of tearooms, making them more accessible to most farmers. Extension workers have therefore taken advantage of this channel to distribute posters and other print-based material. AEDO of Mitundu said,

Distribution channels vary from area to area, in our case, mostly, we stock posters in resource centres or paste in tearooms, we understand most farmers patronise tearooms so, we fix them in tearooms so that farmers access them as they drink tea.

Besides, the AEDOs fix print materials on trees, on a lower scale, because their safety on trees is not guaranteed. The reason is that people pluck them off even when the message is still wanted to address the prevailing issues such as fall armyworm control. This investigation allowed the researcher to carefully analyze the effectiveness of the channel itself both in theory and in practice.

The study also found out that print materials were effectively distributed through Village Resource Centres, in areas where such facilities exist, notice boards in Extension Planning Area offices, via lead farmers who in turn have the potential to reach many farming families in their area, via village meetings organized by the AEDOs and lastly, via placement in tearooms. This section discusses the distribution models of print-based materials that were presented by the participants.

Village Resource Centres (VRCs) were identified as one of the advanced channels of distribution for printed IEC materials that the ACB has recently been advocating for according to the PRO. VRCs are enclosed spaces which are donated by the community to work as libraries of on various agricultural information and message (PRO, 04/2022). Although VRC's are a recent model in Malawi, such structures have already been introduced in other countries such as India, Cameroon, Burkina Faso, the Democratic Republic of Congo, Mali, Nigeria and Botswana (Hegde, 2016; Degrande, 2015).

Scholars such as Shaijumon & Menon, (2016) have identified VRCs to be significant in knowledge diffusion, innovativeness, and productivity of farming communities. They help to improve the quality of life in villages by providing new knowledge at the doorstep of the common man, in vernacular language, thereby reducing information inequality and the emergence of a new socio-economic relationship. According to the PRO, the approach allows farmers and all other villages to access information very easily within their own communities.

The setup is that literate volunteers run such places; they help in organizing, safekeeping and translation of materials to illiterate farmers. These structures, according to the PRO,

aim at helping farmers to access information when they need it, whether it be on CA, integrated homestead farming or any agricultural technology. After accessing and using them, such materials are given back to the volunteers responsible as librarians. When the extension workers were asked on the same, they mentioned the same structure to be on campaign of being implemented. For Mitundu EPA, one of the extension workers said that she has such a structure in her area's model village which is currently running.

However, findings from the other AEDOs indicated that, the Village Resource Centre idea had just been introduced as a policy and they are working towards its establishment.

“We have received information from DAES that we should also include an approach of establishing village resource centers and we have told our farmers about it. Some of them have already identified places to put up the structures, so we know it will roll out soon.” (AEDO, Mitundu EPA, 03/04/2022).

This information contradicts to findings by Ndilowe (2013), who her study was conducted in a different village but in the same EPA Mitundu. Her findings showed that farmers usually access the print information in the resource center, which is located in the village. They visit the resource center twice a week to read together. The resource center is one of the ways of dealing with the problem of illiteracy in the village. When the farmers go to the resource center those who are not able to read and write have an opportunity to learn through a program locally known as Kwacha (adult literacy school). Therefore, from the findings especially in a statement by one of the AEDO's that the policy was just introduced, it demonstrates lack of awareness and enforcement on the policy between agricultural communications branch and extension workers as well as farmers.

Pasting print materials on notice boards in the EPAs and ADMARC was also identified as one of the modes of distribution. The PRO explained that print materials are pasted strategically in the notice boards to avoid them from getting destroyed or stolen. He mentioned that, as the communication branch, they have trainings on strategic distribution of printed materials to ensure that materials last long and they are properly

used by farmers. Similarly, all the AEDOs said that they paste materials on notice boards and commonly these are annual rainfall calendars which are distributed across all EPAs. The Extension workers did not mention having any training on such strategic placement of posters but they knew that it was their responsibility to ensure that the materials are safe, somewhere where farmers can continuously access them.

2.2.4 Financing production and distribution processes

Financing production and distribution process costs is key to successful implementation of the programmes. According to ACB senior agriculture communications officer, production, distribution, printing, pretesting have budgets whose funding sources are agriculture projects or government's other recurrent transactions (ORT). However, the respondent could not divulge information about how much is put into the budgets that the KI reported are prudently used. This is because just like in the provision of agriculture extension services, decision making on financing and number of materials to produce, follows a "top-down approach," in department of agriculture and extension services.

2.2.5 Print as one of Government key communication channel

One of the key questions in the study sought to investigate the most widely used channels of communication in extension work, promoted by the government of Malawi. In this regard, the study revealed that extension service was the primary means of communication seconded by the radio, print and mobile phones. It is revealed that direct information from extension workers was commonly used in sharing agricultural information, messages and updates to farmers.

Print-based IEC materials were commonly used for sharing information on agricultural technologies to farmers. Results also revealed that, mobile phones were also used through mobile short message services (SMSs) and toll free line which was introduced with DAES in conjunction with the National Smallholder Farmers' Association of Malawi (NASFARM). Farmers' cellphone numbers were recorded into the system to receive updates on new farming technologies. Although the AEDOs have not yet confirmed if indeed farmers are still receiving such texts messages, they were sure that the programme

was to roll out earlier in 2021. Briefly, extension services, radio, print materials, and mobile phones SMSs, were identified as the common channels of communication. There were other channels such as interactive cinema shows and drama, which were reported to be frequently used in the past. The channels' users relied on projects that were implemented in the impact areas.

2.2.6 Use of Printed IEC Materials and farmers voices

As the study aimed at assessing the effectiveness of print materials in particular and more specific questions were asked on the use of print-based IEC materials in the study population. The printed IEC materials have been very effective in disseminating information on agriculture technologies as it was explained by all the extension workers. It was identified to be effective as it is readily available to the farmers despite absence of the extension workers. Presenting their opinions or voices, participating farmers during focus group discussions especially in Mitundu reported that CA commonly known as *Ulimi Wa Mlera Nthaka* in their local language: Chichewa, has brought higher yields from crops especially maize and groundnuts and better family nutrition.

In Mkoche village for example 5 out of 6 in the focus group adopted CA technology. Our extension worker grouped us according to type of CA technology we do practice like maize-bean Intercropping, Rotation: maize after groundnuts, Residue retained soon after harvest and Planting using a dibble stick.

Similarly, in Maenje village, 3 out of 6 farmers who participated in focus group discussions adopted CA technology when it was introduced using print materials in 2011 but material distribution was discontinued by extension workers. Farmers who adopted CA, highlighted some benefits they are getting from their gardens. One of the farmers in Kalumba Mitundu disclosed, "We are now able to harvest up to 20 fifty kilogramme bags of maize per acre. From the same acre of land previously, we could harvest 6 bags only."

However, notice that the results were opposite of some villages. For example, in Katimba village in Chileka all participants said that they have not adopted any CA technology

because they said they had not received materials on CA. there are other materials which they have accessed but they were on other different farming technologies like soy farming distributed by GIZ.

Clarifying on the matter why farmers some farmers adopt the CA technology in Mitundu EPA, the AEDO who was interviewed explained that the current materials on CA distributed in the area, have much details especially facts and measurements or dimensions which make it easier for farmers to use print as a communication channel. Refer to appendix d, Image1: KI Interview with AEDO in Mitundu EPA. The print materials, according to the AEDOs observation, surpass extension service as they allow farmers to access information at any time of need.

Even though the extension workers identified print materials as effective in communicating agricultural information, they indicated that printed IEC materials were largely inadequate, such that they do not reach quite a very big audience in terms of farmers. In addition, they also lamented the lack of monitoring mechanisms that would ensure that print media is an effective tool for agricultural communication. However, almost in all the four sections where AEDO's were interviewed, it was quite clear that printed IEC materials come in less quantities that they do not reach quite a very big audience in terms of farmers. In Chileka it was worse, extension workers said that, there are times they only have three copies to distribute to a very big area in their section where there are over 2000 farmers.

This limits the effectiveness of the model, extension workers resort into not distributing the materials, alternatively they just study and deliver the messages through extension services.(AEDO Chileka, 04/04/2022).

When the PRO was asked why this is the case, he said that commonly such materials are distributed by other development partners so for the government to translate and distribute in large numbers in high quantities is a very big challenge. Apart from that, such materials target other development partners that are there in the EPAs so they are still relevant. In terms of language, the extension workers who were interviewed said that

the design of printed IEC materials is very simple for a layman to grasp the idea. Language is very clear (Chichewa) often and again the aiding photos are relevant and they help illiterate farmers to follow with interest. In terms of they also said that, they use discussions to translate the messages which is aimed at helping illiterate farmer. They do that through lead farmers, farmer clubs and farmers' children.

The extension worker in Mitundu area said that they have been promoting this reading to fellow farmers approach because the AEDOs know that they will not be available in the communities every time. They also promote the spirit of helping each other where they encourage literate neighbours or children of farmers to translate the messages of printed IEC materials to those that are illiterate. Messages are distributed in all the villages to conduct group discussions so that all types of farmers both literate and illiterate can benefit from the discussions.

Though, there has been a huge success in terms of translating materials to local languages there have been other materials which have been sidelined commonly those with technicalities. A good a example which was given was of a CA poster which has measurements but it is only in English. This limits the ability for farmers to understand such materials as there are only a few farmers who are able to read and understand English.

We have a CA material which is very well detailed, a good material with all the measurements but it's in English. We can rarely distribute it to farmers because what is the use? They do not understand. (AEDO Mitundu EPA, 03/04/2022)

The design of the material has also been user friendly. There is a local message platform (321) which is linked to the agricultural communication branch and it is found on printed IEC materials. ACB's telephone numbers are also pasted on these posters to give room for questions and clarifications. In terms of monitoring, the research participants indicated that there was no proper monitoring strategy in place. The PRO mentioned that DAES provides a hardcopy of monitoring tool at an EPA to show the quantity of distributed IEC materials; however, there was no mention of a proper follow up. Apart

from that, he also mentioned that through the village committees created at a village level, they are able to follow up on that. All the AEDOs interviewed mentioned nothing of that sort. Nevertheless, one of them from Mitundu mentioned that they monitor through practice of a particular technology or method. However, when asked how they balance between information, which is acquired through other means of communication such as extension services, she was unable to do so.

Observing from these finding, it can be concluded that CA information has not been effectively promoted which has challenged its adoption. Ndilowe (2013) who found that there are inadequate communication plans for the promotion of technology uptake and scaling up also presented similar findings by the Agricultural Communication Branch. This can be the reason for in adequate print materials promoting CA technologies amongst farmers and extension workers.

In conclusion, the study has established that there is effective use of printed IEC materials in the areas visited, though minimal since it is challenged by low supply of materials use of foreign language for other materials and lack of monitoring by extension workers.

2.2.7 Field of expertise for extension workers

In examining whether extension workers working within the study population had an academic qualification in extension work, the study found that almost all the extension workers had qualifications in agricultural extension although they lacked specialized knowledge in communication for development. This is unlike communication for development; agriculture extension follows a “top-down approach, that is, information flow is mostly extension worker to farmer. The extension workers interviewed had a minimum qualification of a Diploma in Agriculture obtained from Natural Resources College (NRC). In the case of Chileka Extension Planning Area (EPA), one of the AEDOs had a Bachelor of Science in Forestry as her credentials which is a very higher qualification. Refer to Appendix d, Image2: KI Interview with AEDO in Chileka EPA.

PRO for agricultural communications branch who reported to have undergone a training in development communication through his journey in pursuing Masters of Arts in Rural Development in Communication as well as a Diploma in Information Communication Technology. The interviews discovered that the PRO had a very good understanding of what is required for a successful communication design and distribution process as compared to the AEDOs and this can be attributed to the fact that he had a wide and rigorous training in communication through his studies. These findings are contrary to Rugasa and Mthinda's (2020:239) findings, which stated that only up to 16% of extension workers employed by the Malawi government, have a primary or high school education.

In terms of extension workers training in C4D or communication in general, they reported that they have never attended such trainings. However, they mentioned that in the course work at NRC and Lilongwe University of Agriculture and Natural Resources (LUANAR) where they all did their school, the course work had an element of communication. One of the extension workers in Chileka EPA, Mtete Section, said, "I remember I was given training in communication within another course whilst I was in college. The course, Participatory Rural Appraisal had a certain element of communication which was emphasized throughout the course work."

According to the extension workers, inadequate training in communication has limited their work in terms of facilitation of effective use and distribution of printed materials. In Mitundu one of the extension workers said that distribution of such materials is just done without any proper strategy as they are not aware of the procedures and skills required to undertake such a task. The findings are very clear that most extension workers are well trained in agriculture extension itself though they are limited in terms of communication skills. This has had a negative impact on the effectiveness of print material distribution as well as management and usage by the farmers. This implies that extension workers low knowledge of communication skills reduces the rate at which print materials could have contributed to CA technology adoption. Although, the AEDOs are able to interpret the messages on print-based IEC materials to the farmers, there has been multiple challenges in terms of management as stated by the strategic communication theory principle.

2.2.8 Challenges associated with management of print materials

The study investigated on common challenges associated with management of print-based IEC material. Among them mentioned by extension workers were lack of transportation, provision of low quantities of print materials, receiving materials that are in foreign language, English, too much or scanty details in one leaflet.

According to extension workers, distribution requires them to have proper means of transportation, which they do not have, for example, in Chileka; the AEDOs who were interviewed did not have motorbikes but their working areas or villages are 4 to 5km from their residential areas. It costs extension workers 6000 kwacha to and fro movement if they paid for a taxi motorbike.

Inadequate supply of IEC materials was also indicated as a key challenge. According to the extension workers, the material that are delivered to their agriculture sections are not adequate for their farmers. In one of examples from an AEDO in Chileka, she said, “There was a time I was given 3 leaflets to share to farmers and in my area I have over 2000 farm families, I was puzzled.”

Looking at the ratio, it is indeed a very big challenge that limits distribution and access of farmers to printed IEC materials. However, when the PRO was asked what could be the cause of the limited supply of printed IEC materials, he dismissed the allegation. According to him, the allocation is based on the number of farm families in a particular EPA that the ratio is very considerate. He continued to say that there is a tendency of keeping IEC materials in offices for some areas especially those that have extension workers who are not good at their job.

The other challenge is producing materials in English language rather than vernacular Chichewa especially those that are technical such as the CA poster which talks about measurements. This limits the ability for farmers to understand such materials. There are only a few farmers who are able to read and understand English. One of the AEDOs also

mentioned that some of the materials are oversimplified so much so that farmers do not get adequate information by just reading them. She gave an example of a poster on homestead farming, which only shows the types of food without complete information on how to practice the agricultural technology. She said that such materials are limiting, they could have at least included the contacts on where the farmers can get answers to their questions.

Agreeing with her was her colleague, AEDO in Mitundu who said:

Those who develop and produce print materials do not spare time to discuss with us, extension workers. We are just told by our supervisor, AEDC (Agriculture Extension Development Coordinator) to collect the materials from EPA where they are delivered, and distribute them to farmers.

According to the respondent, that is a big challenge since farmers mostly rely on agricultural extension to implement conservation agriculture and other farming technologies.

“Printed materials have the capacity to turn tables for the farmers as they are self-applied training manuals, you cannot require an extension worker to help you with a CA technology. In this system where transportation is hard for us to visit every village within our EPA these materials could have been helping them. We just do not know the strategic procedures to make them effective.”

Unlike the AEDOs who throughout the interviews could not possibly say why there are some challenges, the PRO was able to isolate the root causes since he had vast knowledge in both agricultural extension as well as communication. Across the EPAs, AEDOs indicated tendencies of having a little knowledge in communication or not having specific training in communication has affected both distribution and use of printed materials between extension workers and farmers.

2.3 Discussion of Results

2.3.1 Extension workers distribution skill gaps

One of the significant findings from the study was that extension workers are adequately trained in agriculture extension rather than communication. Agunga & Manda (2014) also presented similar findings he argues that: “although extension workers are asked to facilitate entire development interventions, their training remains primarily in agriculture extension. According to him, they need training in Communication for Development (C4D), an emerging body of knowledge for addressing problems, such as participation, integration and capacity building.”

What these scholars are arguing is that extension workers who are handling print-based materials need to undergo a training in communication. The bottleneck is that extension workers have limited knowledge in information transfer skills such as: participatory, advocacy and dialogical which are C4D approaches. This concurs with Raina, Chahal & Khel (2016) argument that extension personnel should have sound knowledge of the subject-matter and be conversant with various communication methods and media to disseminate the information effectively and to ensure its effective adoption by the farming community under different socio-economic situations.

We cannot entirely dismiss them in the distribution process of print-based material since their position as experts in the field of agriculture makes them the best individuals to disseminate printed IEC materials on agriculture technologies. Bill & Melinda Gates, (2009) encourages provision of ‘multi- level training to service providers covering qualified, semi- qualified and non- qualified providers to improve correct use of product.’ As experts in agriculture, extension workers clearly know what information is required for their farmers to use the new agriculture technologies being promoted; they know what action farmers are expected to take.

Therefore, providing them with such training will prevent them from guessing on best communication methods to use in order to promote the technologies. Utilization of such methods influences farmer’s acceptance and adoption of farming technologies (Sharma et

al, 2020). C4D approaches promote demand for products and services. This implies that training on print material usage is important to extension workers as well. This removes overreliance on what can be called dormant methods like pasting on notice boards, village resource centres or just handing them over to farmers.

2.3.2 Integration of Distribution and Participatory models

Participatory models is where a communicator combines discussion or dialogue with distribution of print materials to enhance users understanding of the content. The study examines whether the modes are used in material distribution process. There are a number of things which have been indicated in the study findings which shows that there is a need for strengthening the dialogic and participatory model that are already in existence. Scholars have indicated that village resource centers are regarded as an effective means for farmers to access print materials (Hegde, 2016; Degrande, 2015; Shaijumon & Menon, 2016). Although this is so, the current study has observed that the implementation of such a model has not been successful in the visited areas. This may be the case because the policy was just directed from the officials at national level in a top-down approach. This policy therefore, would be challenging to implement as the model requires the farmers to donate a structure as well as the ACB to provide EPAs with adequate printed IEC materials which so far has been identified as the biggest challenge.

According to Cerna, (2013) the top-down approach means policy decisions are passed on from the national level to the lower levels without involvement of the locals (bottom-up) which the writer observes may bring impact at lower as well as higher levels. It is therefore key that the ACB should change its approach as the researcher has noted that already there are efforts by extension workers attempting to resolve some of the existing problems. We have observed in the findings that extension workers have been promoting the employment of a system of aiding illiterate farmers in reading printed materials. They do that through lead farmers, farmer clubs and farmers' children.

This practice follows the dialogic principle in the theory of strategic communication. A study conducted in South Africa by Carstens (2004) revealed that it is important for

communicators to “use a conversational style” of reading to help audience with low-literacy to understand public information materials. Similarly, Adebimpe (n.d) observes that effectiveness of print depends on ‘contact’ and ‘feedback methods which include dialogue, discussions or information sharing through teaching and learning.

It is, therefore, crucial to note that, as presented by the extension workers reading the materials to those unable to read has given an opportunity to farmers to know the technology. Beyond that it has also enabled extension workers to assess farmers understanding of the technologies through their technology practice.

When people reading materials to the illiterate farmers are familiar like children and neighbours that makes them free to ask questions for clarifications on the print materials they receive. Discussing or demonstrating print material content with farmers or farmer-to-farmer interpretation is in tandem with strategic theory element of interaction and participation or involvement. Studies have shown that messages processed in discussions method tend to be retained for a longer time and are more likely to lead to permanent change (Kreuter, Strecher, & Glassman, 1999).

2.3.3 Print material distribution scheduling

One other key finding was that materials do not reach the farmers or AEDOs when they are required to address a prevailing issue. This means that the distribution of materials do not have a proper schedule and there are inadequate monitoring mechanisms to ensure its effectiveness. However, ACB senior agriculture communications indicated that they make follow-ups to verify if farmers received the print materials they distributed in EPAs. This challenge is not only in Malawi, a similar challenge has been reported in Malaysia. Hassan et.al (2010) reports, “Some of the printed publications do not reach the grassroots level, finance and delayed information received are among the problems faced by the Department of Agriculture Malaysia.” Scheduling of distribution is a solution to the challenge so that most farmers are reached. Consultation is crucial in resolving issues of delays, undersupplying designing suitable materials and dissemination mechanisms.

C4D scholars describe print materials as best for record keeping and best daily reference material. Aboglila (2021) argues, “No one is untouched by the use of print media. It is going to happen to us every day like we all start our day with a newspaper. Can you imagine a world without paper?” what this author is promoting is the use of print as it keeps history and reference for everything. Extension workers low monitoring of farmers’ compliance to print material messages nevertheless, makes it difficult to determine adoption rate of agriculture technologies by farmers. Farmers have a tendency of relying on the extension workers’ presence to implement the technologies, although they have been shared some printed materials. If the extension workers were making efforts on that, they could have promoted the culture of keeping printed IEC materials safe for reference in their farming activities.

Another solution to the challenge in terms of distribution model is promoting the use of language spoken by the target audience. This reduces the number of printed materials that are undistributed due to low literacy levels of a particular community. Furthermore, the innovative use of tearooms as an effective distribution channel for print materials is in support of key principles of strategic communication: contact and availability by promoting the use of readily available local structures within the community.

Other scholars like Trippathi (2021:5) argues about the positive gains of monitoring. The author states that monitoring helps in result amplification and develop verifiable success parameters. It is therefore, key that monitoring should be implemented at all levels to ensure that the print materials are effectively promoting the adoption of CA technologies.

2.4 Conclusion

Findings in this chapter have indicated some positives in terms of use, distribution and dissemination of print-based materials on agricultural technologies. Majority of print materials distributed by AEDO’s are in native language however, the major challenge is extension workers are only qualified in agriculture extension. Their knowledge in communication is limited. The materials are designed in local language and farmers are able to refer and continue with some discussions. Extension workers are to consider

interactivity in IEC materials. that is, sharing ideas through discussions or dialogues but the AEDOs have limited skill to use the methods though the materials are in the languages that participants' groups speak. In addition to skill challenge is that the ACB provides low quantities of materials and in some cases, there is over simplifying of materials. Nevertheless, the materials are very effective among the users. Extension workers have devised some local models of dissemination such as use of tearooms, use of literate relations to read out to illiterate farmers as well as conducting discussions on print-based IEC materials in farmer clubs to interpret messages to illiterate farmers. They have also adopted some of the advance models as guided by the ACB such as village resource center establishment policy promoting storage of print materials to increase farmer access. All this has contributed to the effectiveness of print-based materials in terms of use and distribution. Despite all this, there has been a number of challenges that slow down the process and in this section; we have attempted to provide some of the solutions as suggested by other scholars.

CHAPTER THREE

EXAMINING HOW FARMERS ACCESS AND SHARE PRINTED INFORMATION ON AGRICULTURE TECHNOLOGIES

3.1 Introduction

In order to understand the effectiveness of printed information, education and communication materials, Chapter 3 presents the findings on the processes used for farmers to access and share printed information on conservation agriculture technology.

The findings for this chapter were generated from the focus group discussions conducted with the farmers from both Mitundu and Chileka Extension Planning Areas (EPAs). The groups comprised of both literate and illiterate farmers in both areas. Refer to appendix d, Image 3: FGD with Farmers in Mitundu. The farmers are organized in clubs at extension planning area level with each club having a minimum membership of 10. According to Development Aid from People to People (DAPP) Malawi (n.d) the overall objective of the Farmers' Clubs program is to train and organize smallholder farmers in rural areas to create community structures, cooperatives, which will assist them to maximize their returns on labour investment and other inputs and ultimately improve their living conditions. They are also established as a wider forum of learning and sharing of farming experiences for instance use of improved plant varieties, integrated pest management techniques and crop rotation to avoid soil depletion.

The last part of the chapter has presented the discussions of the results on farmer adherence based on the elements of strategic communication theory.

3.2 Results and Findings

3.2.1 Modes Farmers Access Information on Conservation Agriculture

Farmers access information in different ways either through extension workers that supply them with printed materials, lead farmers, notice boards EPA where they are

pasted. Government of Malawi, (2016) states that the initial establishment of EPAs has been to help farmers get contact with extension workers and it has been the most common means of communication. One of the questions which farmers were asked aimed at understanding the common means of communication which farmers use to access various information from government on conservation agriculture and other agricultural technologies. According to the respondents from all the four villages in extension sections in Mitundu and Chileka, extension services are the most common means of accessing information on conservation agriculture technologies. The farmers reported that extension services are the most common because they are reliable means for accessing information on CA. The services are provided by the extension workers themselves and the lead farmers.

Chiwiri section farmers in Mitundu EPA in particular, said through such services, extension workers visit them monthly. One of the respondents in the section said:

Extension workers have been very vibrant in this area, their means of training us is very effective as it allows us to have direct contact with them, sometimes it allows us to ask extension workers very important questions and often they demonstrate to us what it means. This helps us to understand and adopt the technology because we are fully informed (Chiwiri FGD male participant, 03/04/2022).

The respondents also indicated that extension workers visit them tirelessly especially during the rainy season because they know there is a need for guidance in their farming activities. According to them, messages and information coming from extension workers reach them in time. Common identified strategies that extension workers use to disseminate messages and information are farmers' field schools, demonstrations and village meetings.

The focus groups from across the EPAs indicated that radio was another common means of accessing information on agriculture technologies. However, the farmers reported that some of their colleagues do not always have time to be around the radio and the radio does not give much of a platform for discussions, although some programs have a phone-

in strategy. According to them, phone-in programmes were still limiting due to issues of airtime.

Print was rated as the third key means of accessing information by farmers. In terms of frequency of receiving printed materials, farmers reported that the materials are seasonally received. A participant from Mitundu commented that:

These materials come when they are in demand, for example, two months before the rainy season, calendars are distributed and pasted on EPAs notice boards. This allows us to prepare for the planting season, if by then you were not ready, you are alerted to be.

Most participants in Chileka were not sure when exactly the materials come in, if they have any schedule or order. The group in Maenje village said they once received print materials on CA in 2011 when they adopted the CA. Use of printed IEC materials such as posters and leaflets, as the participating farmers reported, was slightly more common in Mitundu in Mkoche and Kalumba villages because of higher distribution there than in Chileka EPA where access was very minimal or zero at times.

In the two villages under Mitundu EPA, farmers reported that they receive the materials from extension workers and lead farmers. At times, they see them pasted in trading centres. According to the farmers, the lead farmer approach has been benefiting them as it allows the farmers to work with a person they are very familiar with. They are also able to ask questions freely leading them to adopting the new farming technologies.

Answering the question on whether printed materials are given and used to disseminate information on new agricultural technologies such as CA, one farmer at Mkoche village in Mitundu during FGD said,

Yes, extension workers give us the print materials but mostly, they are given to lead farmers. They come in very small quantities but we sometimes see or read others in our trading centers where they are fixed on trees.

At Maenje the research participants said the materials are given more especially when farming season begins in the months of September, October and November.

Other farmers said they access printed IEC materials on demonstration farms. This is more common in farmers who have been chosen by seed companies that distribute seeds. The companies advertise their seeds using printed materials which are pasted on the farmers' fields so that other farmers recognize the seed brand which mostly does well in terms of yield.

The other means of accessing information that were found included film screenings. They are especially effective if participants are given the opportunity to discuss the film after the showing.” According to one group of the farmers in Maenje Village in Chileka EPA, The National Smallholder Farmers' Association of Malawi (NASFARM) once in while showed agricultural films in the area promoting agricultural technologies. NASFARM's has been known with the function of organizing, supporting and representing the smallholder farmer, including at the national level (Makwenda, 2010:65).” NASFARM promotes farming (cash and food crop production) as a business in order to develop the commercial capacity of its members, and delivers programmes that enhance member productivity. Kumwenda (2013) explains that NASFAM's overall approach is using conservation agriculture, crop diversification, grain banking, seed multiplication and nutritional education to support food security. This is to ensure households are food secure.

Other means mentioned were public announcements or loud hailing using mobile vans and drama performances which appeared to be used only in rare circumstances because most participants were not able to recall when they had such means of communication.

In summary, findings in this section have identified extension services provided by lead farmers and extension workers seconded by printed materials to be the most commonly used methods in accessing messages on CA by farmers in Mitundu and Chileka EPAs in Lilongwe. Radio was also among the top four that were reported commonly used. There

were other means of accessing information that were revealed namely drama performances, film screening and mobile phones, though other participants indicated that they are not very commonly used.

3.2.2 Printed Material destination

Since this study is about the effectiveness of printed IEC materials in communicating agriculture technologies, this sub-section will therefore, investigate on where the distributed printed IEC materials end up to and how they are used in CA promotion. Respondents indicated that some materials, once distributed, end up in EPAs notice boards and Resource centers. However, most farmers' groups said that they do not have VRCs. According to the farmers, they have been told about the new VRC establishment policy and preparations are underway to erect them. However, at Umodzi Section, farmers were very skeptical if such a facility will be established sooner because there is no coordination in the area and they doubted if the idea could be properly managed.

Nevertheless, the respondents also said materials end up with lead farmers, individual farmers' homes and village heads' custody and reference during lead farmer to farmers' meetings and village meetings respectively. Sometimes materials are kept for further physical distribution to farmers during extension visits depending on the quantities supplied to extension workers. They are also used for reading and interpreting material content to illiterate farmers. The extension worker also uses the materials to demonstrate on how particular farming technologies which are on the print materials, are done.

Contrary to the expectation of farmers, some extension workers were reported just piling up the printed materials in their offices instead of ending up in farmers and village heads' hands. In a comment by one of the farmers in Chileka EPA, Umodzi Section a farmer said that: Some extension workers just pile the posters in their offices instead of distributing them to us. That is why some of us do not even know what a leaflet is.

3.2.3 Aiding Illiterate and Semi-Literate Farmers

One of the most reliable method of assisting illiterate farmers was reading printed material content to them (illiterate and semiliterate) farmers to understand the materials. This was established through the discussions that were conducted with the farmers. Participants from all the four villages said that the extension worker chooses a lead farmer. The lead farmer or extension worker reads the printed IEC materials to illiterate farmers. At the end of the reading, the floor is open for discussion of the material. According to one of the participating farmers:

The process helps us to understand what has been written, and the illiterate farmers benefit from the interpretation of the messages. You ask a question on what is not clear and the feedback is given on the spot.

Other farmers revealed that when they are not able to read, they ask a neighbor, children or a lead farmer close by to help them read the content. One of the participants in Chileka EPA said:

This (assistance in reading) allows us farmers to discuss naturally and understand whether with our children, family and friends. Mind you these are materials being read by someone, so often we ask questions in order to understand when the message does not come out clearly. Answers to the questions supplement our understanding.

3.2.4 Print Material pass-on policy

Farmers especially from Chiwiri section in Mitundu revealed that they follow a pass-on policy approach towards usage of print materials. In this approach, after receiving and reading the materials, those farmers that have read pass the materials on to the next readers who have had no chance to read the materials. The system works well where materials are in short supply, like in most sections of Mitundu and Chileka EPAs. Similar policy is applied in the distribution of a Government of Malawi vernacular newspaper- *Boma Lathu*. “The paper is distributed for free to the public. The idea is that it should be passed on to the next reader,” says Maganga (2018).

3.2.5 Farmers perceptions on Design of print materials

Respondents indicated that they only receive materials made of paper and access those made in other formats in demonstration fields. Three focus groups said the materials are designed in the way that it is easy to understand. They are mostly in their native language, Chichewa. A focus group member from Katimba village in Chileka EPA said:

The size of letters on the posters that we received were big enough and readable, pictures were clear only that the posters were not on conservation agriculture but on soy farming technology.

Three focus groups reported that the print material developers mostly use Chichewa. However, one focus group at Kalumba village in Mitundu said other materials like those of CA come in English and that makes it very difficult for them to understand.

3.2.5 Challenges Faced by Farmers in Accessing IEC Materials

There were a number of challenges faced by farmers when using and accessing printed IEC materials. Among the challenges, those that frequently came up had to do with limited supply of materials across all the four villages in Chileka and Mitundu. In Mitundu, some farmers mentioned that through their lead farmers, they have access to the materials. However, these farmers also said that, some farmers from their area do not have access due to unlimited supply of print materials.

This was worse in Chileka, Umodzi Section which is very far from the Trading Centre and the EPA. Farmers in the area said that they have completely no access to such materials, it was only the lead farmer who said that he once accessed printed materials. One lead farmer also reported to have received IEC materials though he reported they come in small numbers, which limits distribution of the materials. Another farmer also said that: "I used to access such materials when I was in Mitundu, but not here, I didn't even know that such products are available for our area."

Another challenge which was identified by the farmers was that there is delay in distribution of printed IEC materials. Participants said that the extension workers in their areas are not very committed and they delay the distribution process. According to the

farmers, materials reach them when their time of use has already expired. One of the participants gave an example of fall army worm material which was distributed when the problem was in its worse stages while the situation needed to be treated with urgency. In Mitundu, this challenge did not come out from the participants but from an extension worker from Chiwiri section who reported on the same delay which she said affects their work.

One more challenge farmers highlighted was that some extension workers just pile the printed materials in their offices when they receive them from EPAs or ACB. One farmer in a focus group at Maenje village in Chileka EPA, complained:

Print materials already come in small quantities, but extension workers just pile them in offices yet, we need such materials as farmers. Let extension workers distribute those materials

One more factor challenging farmers' access to materials is lack of cooperation amongst themselves to establish Village Resource Centres that allow farmers to access printed materials at their own convenient time in a specified place offered by the community. In Chiwiri section, farmers said that they have identified the land, although there were other conflicts. The farmers said they would ensure the conflicts are resolved because the policy has been put in place and it needs their action. In Umodzi and Chiwiri sections, respondents reported that there is that idea of establishing a Resource Centre but no one has come out offering a place to erect the facility.

Another key challenge that was mentioned by the farmers is high illiteracy levels. This has resulted into more farmers not having the passion to use printed materials. Additionally, participants said some farmers have no interest in new farming technologies. Even though repeatedly such farmers are taught whether through print, radio, film or extension services, they show no interest.

These people are stuck in indigenous knowledge their forefathers gave them, they do not accept to try out new things, said a participant in Mitundu EPA on 03/04/2022.

Lastly, there was a revelation that some farmers are just not interested in new farming technologies. Such farmers have no interest in whether the technology is promoted through print, radio, film or extension services.

The above findings have indicated these challenges are the cause for limitation in access to printed material as well as its effectiveness. Farmers are worried about the low quantities of printed materials distributed; although they indicated, print is very helpful when it comes to understanding of technological terms and accessing them anytime they are needed. There is a lot which needs to be done from both the material senders who are extension workers and the receivers who are the farmers if effectiveness of printed IEC materials is to be realised.

3.3 Discussions of the Results

One key finding was that Print-based IEC materials were at second position as a means for accessing information by farmers despite lower quantities given to farmers. Surprisingly, materials were reported to be seasonally supplied or supplied after three years with low quantities of materials. The findings revealed that availability of enough and relevant CA materials was questionable. Sometimes those materials available were not even distributed to farmers by extension workers. A communication for development scholar Wu, (2005:238&240) argues:

The printed text remains the standard. Printed materials carry a greater guarantee of permanence. While it is possible for print materials to be retracted, wholesale removal of materials that are already printed, distributed, or both is difficult to effect.

The author adds that print formats deliver benefits that their digital brethren cannot because printed materials are thoroughly vetted and are reliable. The argument justifies why they should be rated second even if they are in short supply. So long as they are, at a given time, made available or interactive with target audience as an element of strategic communication, the benefits they bring to a community are noticeable.

However, farmers suggest that there should be an increase in the quantities of materials provided to enhance their effectiveness in influencing CA technology adoption. In terms of the design, print IEC materials, sometimes they are metallic or plastic and at times they use papers that cannot be affected even when there are rains so they stay in the fields for a very long time. However, most print materials farmers received were in the form of paper. The design does not affect the message conveyed. The only difference is that the metallic may be more durable than the paper design.

Although the participants differed in their responses towards extension workers' handling of print materials, the other key finding was that extension workers pile printed materials in their offices instead of distributing to the end-users. Harmsworth & Turpin (2000:24) argues it's good to make use of events, professional bodies and subject associations that audience (farmers) engage with to disseminate the materials. The authors affirm that:

Earlier projects have sometimes made the mistake of believing that they had to undertake all their dissemination on their own although experience has shown that identifying existing channels through which to work can be one of the most effective methods of dissemination. (Harmsworth & Turpin, 2000:24).

It can also be argued that the extension workers were overloaded with work or they did not know what to do because they had not undergone any professional training in communication for development to distribute and disseminate the materials.

From the FGDs, findings shows that some farmer groups, though not all, discuss and read the materials to fellow farmers who are unable to read and write (illiterate and semi-literate farmers). Farmers indicated that they use children and neighbours to read or interpret them printed materials. This has a very greater impact in helping illiterate farmers to understand print-based information, which has improved the dissemination of printed messages. The findings, concurs with one of the propositions of strategic communication theory. The proposition states that audience participation should be valued in information creation, interpretation and sharing, (Piotrow, et al, 1997:18).

According to Pitrow et al (1997) ‘communication shifted from monologue to dialogue’ or discussion as one of the main print material dissemination method. The discussion, as noticed, is promoting inclusivity of farmers of different backgrounds or characteristics in terms of their education status, age and gender among others.

However, notice that although this has its own benefits it must be emphasized that a discussion prompted by an extension worker/ lead farmer who has more knowledge on the issue could be beneficial, a discussion led by a neighbor or a child of a farmer may lead to wrong or incomplete information. Therefore, in order to ensure that the process is effective, it is very crucial that lead farmers and extension worker lead the discussion while the other relations may just be a supplement (people to remind illiterate farmers on messages which have already been interpreted by extension workers or lead farmers. Through this process as argued by Pitrow et al. (1997) it will allow the audience to ‘reach mutual agreement which in turn makes collective action (such as adopting CA) possible.’

From this discussion, it follows that effectiveness of print materials is dependent on how best they are utilised. At times, they require channel mix like field demonstration and dramatizing messages conveyed by the materials. The print materials require not just distributing them to farmers but also engaging them into a discussion to have the message so that they slowly understand and adopt the messages.

Hassan et al, (2010) advises that farmers should be provided with the schedule of the date for the dissemination of messages in order for them to be ready to access them. Similarly, if the Agricultural Communications Branch could adopt this approach, it will help both extension workers and farmers to be ready on when to access the materials. This will also help in accountability and openness of distribution as people will be answerable when some EPAs or farmers have not accessed the materials. On its own, this strategy can be used as a monitoring and evaluation tool for print-based IEC materials both on CA and for other agricultural materials.

3.4 Conclusion

The main research question in this chapter aims at presenting the processes or methods used in order to allow farmers to access and adhere to printed information advocacy on conservation agriculture technology adoption. Farmers, mostly like using print materials, as their reference materials, in the absence of the AEDOs. Despite inadequate supplies, there has been effort of making the print materials interactive or dialogical by discussing in farmer clubs and or farmer-to-farmers discussions as revealed in the study.

Based on the findings from this research work, it can be argued that printed material content on CA can be adequately accessed, adhered to and promoted, if appropriate distribution and dissemination processes are followed: discussion or interactivity and CA technology practice monitoring to verify its adoption. “Print visual materials are particularly effective for generating discussions,” argues Ndilowe (2013:70). On the other hand, the scholar states, “The disadvantage, however, with print media as observed by the farmers is that it favors those who are literate.” The discussion process makes information dissemination inclusive of all the farmers including the illiterate which is in line with elements of strategic communication theory.

CHAPTER FOUR

FARMERS INTERPRETATION ABILITIES AND USAGE OF PRINT-BASED IEC MATERIALS ON CA TECHNOLOGIES

4.1 Introduction

In this chapter, I present findings from the farmers interpretation abilities and usage of print-based IEC materials on conservation agriculture technologies. The findings were drawn from 20 participating farmers in the experiment: 9 literate and 11 illiterate farmers. The experiment investigated on how farmers interpret content of particular conservation agriculture print-based information, education and communication materials exposed to them for promoting adoption of new agricultural farming technologies.

Respondents were exposed to 3 categories of materials, in Appendix c; Leaflet X with photo only and one page, Leaflet Y with Text only with 4 pages and Leaflet X with Text combined with Photos with 5 pages twitched for purposes of this experiment. ACB however, only produces and distributes photo and text material design which only a few illiterate farmers that have reading aids, preferred. The farmers were given over 5 minutes each to browse through. They were tested in a number of areas namely identification of key messages from materials, comments on how materials were designed. The experiment assessed farmers meaning processing skills that they normally use when they receive and share materials. The method gave room to the researcher to observe farmer reactions when exposed to the materials. The findings were drawn from the experiment conducted in four villages in Chileka and Mitundu EPAs. The farmers that previously saw printed CA technology were able to identify key messages faster than those seeing materials for the first time. Some individual farmers were observed and heard complaining of too much detail in text and photo material. The plan was to have equal numbers of literate and illiterate farmers involved in the experiment but the lead farmers involved in selecting members of families went for higher numbers of the farmers in illiterate block than literate. Refer to Figure 3: Participants to RBD

Experiment. Changing in the last minute was a problem because other farmers had left for other village activities.

The final part of the chapter presents the discussion and conclusions based on the identified themes from the findings.

4.2 Findings and Results

4.2.1 Examining farmer's identification of CA printed materials

Out of 20 participants tested one by one, 4 participants identified and reported to have seen and used the conservation agriculture technology promotional materials. One of them from Kalumba village said, “*Inde ndinatiwonapo timapepala iti ku musonkhano wa alimi ku Mitundu EPA*. (Yes, I once saw these leaflets on conservation agriculture technology at Mitundu EPA where we had farmers-extension workers meeting). The other farmer from Katimba village said she saw the CA leaflets in Chipata Province in Zambia bordering Malawi to the east in Mchinji district.

From the same Katimba village, one respondent indicated that she saw the leaflets however, they were not on CA. The ones she came across were on groundnuts farming technology. What clearly came out of this identification process is that, it was possible to have respondents from one village, give different responses. In addition, this shows that more agriculture technologies are promoted through print-based IEC materials. CA technologies is just part of the technologies promoted in the EPAs.

The rest of the 16, indicated they had not been exposed to such CA printed materials before but they have heard about them from farmers in other clubs. The materials they had seen were promoting other farming technologies, for instance, fall army pest control, groundnuts, banana and soy bean production.

One respondent from Mkoche village was captured in vernacular, Chichewa explaining: “*Ndikuyamba ukuku kuwona timabuku ngati ititi chifukwa alangizi athu amangobwera kudzatiphunzitsa za Ulimi wa Mleranthaka*.” (This is the first time I am seeing this leaflet on conservation agriculture technology. Normally, our extension workers only come to

train us on the CA technology without such materials). Similar sentiments were made by participants from Maenje and Katimba villages respectively.

4.2.2 Assessing farmer's ability to understand key messages from CA print materials

As part of the experiment, farmers individually were first provided with the first CA material with photo only. After five minutes of browsing, both illiterate and literate farmers found it very easy to identify key messages from the CA material designed with photo only. One of the farmers in Mkoche village in Mitundu said:

Chithunzi chikundipatsa ulangizi wonse chikuyankha mafunso anga onse a m'mene ndingayalire mapesi, m'mene ndingadzalire chimanga ndi zina.
(The photograph directly gives me a picture of how crop residues are laid in the crop gardens. It answers most of my questions I may have on CA farming technologies).

In the second phase of the experiment, participating farmers were provided with a CA material with text only. Most literate farmers identified messages from materials with text only but three illiterate ones were seen just flipping pages and stopping browsing even before the allocated time ended. These could not process any information from the text or said very different things from what was in the text.

The third and last category provided consisted of a five-paged leaflet with combination of photo and text. The literate farmers identified messages from leaflet with text and photos. The literate identified more key messages than illiterate who relied on the photos in the leaflets to get key messages. Among the common messages identified included:

Ulimi wa Mleranthaka ndi njira imodzi yochulukitsa zokolola
(Conservation agriculture is one of the methods of increasing crop yields);
Ulimi wa Mleranthaka ndi kuphimbira nthaka pogwiritsa ntchito zotsalira m'munda kapena masamba a mitengo kuti nthaka ikhale yachinyontho
(Conservation agriculture is the concept where the soil is covered with crop residues or tree leaves to keep soil moisture). *Timapepala tikukamba*

za Ulimi wakasakaniza obzala mbeu za m'gulu la chimanga pamodzi ndi za m'gulu la nyemba (The print materials talk of intercropping maize and legumes like beans and pigeon peas).

The literate participants were able to connect pieces (photo and text) without taking much time and effort. The literate farmers could as well identify correct messages from the category of photos only especially from images that were clear and big enough.

Despite not being able to read texts on their own, the illiterate farmers said if given print IEC materials with texts and photos, they still benefit from them because farmers are assisted by friends or children to interpret the contents of the materials. One of the female participants from Katimba village who was exposed to photo and text material category said: *“Aka kophatikiza malembo ndi zithunzi kakugwira mtima ngakhale kwa ife osatha kuwerenga chifukwa ngati iwe siutha kuwerenga, ena atha kukuwerengera ndikukuphunzitsa”* (Material with photo and text is satisfactory even to some of us who do not read and write because if you have it others can read to you and orient you about the CA technology).

4.2.3 Testing farmers' opinions on whether print materials are persuasive

During the experiment, the researcher sought farmers' views on whether leaflets exposed to them persuade farmers to adopt CA technology. It was discovered that farmers exposed to print materials are encouraged and reminded of the importance of CA technology. 75 percent (15 out of 20) respondents said they would make a decision to adopt the CA technology without attaching any conditions so long as the extension workers continued visiting and correcting some common errors on technology implementation to increase their crop yields.

However, 25 percent of the respondents (5 out of 20) said they would adopt the technology on the condition that they would be supported with other basic needs like fertilizer and improved seed varieties of different crops. One farmer in Chileka EPA, Kalumba village said

Njira yamakonyi ya Mleranthaka ndiyabwino chifukwa umakolola zambiri koma ine singayambe pokhapokha nditathandizidwanso ndi zipangizo zina monga feteleza ndi mbeu yamakono. Njira ya Mleranthaka siyongofuna kugwiritsa ntchito mapesi kapena manyowa okha ayi imafunikanso fetereza kuti mbeu zikule bwino. (The CA technology has lots of benefits, for instance it increases crop yields. But in my case, I cannot start practicing it because I still need other basic needs like fertiliser and improved crop varieties to practice it).

Despite farmers' readiness to adopt the CA technology, it was revealed that in some ill-minded villagers set fire on the cover crop residues some farmers laid in their gardens as one of the types of CA technologies, mulching. "It was so disturbing to have our crop residues we used to cover our gardens burned by these ill-minded villagers," complained one of the farmers.

4.2.4 Farmers preferred print material designs

It was found out that most illiterate farmers preferred leaflet design with photos only because they indicated that photo only was very easy to understand. It provided room to directly see how CA is practically implemented how retained crop residues cover the soil. On the contrary, literate farmers preferred a leaflet with a combination of both text and photo.

Two respondents from Maenje and Kalumba villages said *Zima pepala zophatikiza malembo ndi zithunzi ndizabwino chifukwa zithunzi zikuwonetsa zoti munthu ayenera kuchita monga kayalidwe ka mapesi, kupereka umboni kwa alimi pamene malembo akuthandizila kulongosola mokwanira za chithunzi ndi mauthenga.* (Photo and text category of materials is good because through the photos, the materials illustrate how the technology is done and also the texts give more message details to the farmers that use the materials). Refer to Appendix d, Image 4: RBD experiment in Mitundu testing farmers understanding of leaflet.

Contrary to expectation, however, even some of the literate farmers (2 out of 9) preferred material design with photo because the image was showing what exactly, the CA technology is done which they said they could follow. Three out of 11 illiterate respondents preferred text and photo design. A participant from Kalumba village said, “*Ndibwino kukhala ndi zonse zithunzi ndi malembo chifukwa kungokhala ndi kopanda malembo, kapepala koterokatha kuperaka uthenga woperewera kwa alimi.*” (It is good to have materials with combination of photo and text. Otherwise only having either of them text or photo can give unsatisfying or incomplete messages to the farmers).

Comparing the designs, a respondent from Kalumba explained that the photo only material has less message details while the photo and text materials, have more details and are more elaborate.

4.2.5 Participants analysis of CA Material Design

In the experiment, 6 out of 20 that participated said all the three print material designs were good, they met all required design standards and that nothing was wrong with them. 14 identified the areas to improve. They cited issues of small size pictures. For these participants, some pictures were too unclear for them to easily understand the message the materials intended to convey to farmers. A participant at Maenje village said if the photos are not clear, it is difficult to make any meaning out of it.

In their opinions, the font size of words and photo sizes and numbers in the materials needed to be increased so that all age groups including those 55 years and above are able to read the materials with ease. Five individual participants from Katimba, Kalumba and Maenje villages proposed that *Zithunzi zizikhala zazikulu komanso zambiri kuti munthu ukopeke mtima. Zilembo zakenso zizikhala zazikulu kuti enafe ovutika kuwona tizikwanilitsa kutolapo kanthu.* (The photos should be big enough and many in the material to attract us. Words should be printed in large fonts so that those with sight challenges can still process some information from the materials).

Further to that, participants proposed that materials be made into different languages rather than Chichewa and English alone.

“Ndikanakoda mabukuwa akanakhalanso muziyankhulo zosiyanasiyana zomwe zili mu Malawi muno powonjezerapo pa Chichewa kuti aliyense amve mosavuta mauthenga ali mutimabukuti.” (I could have loved to see that the materials are also translated into other native languages besides Chichewa).

Comparing the sizes, the one with photo only was easy to make meaning out of it because most of its page was covered with photos. Both the illiterate and the literate understood how mulching should be done through a picture. A leaflet Y with text only, was noted to be demanding too much time from farmers to get the message. Developers and designers need to come up with leaflets with few words to attract farmers to read. Farmers preferred huge pictures with few or no words. However, the leaflet X in appendix c with both photos and text from ACB was reported to be overloaded with words and some small pictures confused the readers.

4.3 Discussion of findings

The principles to analyse print-based IEC materials interpretation abilities for farmers in chapter 4 was gathering feedback from audience or material users for instance, are IEC materials reaching multiple audience as one of the principles of strategic communication. Additionally, do printed IEC materials capture the attention, the interest, and, above all, the emotions of an audience. In the experiment, it was found that the most preferred print material design by illiterate farmers was leaflet with photos only. They were able to process photo information or key messages from the pictures that were clear. The farmers said the clear images demonstrated to them practical implementation of the CA technologies. However, the participants indicated that photos should be big and attractive for farmers with low literacy levels to get key messages. A communication for development scholar, Carstens 2004 argues that:

Communication specialists who are in the business of writing public information documents need to take cognisance of this fact (that some

members of audience have not completed primary school, or have no schooling at all) if they are committed to producing documents that meet the needs and skill levels of their different audiences.

In the leaflet X photos combined with text from ACB that was used for experiment, one photo could not clearly provide meaning to the research participants both illiterate and literate farmers who were exposed to the material during the experiment. This implies that there was little consultation with the users of the materials. Or else, there was no pretesting of the materials which one of the most important steps in print material production. The shortfalls could have been identified during consultations or pretesting of the materials. One respondent from Maenje village in Chileka EPA, while pointing to the pictures, in his reaction, said, *“Zithunzi zinazi zikundithandiza kumvetsetsa za kachitidwe ka ulimi wa Mleranthaka koma chithunzi ichi sichikuoneka bwino kuti upeze kuti chikupereka uthenga wanji. Nkofunika kuti zithunzi zizikhala zazikulu komanso zowoneka bwino.”* “These other pictures are helping me understand how CA technology is done but from this one, I can’t tell what CA technology message it is conveying. There is need for pictures to be large and clear for us to learn from them.”

Arbuckle (2004) says, “pictures and illustrations are widely used in educational materials aimed at readers with minimal reading skills, and rightly so.” However, the scholar adds that for the picture viewer to understand a picture correctly, they must know certain conventions for example laying of cover crops (mulching) in CA, one-one planting of maize, spraying of pesticides in vegetables depicted in the picture. This explains why illiterate farmers preferred materials with photo only since they have very minimal reading skills. In the case of CA technology, a picture may present how crop residues are used to cover the soil which the illiterates see directly. The picture on its own explains the details.

Jalilehvand (2012) argues, “information is much easier to retain and retrieve when it is dual-coded (text length and picture) because of the availability of two mental

representations instead of one.” The words explain message details while a picture provides real life situation, evident and practical.

Two scholars, Lavalley and Briesmaster (2017) conducted a study on *Use of Picture Descriptions in Enhancing Communication Skills among the 8th Grade Students—Learners of English as a Foreign Language*. They found out that: the students’ communication skills increased as result of integrating picture descriptions in classroom activities, which in turn enhanced the students’ overall participation.

Using pictures can bring benefits to teaching as “About half the world’s population is illiterate,” according to Lavalley and Briesmaster (2017) and German Scholars Goetze and Strothotte, (n.d), In Malawi, “There are 15.0 million persons aged 5 years and older and out of these 10.3 million persons are literate, representing 68.6 percent literacy rate. There are more literate men than women, 71.6 percent and 65.9 percent respectively” (GoM 2018:21). This means that 31.4 percent are illiterate. These 31.4 percent can be denied access to information which can be vital for employment, health, and the participation in political processes.

When exposed to CA leaflets with clear photos, farmers were able to identify accurate messages from the materials and confidently said they could practice what was displayed in the images. Henry (1987:6) argues that:

printed and duplicated materials are almost certainly the most versatile and most important. They can, for example, be used to provide the basic resource materials on which the exercise is centred, provide the participants with instructions or guidance on how to carry out the exercise, and provide ancillary or illustrative material of various types.

Farmers were able to process information from print materials that they could use in their work. They were also able to analyse pictures that were not giving any meaning regarding CA technology. This is in contrast to focus group discussion findings where respondents were indicating all pictures were clear. This could have been because they were not tested to identify the messages from the pictures and texts in the leaflet. It can

be argued then, that for illiterate farmers, photos only are effective or appropriate kind of print materials because they help them easily understand the CA technology by directly seeing in the picture how the technology is implemented.

The other finding and result was that in the leaflet, a text should not be ignored as it targets both the literate and illiterate. The illiterate farmers indicated that though not able to read and write, they still needed the text and photo because their children and friends help them read or interpret the printed materials. Arguing for print materials necessity Nath (2014) says:

In developing countries like India, print materials are still the dominant medium of instruction... Print materials need to be used optimally to help compensate for the physical gap between learners and teachers in such a context.

Print materials material help farmer even in the absence of their extension workers or lead farmers. However, farmers understand materials designed differently. This implies there is need for ACB to consider producing the most preferred designs of photo only including text and photo combined to reach all farmers with varied characteristics rather than targeting the literate alone. Currently, the ACB only produces print materials combined with text and photo Leaflet X which are delivered to farmers through extension workers or lead farmers.

Nevertheless, other illiterate farmers had no connection to the text as observed during the experiment where they could respond contrary to what the question looked for, for instance: what key message do you get from the leaflet? They looked uncomfortable and answered questions out of context. A clear example is a participant from Katimba village in Chileka EPA. When she was asked what key message she identified in the material she was exposed to, she said nothing and later said she needed help from someone to read to her to understand the messages. This explains why strategic communication stresses on dialogue or discussion as a way of increasing understanding and promotion of technology in question.

Print is very effective when used with other mediums like demonstrations, discussions and edutainment which combines education and entertainment like drama, comedy and interactive films. Farmers indicated that extension workers use print for discussing and demonstrating to farmers the messages conveyed by leaflets in their areas. Also, though not frequently used, drama groups and video screening are conducted to promote new farming technologies. From such findings it could be argued that mixing of communication tools is beneficial as it contributes towards obtaining expected results. Adzharuddin (2013) attests that “the integration of these two or more mediums can promote memory performance and encourage positive attitudes on the part of consumer (or audience).” Similarly, Raina, Chahal, & Kher, (2016) argue for the idea that it is important for extension workers to be “using the most appropriate communication tools, media mixes since they “act as a hub to transfer, persuade, motivate and convince the farmers to accept and implement the new technology and information.” The scholar exemplifies strategies like farmers visit systems, discussions and trainings.

Further, print was found to be farmers’ platform for reference because it is always there with farmers as long as it is distributed to them. Opele (2015) explains “where electricity supplies are inadequate and many lack access to computer databases, print resources seem to be preferable for the purpose of service delivery.” In villages under Mitundu and Chileka EPAs, electricity is not available. Print materials, according to farmers, are handy and user-friendly. That is why it can be concluded that most farmers demanded for provision of print materials in large quantiles because they always refer to the materials when they want to implement CA technologies especially on some recommended dimensions or measurements like spacing between plants and ridges respectively.

However, 14 out of 20 farmers who participated in the experiment, identified the key CA messages from the leaflets. They emphasized on their stand to adopt CA technology. However, besides expressing willingness to adopt the technology, they were also much concerned with access to fertilizers than the technology itself. They linked successful CA technology implementation to fertilizer availability at their household, which they argued was a challenge to them. One farmer at Maenje village said:

Yes, am very much willing to adopt CA but the technology does not only need manure application, but also requires fertilizer if I am to produce bumper harvest from my crop gardens like maize. My main challenge is failure to afford buying fertilizer which, now, is very expensive MK45, 000 per bag of urea.

It is then, argued that farmers can understand messages and level of understanding of CA and maize production, from farmers responses, is increasing but the decision to adopt new technologies considers other personal and contextual considerations that apply to them. That farmers are not passive recipients of government recommended policies and initiatives. They have agency and are capable of making informed decisions given the information and the situations of the time.

The experiment revealed that mere interviews on farmers' understanding of print materials was inadequate because interviews based much on gathering opinions of farmers. In the experiment, they were able to pick key messages, analysed the materials and identified some errors in the materials. They did not accept the materials wholesomely. It can therefore, be argued that practical understanding tests used in the experiment demonstrated how best print based IEC can be able to communicate to farmers, that the tests validated the responses provided by participants in the focus group discussions. Showkat and Parveen (2017) argue that the advantage of communication research is that "the reliability and internal validity of experiment research is high. Experimental methods minimise the errors or random variance. However, the scholar argues that the weakness of experimental methods is that they are expensive, lengthy and time-consuming." In my view, experiment just needs to be properly planned and given time for its findings are not far from truth.

4.4 Conclusion

The chapter responds to the question on how farmers process information from print-based IEC material designs through an experiment. Farmers best understand messages conveyed by print materials designed in different ways rather than one size fits all, photo

and text. Most illiterate farmers' best understood messages from CA material with photo only and were uncomfortable and embarrassed if given text only. The literate respondents best understood messages from both photo and text materials. Farmers' preferred print different material categories, which influenced them to make decisions to adopt CA technologies being promoted or advocated.

They further understood the CA materials by integrating them with other communication channels for instance, in the case of the illiterate, reading materials to them, engaging them in discussions, dialogue and demonstrations including theatre and cinema. It was noted that theatre and cinema were rarely performed and screened respectively, in their areas. Hassan, et al, (2010) promotes the use of a communication channels mix and cites the practice in Malaysia on using materials on other channels. "The Department of Agriculture Malaysia has produced 20 types of printed publications and they are also one of the major sources for radio and television agriculture programs aired at Radio Television Malaysia and Selangor FM."

Above all, the participants could best have understood print-based IEC materials that were designed to their expectation and liking such as those in their mother tongue, those with just enough details, not overcrowded, those with large font size of letters, those with large size and clear photos to process accurate information from them.

CHAPTER FIVE

GENERAL CONCLUSIONS

5.1 Introduction

Having discussed chapters 1 to 4, it is expected that the chapter highlights key points from the various chapters that support the topic of the research, answers the research questions, addresses the research statement, aims, goals and objectives, identifies missing gaps then suggest recommendations for policy makers or further research. The study assessed the effectiveness of print-based IEC materials when communicating new agriculture technologies including conservation agriculture to farmers in Mitundu and Chileka areas in Lilongwe, Malawi.

5.2 Summary of Chapters

5.2.1 Chapter 1

Chapter 1 outlines the general introduction and background of the research study. The study focused on effectiveness of agriculture communication tools particularly, prints-based IEC materials of (leaflets, posters, newsletters) to achieve agriculture technology transfer and adoption by farmers.

The literature review assessed print design methodology, accessibility, readability or audience ease of information processing from the materials. According to Oyeleye and Laninhun (2021).The content of IEC materials should be accurate, action-oriented, culturally sensitive and acceptable to the target audience.

The literature review conducted revealed that most studies were conducted on effectiveness of agricultural communication organisations and programmes and or mass communication in general (Ndilowe 2013) rather than print specific. It was revealed that the purpose of print based IEC materials are meant to reduce farmer's knowledge gap on technologies. They are farmer reference materials. The review of works of other scholars

revealed the gap on which the study with three research questions, was created. It was revealed that some farmers are sticking to traditional ways of farming, among them there is low adoption of farming technologies. Responses to the three research questions were translated into three study chapters of 2, 3 and 4.

The chapter also, describes detailed research methodologies and tools employed. It further outlines the study locations, sampling of research participants, the research tools used and the data analysis process.

Finally, Chapter 1 explains research ethics that were considered in the study. Above all, the chapter introduces the study elements that includes the main goal to be achieved.

5.2.2 Chapter 2

In this chapter, the study revealed that distribution of print materials was done by extension workers who were not trained in C4D. In their degree or diploma agriculture programmes, communication was a mere topic covered within another course. They had expert knowledge in agriculture, but lacked distribution mechanisms and skills including appropriate strategic usage of materials. They needed interpersonal communication skills to apply them when using the print materials in their agriculture sections.

Print materials were identified as second common communication channel in the EPAs. However, it was discovered that on the ground the presence and use of print materials were very minimal. Printed materials were rarely distributed to farmers who, once in a while, saw the materials when they visited Mitundu and Chileka EPAs to attend agriculture development meetings with their extension workers. Contrary to this finding, two AEDOs reported that once materials were delivered to EPAs, distribution was through extension worker to farmers during meetings, but also from lead farmers to farmers. According to the two, the materials were also displayed in tea rooms and village resource centres which the respondents said were effective mechanisms.

Considering low literacy levels in some villages, AEDOs encouraged literate farmers, children and neighbours to read or interpret materials to illiterate farmers or engage them in a dialogue or “conversational style” approach. Print was reported to keep history and was a reference material for farmers regarding their work.

On the weakness of the current CA print materials, the extension workers said the materials had too much details, at the same time, the materials were distributed in lesser quantities in almost all the 4 sections the recruited AEDOs came from. Naturally, it was learnt from AEDOs and farmers that they favoured print as their source of information on agriculture technologies and they wished they received the materials in large quantities.

The findings imply that print as a channel, is appropriate for promoting CA technologies as long as it is adequately supplied to farmers and AEDOs. As reported by AEDOs, some CA materials were in a non-vernacular language, English. This made it difficult for farmers use because farmers like and understand better materials produced in their mother tongue, Chichewa. Three interviewees revealed that there were no proper follow ups print material usage and CA adoption rate. One interviewee in Mitundu EPA said monitoring was done through farmer visits by checking if they practise CA technologies.

All in all, it was found that the effectiveness of print-based materials depends on acceptability and suitability of the design, relevance of print content, quantities distributed, dissemination strategies of messages conveyed by the materials. Engaging farmers in a discussion of print material content is key to ensure increased understanding of the messages and persuading farmers to adopt CA technologies.

5.2.3 Chapter 3

Chapter 3 presents findings and discussions on processes and approaches both literate and illiterate farmers said they use to access various information from government on conservation agriculture and other agricultural technologies. Focus group discussions respondents said extension services are the most common and reliable means of accessing information on agriculture technologies. Radio was also mentioned as a common means

of assessing information. However, some farmers indicated that the channel does not give much room for discussions and restricts access because of limitations in airtime.

Just as in the key informant interviews with extension workers discussed in chapter two, print came at position two as a common means through which farmers access information despite materials being seasonally received. Other farmers could not even tell when they last received the materials. However scholars have affirmed that print is one of the best ways of passing information, changing people's behaviours Mehra (2020) and Opele (2015) especially in rural areas where electricity is intermittent or nonexistent.

It was also revealed that print materials were accessed through lead farmers who distributed them to farmers or just used them as discussion tools with farmers. Furthermore, it was discovered that apart from lead farmers, the print materials ended up on EPAs notice boards, in individual farmers' homes, village heads residences and in some sections, they end up in village resource centres. However, it was found out that some extension workers piled materials in their work places instead of distributing, a practice which farmers said was frustrating government, particularly Ministry of agriculture's efforts to promote adoption of CA technologies. Not only that, the village resource centres were reported not fully established to provide access to information.

Assisting illiterate farmers to read was found to be reliable method of increasing access to information especially to the farmers that are unable to read and write. The illiterate farmers asked other literate farmers or neighbours and children to help them with reading or discussing the materials.

The other method reported to be used was pass-on-policy approach. In the approach, farmers that have read the materials, pass them on to the next users. This is to solve the problem of material shortages. Similar policy is applied in *Boma Lathu* local newspaper published by Malawi's Ministry of Information to increase access to development news. Giving their views on the print CA design which was made of paper, the focus group participants proposed that materials should always be in Chichewa rather than English

which farmers find difficult to understand. Some farmers reported that they adopted CA technologies as a result of access to print CA materials however, after discontinuation of distribution and other challenges like ill-minded people setting fire on their gardens where CA technologies were practiced, the farmers abandoned the technology.

It was also found out that most materials distributed and accessed in the EPAs are on different technologies from CA. Those materials found are on technologies like soy beans and groundnut farming. The farmers revealed a number of other challenges faced. Such challenges include limited supply of materials across the 4 villages in Chileka and Mitundu EPAs. It was worse in Chileka. Delays in distribution of materials was another problem identified. Materials like posters on fall armyworm were delivered when the issue had ended.

Piling of posters in their work places by extension workers instead of distributing was also mentioned as a huge setback. Other hiccups were failure by communities to finish establishing village resource (library) centres even when land was identified for their construction.

Not only that, high literacy levels contributed to low understanding of print materials and low passion for using printed materials. It was found that, some farmers whether literate or illiterate are not interested in any new farming technologies being promoted. However, print materials deliver more benefits to farmers than depicted Wu (2005) reveals. Therefore, there should be an increase in quantities provided. One scholar suggests a solution to piling of materials in offices. Piling of materials can be prevented by distributing during other programmed events or other groups, Harmsworth and Turpin (2000). It is assumed the extension workers wait for special distribution time of the materials, which is not cost effective.

Despite inadequate use discussions of print materials by extension workers, farmers indicated that the method is important as it enhances their understanding of the materials. Previous scholars have already written and emphasized on discussion rather than

monologue for better understanding of the target audience. Piotrow, et al, (1997:18) argue that ‘communication shifted from monologue to dialogue’ or discussion. This can be used as one of the main print material dissemination method for effectiveness of print material.

The chapter further found out that large size of pictures and words made farmers easily understand materials. Harmsworth & Turpin (2000:15 and 18) say, “Again, think about what the important issues are for your audiences and focus your (print materials like) newsletters around these to be sure to engage.” What farmers proposed to be considered when designing the print materials can attract them to practice farming technologies being promoted through print. They can change attitude of some farmers that are always not interested in any new technology despite either being promoted through a mixture of communication channels, print, radio or television.

5.2.4 Chapter 4

The chapter tests farmers’ understanding of CA print-based IEC material categories government distributes to the farmers. The experiment found out that only 4 had seen and used the CA materials at their EPAs and others saw them in Malawi’ neighbouring country of Zambia, Chipata. This meant the CA materials were either rarely or not available to farmers. However, it was other farming technologies which though in short supply, were seen and used by the farmers. Despite the challenges, farmers demonstrated positive attitude towards utilization of the print materials if made accessible to them.

As noted previously during farmers’ material interpretation ability, that most illiterate participants preferred photo only and that most literate (and some illiterate) participants preferred photo and text to identify key messages because they had minimal reading or interpretation skills. The photos directly shared CA implementation procedures. Where photos were not available, farmers failed to pick identify key messages and they expected to be assisted to read and understand the message.

Although the illiterate and semiliterate preferred photo only material, ACB does not produce the design. Farmers in the discussions, argued against ACB's practice of producing and distributing single design of combining photo and text materials. This meant leaving out the other caliber of farmers-the illiterate or semiliterate from understanding print material content.

Three out of eleven illiterate farmers opted for the unexpected choice. They still preferred text and photo because they observed that the materials are well detailed. Their children read the materials for them hence they still understand the messages. This is contrary to the findings by other scholars like Ndilowe (2013:74) who claimed, "While these characteristics made the leaflet user friendly for literate farmers, those who are illiterate got nothing from it." Print materials were still able to persuade all farmers to make decisions to adopt CA technology but they still called on extension workers to be visiting them for process monitoring to correct some implementation errors on spot.

Farmers analyzed the materials and proposed some major issues be addressed. Among them are that pictures and font size of words be made large enough and clear so that all farmer age groups are able to see and understand without difficulties. Carstens (2004) argues that materials or document producers require to meet the needs and skill levels of their different audiences. Consider picture descriptions (picture and words) to make interpretation easy for all the farmers as pictures stimulate material users.

The essentiality of print materials was recognized by farmers because the materials help farmers even in the absence of extension workers, in developing countries like India, print materials are still dominant (Nath 2014). However, illiterate farmers have preferred photo materials, had no vibe for text as observed in the experiment. Such farmers were seen uncomfortable and answered questions out of context, the main argument however, is that print is more effective if used with other mediums like discussions, dialogues, theatre and demonstrations. This can lead to high adoption levels of CA technologies by farmers although they also get interested in and demand for other basic needs like fertilizers to support them in practicing CA technologies.

The findings from the experiment helped validate some responses from KI interviews and focus group discussions, which mostly were based on extension workers and farmers' personal opinions on the matter. Through the experiment, the researcher has full control over all aspects of influencing the results, ...thus, offering high internal validity and quality of evidence (Campbell and Stanley, 1963; White and McBurney, 2013). In addition, Knight K. L. (2010) argues that experimental design improves the clarity of communication and bring praise from readers. Furthermore, experimental design plays a much broader role than simply defining and directing the statistical analysis of an experiment.

5.3 Implications of the Study

This section presents conclusions drawn from the main study results. It also suggests subsequent research studies that could be carried out to address the gaps identified in the literature review as well as this current study that has been done. A number of implications are drawn from the findings in study highlighted in chapters 2 to 4.

In chapter 2, it was found out that there is minimal application of the C4D approaches, methodologies and skills in Agriculture communication among extension workers. Print material distribution and dissemination is done devoid of participatory methodologies. From the AEDOs responses this was because they had minimal communication courses from Natural Resources College (NRC) and Lilongwe University of Agriculture and Natural Resources (LUANAR). This is because in this study extension workers had no expertise in interactive and exciting ways of using print materials. Lack of discussions and dialogue in print materials put illiterate farmers and learners at a disadvantage. They are excluded in the process of transferring key and relevant information.

In my view, there is need that C4D be included in Agricultural Extension course as well. Agriculture like health and gender sectors are seriously involved in promotional activities hence the need for C4D knowledge and skills, which among others promote development and utilization of communication strategies for tangible results such as positive practice – agriculture technology adoption.

Similarly, it was found that there is no consultation between ACB and agriculture extension staff including farmers on designing and production of print IEC materials. This was also noted when respondents identified so many errors in the CA materials. It can be argued that the materials were produced and printed before pretesting them with potential users or if pretesting was done, it failed to incorporate some constructive views from users. Many writers like Bruce (2013) have written that production of IEC materials need audience involvement. The author argues that once involved, the audience will ‘perceive that the print material is talking to them the ‘message will be considered relevant to their lives.’ However, this step on audience engagement might have been skipped in the CA material designing and production because some pictures were still unclear or just blur. Users did not accept such materials.

Additionally, in the same chapter, it was revealed that some farmers in Lilongwe turn a deaf ear to any appeal for adoption of new farming technologies introduced either through edutainment, or electronic media. A similar finding was reported by Ndilowe (2013). Future research can be considered to examine factors driving communities’ resistance to adopt CA technologies in some agriculture sections in Chileka and Mitundu EPAs in Lilongwe.

Key informant interview and focus group discussions with farmers and AEDOs in chapters 2 and 3 respectively revealed that policy on establishment of village resource centres to increase farmers’ access to print materials was not being implemented. Other farmers in their responses regarded it as a new policy but Ndilowe (2013) in her study, found out that the policy was already there and the concept was first hatched in India in 2004 (Shaijumon and Menon, 2014). “The Indian Space Research Organization (ISRO), with the objective of disseminating knowledge to the rural masses, envisaged the Village Resource Centre (VRC) concept in 2004.” This confirms that there is limited sharing of information among AEDOs and farmers. In future there is need to assess possible barriers and solutions to establishment and enforcement of village resource centres in agriculture sections.

On examining farmers' common means of accessing print materials, one AEDO in Mitundu EPA said the farmers access print materials pasted in tearooms which most Lilongwe farmers patronize. It was learnt that it is a lifestyle preference in Lilongwe and other central region districts to go, pay and drink tea from such rooms rather than their homes. There is need to carry a mini survey to map tea rooms in EPAs to take advantage of the locally available facilities to increase access to print materials. It is argued intensifying usage of such local channels of communication can promote agriculture technology adoption through print materials.

In the experiment, illiterate farmers preferred photo materials or materials made of images alone. But ACB produced text and photo messages alone because of the belief that that one size material fits all or print materials are designed for and understood by literate people alone. Ndilowe (2013) wrote the illiterate get nothing from leaflets. However, this study reveals, through photo material design, the illiterate and semiliterate farmers, understand key messages from the material.

Previous scholars have tended to differ. Thorset (2020) argues “Design (materials) with illiteracy in mind. Design materials that people will want to keep and use. Take time to learn about illiteracy rates in your country and consider how images alone could convey the target message.” This scholar supports the idea presented in chapter 4 by illiterate farmers to have photos only which they understood better during the experiment. From the findings other study implications are that message developers take it upon themselves to design and produce without pretesting the materials.

Above all, there is little or no consultation with AEDOs and farmers on developing print materials that could meet farmers' desires for enhancement of technology adoption. A study needs to be carried out to identify solutions to barriers of print-based materials effectiveness to promote adoption of new farming technologies. Another area of study for consideration could be to conduct an analysis of attitudes and perceptions key agriculture communication stakeholders and farmers possess that pose as either barriers or influencers of new agriculture technologies adoption.

5.4 Conclusion

The study findings have demonstrated that print-based IEC material are effective when communicating new agriculture technologies including conservation agriculture to farmers especially in Mitundu and Chileka areas in Lilongwe. This is drawn from the respondents' decision to put print materials at position two as a channel through which they commonly access information on agriculture technologies from government through extension workers. More so, participants were very positive about print material usage. The appropriateness of print materials was confirmed through some farmers sentiments that through access to print materials on conservation agriculture, they gained new technological skills which resulted into increased crop yields especially maize. The few farmers that reject the scientifically proven agriculture technologies are not against the IEC materials per se but rather stuck to their traditional ways of doing things because of low access to the materials. To enhance print material effectiveness there is need to increase quantities of materials supplied to EPAs and strengthen distribution through local 'tearooms' and globally accepted methods 'village resource centres' or libraries. When designing materials, use more clear and stimulating photos for the illiterate to get meaning from the materials. Due to low quantities and poor distribution mechanisms other farmers in Chileka EPA said they access some print materials on CA from neighbouring country of Zambia. Print can be more effective than it has been found in the study if users combine print with other communication channels; employment participatory methodologies, demonstrations, 'dialogues or discussions', assisting each other in reading for inclusivity which is proposed by strategic communication. Use some farmers' attitudes and perceptions baring adoption and utilization of agriculture conservation to develop other development communication programmes or interventions including information, education and communication materials.

Finally, agriculture as a promotional sector need to embrace C4D approaches to resolve print material designing, distribution and dissemination challenges.

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APPENDICES

Appendix A.Data collection Instruments

1. Key informant interview (KII) Guide

QUESTION	TOOLS	QUESTIONS
1. What processes do agriculture communications branch employ in producing, distributing and disseminating print-based IEC materials on agriculture technologies? (Ndinjira zANJI zofunikira zomwe bungwe la Boma (ACB) limagwiritsa ntchito pogawa timapepala ta Ulimi wa Mlera Nthaka ndi kufalitsa mauthenga ake?)	<u>Key Informant Interviews</u>	1. As an Agricultural Extension Worker, explain more about your field of expertise? (<i>Inu ngati alangizi a Zaulimi longosola za maphunziro anu ndi ntchito zomwe mumapanga</i>)
		2. Do you have any professional training in communication for development? Explain. (<i>Munachitapo maphunziro akafalitsidwe ntchito kamauthenga opititsa chitukuko patsogolo? Longosolani.</i>) How is content gathered, produced and packaged? (<i>Kodi mauthenga amene amalembedwa mukabukuka amapezeka mwanji?</i>) Who decides on content and pictures to use? (<i>Komanso ndi ndani amasankha mauthengawo ndi zithunzi zake zopita mmenemo?</i>)
		3. What are the common means of communication which the government uses to share information to farmers on new farming agricultural technologies and methods? Mention three (stating those that are very important first). (<i>Ndinjira ziti zofalitsira mauthenga za malidwe amakono zomwe Boma limagwiritsa ntchito kwambiri ? Tchulani njira zitatu.</i>)
		4. How often do farmers in your area receive messages related to new farming agricultural technologies and methods? (<i>Nanga alimi amalandira kangati mauthenga okhudza ulimi wamakono monga Ulimi Wamlera Nthaka ?</i>)
		5. Once government communicates new print-based IEC

		messages with you, what efforts do you make to get the message to the farmers in your area? <i>(Boma likakutumizirani mauthenga a Ulimi wa Mlera Nthaka, mumagwiritsa ntchito njira zANJI poonetsetsa kuti uthengawo wafikira alimi?)</i>
		6. How is the content (language, photos, text, font, etc.) of the print-based IEC materials designed to ensure that farmers are able to understand the messages? <i>(Mauthenga amapangidwa bwanji poonetsetsa kuti alimi onse akutha kumvetsetsa mauthenga a Ulimi wa Mlera Nthaka?)</i>
		7. What are the common methods of distribution used for farmers to receive the printed IEC materials? <i>(Ndinjira ziti zomwe alangizi a zaulimi amagwiritsa ntchito kwambiri pogawa timapepala tofalitsira mauthenga a Ulimi wa Mlera Nthaka kwa alimi?)</i>
		8. Do you think that these materials are distributed in time for farmers to use them? Who receives them? <i>(Mukuwona kuti timapepala tamauthenga timagawidwa kwa alimi panthawi yake? Amalandira ndani timapepalati?)</i>
		9. Where do posters end up? What about Fliers, booklets, etc? <i>(Kodi timapepalati timathera kuti?)</i>
		10. How does Government ensure that extension workers understand the materials before they take them to farmers? <i>(Kodi Boma limaonetsetsa bwanji kuti alangizi a zaulimi akumvetsa mauthenga omwe ali mumapepala asanawagawe kwa alimi?)</i>
		11. How do you as extension worker ensure that you fully understand the materials before you take them to

		farmers? Nanga inu ngati alangizi <i>mumaonetsetsa bwanji kuti mukumvetsetsa mauthenga omwe ali mumapepala musanawagawe kwa alimi?</i>)
		12. Are there any individual provisions you make to improve how illiterate farmers access the materials? If yes, explain the ways. <i>(Palinjira zomwe mumagwirita ntchito kuti mpititse patsogolo kuthandiza alimi amene satha kulemba ndi kuwerenga kuti nawonso athe kumva mauthenga? Ngati zilipo, longosolani njira zake).</i>
		13. Are there any strategies you use to assess farmer's compliance to the messages which the IEC materials have been disseminating to the farmers? If yes, explain them. <i>(Pali njira zANJI zomwe mumagwiritsa ntchito poonetsetsa kuti alimi akutsatira mauthenga a za Ulimi wa Mlera Nthaka?)</i>
		14. What are the challenges extension workers face in print-based IEC materials design, distribution, usage and monitoring? <i>(Kodi ndi mavuto ANJI omwe alinjizi a zaulimi amakumana nawo popanga, kugawa ndi kugwiritsa ntchito timapepalati komanso pochita kalondolondo wa alimi?).</i>
		15. What recommendations would you give to ensure that there is effectiveness in the use of print-based IEC materials? <i>(Ndi upangiri wANJI womwe mungapereke poonetsetsa kuti kagwiritsidwe ka timapepera tofalitsa mauthenga a Ulimi Wamulera Nthaka ikhale yopinduliralira alimi?)</i>

2. Focus Group Discussion (FGD) tool Guide

Research Question	Tool	Questions
2. How do	<u>Focus</u>	1. What are the common means of communication,

farmers access and use print based IEC materials on new conservation agriculture technologies or methods? technologies? (Kodi alimi timawafikira bwanji timapeperati ta za Ulimi wa Mlera nthaka ndi kutigwiritsa ntchito moyenera?)	<u>Group</u> <u>Discussions</u>	which farmers use to receive information on new farming agricultural technologies and methods? Mention three (stating those that are very important first). <i>(Ndinjira ziti zofalitsira mauthenga za malidwe amakono zomwe zimagwiritsidwa ntchito kwambiri? Tchulani njira zitatu.)</i> 2. Are printed materials used to disseminate information on new agricultural technologies such as CA? <i>(Nanga kudera kwanu kuno timabuku monga tokhudza Ulimi wa Mlera Nthaka timagwiritsidwa ntchito?)</i> 3. Are the materials designed (language, text, photos) in a way that it is easy for you to understand the messages? Give examples. <i>(Nanga timabukuti tinapangidwa mwanjira zANJI zoti zimakuthandizirani kumva msanga?)</i> 4. Are there any strategies put in place by the extension workers in order to help illiterate farmers to understand print based materials? Explain. <i>(Palinjira zomwe alangizi a zaulimi anakhazikitsa zothandizira alimi amene satha kulemba ndi kuwerenga timapepala tofalitsira mauthenga? Longosolani njira zake).</i> 5. As farmers, on your own, how do you ensure that illiterate farmers also benefit from the print-based materials as well? <i>Ngati alimi panokha pali njira zomwe munakhazikitsa zothandizira alimi amene satha kulemba ndi kuwerenga timapepala tofalitsira mauthenga kuti nawonso nkupindula nawo? Longosolani njira zake).</i> 6. What are the common processes used by extension workers and lead farmers to distribute or disseminate to print material on CA to farmers? <i>(Ndinjira zANJI</i>
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		<i>zomwe alangizi a zaulimi amagwiritsa ntchito kwambiri pogawa timapepala tofalitsira mauthenga a Ulimi wa Mlera Nthaka?)</i>
		7. How often do farmers receive messages related to new farming agricultural technologies and methods? (<i>Nanga alimi amalandira kangati mauthenga okhudza ulimi wamakono monga Ulimi Wamlera Nthaka ?</i>)
		8. Efforts to receive these messages follow which trends? - From farmers or extension workers - From extension workers to farmers - From government to farmers (<i>Kodi mauthenga amalandiridwa potsatira ndondomeko iti</i> <i>kuchokera kwa mlimi kapena kwa mlangizi wa zaulimi</i> <i>kwamalangizi kupita kwa mlimi</i> <i>kuboma kupita kwa mlimi?)</i>
		9. How many of you adopted the CA technology due to access to information conveyed by print materials only? (<i>Ndiangati mwa inu amene anayamba kutsatira njira ya Ulimi wa Mlera nthaka atalandira mauthenga kudzera mutimapepera iti?</i>)
		10. How do extension workers assess your compliance to the messages conveyed by IEC materials? (<i>Alangizi a zaulimi amagwiritsa ntchito njira zANJI zoonetsetsa kuti alimi akutsatira mauthenga a za Ulimi wa Mlera Nthaka?</i>)
		11. Explain challenges you face in using the printed IEC

		materials? (<i>Longosolani mavuto amene mumakumana nawo pogwiritsa ntchito timapepalati</i>).
		12. What recommendations can you give to ensure that print-based IEC materials are effective in communication CA? (<i>Ndi upangiri wanji womwe mungapereke kuti njira yogwiritsa ntchito timapeperati pofalitsa mauthenga a Ulimi Wamulera Nthaka ikhale yopindulira?</i>)

2. Randomised Block Design (RBD) Experiment Guide

RESEARCH QUESTION	TOOLS	QUESTIONS
3. How do farmers process information from print-based IEC material packages promoting adoption of agriculture technologies? (Kodi alimi amatha bwanji kutengepo mauthenga mutimapepapa ta Ulimi wa	RBD EXPERIMENT: Semi-structured questionnaire: this tool will collect demographic data and farmers' access and understanding of print based IEC materials with different designs.	1. What is your name? (Kodi dzina lanu ndinu ndani?)
		2. How old are you? (Muli ndi dzaka zingati?)
		3. Male or female (Wammuna kapena or Wamkazi)
		4. How far did you go with you education? (Munafika pati ndi maphunziro anu?)
		5. Are you able to read and write? (Mumatha kuwerenga ndi kulemba?)
		6. What is your occupation/source of livelihood? (Mumagwira ntchito yanji yomwe imakubweretserani chakudya chatsiku ndi tsiku pakhomo panu?)
		7. What key messages do you get from the material you have in your hand? (Material with pictures only, text only, and with both picture and text). (<i>Mwaphunzirapo mauthenga ati mukabukuka?kazinthunzi zokhazokha , kazilembo zokhazokha ndi ndi kophatikiza zilembo ndi zinthunzi?</i>)
		8. Were you able to identify leaflet (with pictures only,

Mlera Nthaka tomwe cholinga chake nkulimbikitsa kugwiritsa ntchito njira za makono zaulimi?		text only, and with both picture and text) with any other materials you have seen or read before? If yes, where? <i>(M'mbuyomu munayamba mwaonako kapena kuwerenga kabuku kofanana ndikomweka? Ngati munakawonapo, Kunali kuti? Fotokozani)</i> 9. After the exposure to the Material (with pictures only, text only, and with both picture and text), do you think it will have an influence on any of your farming decisions? Explain. <i>(Mukuona kuti musintha kachitidwe kanu kaulimi ndikuyamba kutsatira ulimi wamlera nthaka, kutengera kuti mwawerenga kabukuka?)</i> 10. Which could be your preferred print material /leaflet design; text and picture or picture without text or text without picture? What reason can you give? <i>(Mukadakonda kabukuka katapangidwanso motani kuti muphunzire zambiri (kazithunzi zokha,kamawu kokha kapena kokhala ndimau komanso zithunzi? Nchifukwa chani mwasankha motere?)</i> 11. How do you compare the 3 categories in terms of ease of understanding? <i>(Mukusiyanitsa bwanji magulu atatuwa kumbali yakomwe kamamveka mosavuta?)</i> 12. How would you like the print material to be designed differently for your easy understanding? <i>(Mukanakonda kakanakonzedwanso motani kuti mukamvesetse mosavuta?)</i>
--	--	---

Appendix b. Consent Forms and Question Guides

I. Key Informant Interview Guide

My name is Wallace Chipeta, I am a Masters of Arts in Theatre and Media Development Communication student at the University of Malawi. Currently, I am conducting Research which is part of the fulfillment of my studies. The main aim of the research is to assess the effectiveness of print-based materials in communicating conservation agricultural technologies to farmers in Lilongwe. I would like to ask for your consent to participate in the study. Feel free to respond to the questions, where you feel uncomfortable you may end the interview. I want to assure you that data collected here will be kept confidential, it will only be used with regards to my study and my academic grades. With me here is my research Assistant who will be helping me with writing and recording of our conversation. Where you do not understand or need clarity, you can ask me questions.

Are you willing to participate? YES ☐ **NO** ☐

If yes, any questions before we proceed?

SECTION A: GENERAL INFORMATION ABOUT RESPONDENTS & STUDY LOCATION

Name : **Signature:** **Date:**
Gender :
Position :
Section :
EPA :
TA :
District :

II. Focus Group Discussion Questions Guide

My name is Wallace Chipeta, I am a Masters of Arts in Theatre and Media Development Communication student at the University of Malawi. Currently, I am conducting Research which is part of the fulfillment of my studies. The main aim of the research is to assess the effectiveness of print-based materials in communicating conservation agricultural technologies to farmers in Lilongwe. I would like to ask for your consent to participate in the study. Feel free to respond to the questions, where you feel

uncomfortable, you may end the interview. I want to assure you that data collected here will be kept confidential, it will only be used with regards to my study and my academic grades. With me here is my research Assistant who will be helping me with writing and recording of our conversation. Where you do not understand or need clarity, you can ask me questions.

Are you willing to participate? YES ☐ NO ☐

If yes, any questions before we proceed?

SECTION A: STUDY LOCATION

Village :

Section :

EPA :

TA :

District :

Date :

SECTION B: GENERAL INFORMATION ABOUT RESPONDENTS

No.	Name	Gender	Age	Marital Status	Source of Livelihood	Education Status	Literacy (Able to Read?)
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							

iii. Randomized Block Design Experiment Guide

My name is Wallace Chipeta, I am a Masters of Arts in Theatre and Media Development Communication student at the University of Malawi. Currently, I am conducting Research which is part of the fulfillment of my studies. The main aim of the research is to

assess the effectiveness of using print-based materials in communicating conservation agricultural technologies to farmers in Lilongwe. I would like to ask for your consent to participate in the study. Feel free to respond to the questions, where you feel uncomfortable you may end the interview. I want to assure you that data collected here will be kept confidential, it will only be used with regards to my study and my academic grades. With me here is my research Assistant who will be helping me with writing and recording of our conversation. Where you do not understand or need clarity, you can ask me questions.

Are you willing to participate? YES ☐

NO ☐

If yes, any questions before we proceed?

Signature:

Date:

SECTION A: GENERAL INFORMATION

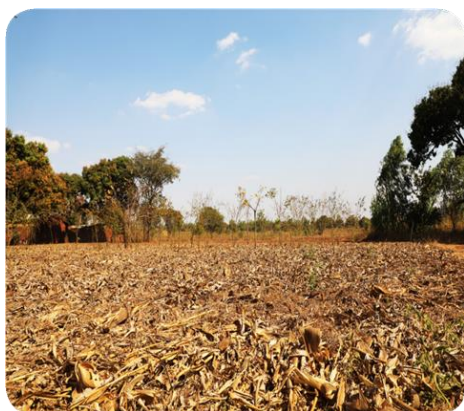
1. What is your name?	
2. How old are you?	
3. Male or female	
4. How far did you go with you education?	
5. Are you able to read and write?	
6. What is your occupation/source of livelihood?	

Appendix c: CA Print materials (leaflets) Used during data collection

Leaflet X: With photo only (Extracted from Text & Photo leaflet for Experiment purposes)



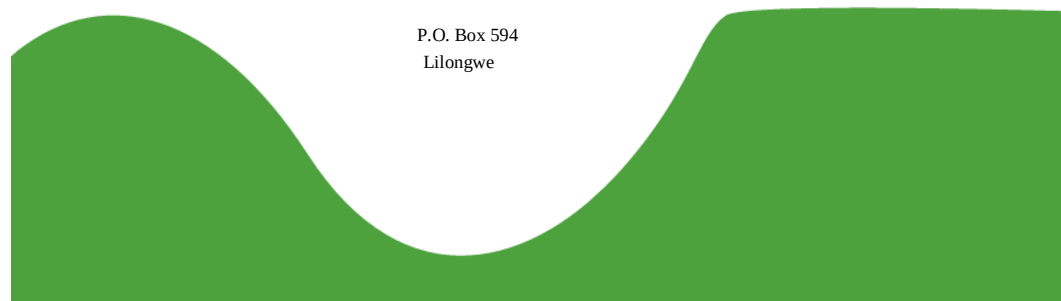
ULIMI WA MLERANTHAKA



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Leaflet Y: With Text only

Kubzala mophatikiza mbeu za m'gulu la nyemba pakati pamikwasa ya mbeu za m'gulu la chimanga	Kutalikirana		Kuchuluka kwa mbeu pa phando	Chiwerengero cha mbeu pa hekitala imodzi
	Mikwasa	Mapando		
Chimanga	75	75	3	53,333
Mapira	75	75	2	35,556
Nandolo	75	25	1	53,333
Khobwe	75	25	1	53,333
Nyemba	75		1	53,333

Tebulo 2: Mbeu yobzalidwa mophatikiza



Mawu oyamba

ULIMI WA MLERANTHAKA

- Kuwonjezera michere ina m'thaka mukachita ulimi wakasakaniza ndi mbeu za m'gulu la nyemba
 - Mumakolola zochuluka ngakhale pa malo ochepea
 - Umachepetsa kumera kwa udzu
- Momwe mungachitile ulimi wa mleranthaka**

A) Ulimi osagalauza, osapalira komanso ophimbira nthaka

Konzani m'munda mofulumira mukangomaliza kukolola mbeu isanafike nyengo ya mvula.

- Dulani ndi kuyala mapesi okwana pafupifupi ngolo ziwiri ndi theka kapena zitatatu pa munda okula hekitala imodzi kuti muphimbire nthaka. Pewani kugwiritsa ntchito zotsalira za m'munda oyandikana nawo. Gwiritsani ntchito kamtengo kosongola kapena khasu laling'ono lotchedwa tchaka pobzala mbeu osati khasu lolimira.
- Onetsetsani kuti m'munda mulibe udzu. Mukhoza kupopera mankhwala ophera udzu monga Roundup pa mulingo wa malita awiri ndi theka pa munda okula hekitala imodzi panthawi yobzala.

- Bzalani mitundu ya makono ya mbeu za m'gulu la chimanga ndi za m'gulu la nyemba kuti mudzakolole zochuluka.
- Mapando a mbeu za m'gulu la chimanga

B) Ulimi wakasakaniza obzala mbeu za m'gulu la chimanga pamodzi ndi m'gulu la nyemba

Mbeu yobzalidwa payokha	Kutalikirana		Kuchuluk a kwa mbe u	Chiwerengero cha mbeu pa hekitala imodzi
	Mikwasa	Mapando		
Chimanga	75	25	1	53,333
Mapira	75	30	2	88,889
Mtedza	37.5	10	1	266,667
Soya	37.5	10	1	266,667
Nandolo	75	20	2	133,333
Khobwe	75	20	2	133,333
Nyemba	45	30	1	74,074

Tebulo 1: Mbeu yobzalidwa payokha

ndi za m'gulu la nyemba atalikirane monga zalembedwera mu Tebulo 1 m'munsimu.

- Thirani mtundu wa fetereza oyenera pamulingo wabwino komanso panthawi yake.
- Zulani udzu ndi manja ukangomera usanafike pa msinkhu ochita maluwa kuti usazamenlenso chaka chotsatira
- Mukamaliza kukolola, siyani mapesi kapena masangwe m'munda kuti mudzaphimbire nthaka.

Ndondomeko zochitira ulimi wa mleranthaka wa mtundu wu ndi zofanana ndi zomazalembedwa pamwambapa koma mikwanda kutalikirana kwa mapando ndi zosiyanasiyana monga zafotokozeredwa mu Tebulo 1 m'munsimu.

Ulimi wa mleranthaka ndi njira imodzi yosamalira chilengedwe komanso kuchulukitsa zokolola pa ulimi wa mbeu. Ulimiwa ndi njira inanso yochepetsa kapena kupeputsa ntchito imene mlimi angagwire. Ulimi wa mleranthaka uli ndi nsanamira zitatu ndipo umakhala opindulitsa mukatsatira bwino nsanamira zimenezi;

Mawu otsiriza

Ulimi wa mleranthaka umathandiza kuchepetsa mavuto omwe amabwera chifukwa cha kusintha kwa nyengo powonjezera chonde m'nthaka, kuchepetsa ntchito yolima komanso kusamalira chilengedwe. Chitani ulimi wa mleranthaka motsatira ndondomeko zoyenera za kalimidwe ka mbeu monga kubzala mitundu ya makono, kubzala panthawi yake, kupalira pafupipafupi, kuteteza mbeu ku tizilombo ndi matenda, kubzala mbeu pampata oyenera komanso kuthira fetereza moyenera kuti mupindule.

- 1) Kulima kosagalauza ndi kupalira
- 2) kuphimbira nthaka pogwiritsa ntchito zotsalira m'munda kapena masamba a mitengo
- 3) Kubzala mbeu mwakasinthasintha kapena kubzala mbeu mwakasakaniza ndi mbeu za m'gulu lina.

Ubwino wa ulimi wa mleranthaka

- Chinyontho chimasungika m'nthaka choncho mbeu sizimafota ngakhala kupange ng'amba.
- Umachepetsa kuthamanga kwa madzi ndi kukokoloka kwa nthaka
- Umachepetsa ntchito, ndalama komanso kuchuluka kwa anthu ofunika pa ntchito ya ulimi
- Umawonjezera chonde m'nthaka

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Leaflet Z: With Combined Text and Photo

Mawu oyamba

Ulimi wa mleranthaka ndi njira imodzi yosamalira chilengedwe komanso kuchulukitsa zokolola pa ulimi wa mbeu. Ulimiwa ndi njira inanso yochepetsera kapena kupeputsa ntchito imene mlimi angagwire. Ulimi wa mleranthaka uli ndi nsanamira zitatu ndipo umakhala opindulitsa mukatsatira bwino nsanamira zimenezi;

- 1) Kulima kosagalauza ndi kupalira
- 2) kuphimbira nthaka pogwiritsa ntchito zotsalira m'munda kapena masamba a mitengo
- 3) Kubzala mbeu mwakasinthasinthaka kapena kubzala mbeu mwakasakaniza ndi mbeu za m'gulu lina.

Ubwino wa ulimi wa mleranthaka

- Chinyonho chimasungika m'nthaka, choncho mbeu sizimafota ngakhale kupange ng'amba.
- Umachepetsa kuthamanga kwa madzi ndi kukokoloka kwa nthaka
- Umachepetsa ntchito, ndalama komanso kuchuluka kwa anthu ofunika pa ntchito ya ulimi
- Umawonjezera chonde m'nthaka
- Kuwonjezera michere ina m'nthaka mukachita ulimi wakasakaniza ndi mbeu za m'gulu la nyemba
- Mumakolola zochuluka ngakhale pa malo ochepa
- Umachepetsa kumera kwa udzu

Momwe mungachitile ulimi wa mleranthaka

A) Ulimi osagalauza, osapalira komanso ophimbira nthaka

Konzanim'munda mofulumira mukangomaliza kukolola mbeu isanafike nyengo ya mvula.

- Dulani ndi kuyala mapesi okwana pafupipupi ngolo ziwiri ndi theka kapena zitatu pa munda okula hekitala imodzi kuti muphimbire nthaka. Pewani kugwiritsa ntchito zotsalira za m'munda oyandikana nawo. Gwiritsani ntchito kamtengo kosongola kapena khasu laling'ono lotchedwa tchaka pobzala mbeu osati khasu lolimira.
- Onetsetsani kuti m'munda mulibe udzu. Mukhoza kupopera mankhwalu ophera udzu monga Roundup pa mulingo wa malita awiri ndi theka pa munda okula hekitala imodzi panthawi yobzala.
- Bzalani mitundu ya makono ya mbeu za m'gulu la chimanga ndi za m'gulu la nyemba kuti mudzakolole zochuluka.
- Mapando a mbeu za m'gulu la chimanga

Tebulo 1: Mbeu yobzalidwa payokha

Mbeu yobzalidwa payokha	Kutalikirana		Kuchuluka kwa mbeu	Chiwerengero cha mbeu pa hekitala imodzi
	Mikwasa	Mapando		
Chimanga	75	25	1	53,333
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Khobwe	75	20	2	133,333
Nyemba	45	30	1	74,074

ndi za m'gulu la nyemba atalikirane monga zalembedwera mu Tebulo 1 m'munsimu.

- Thirani mtundu wa fetereza oyenera pamulingo wabwino komanso panthawi yake.
- Zulani udzu ndi manja ukangomera usanafike pa msinkhu ochita maluwa kuti usazamelenso chaka chotsatira
- Mukamaliza kukolola, siyani mapesi kapena masangwe m'munda kuti mudzaphimbire nthaka.

B) Ulimi wakasakaniza obzala mbeu za m'gulu la chimanga pamodzi ndi za m'gulu la nyemba

Ndondomeko zochitira ulimi wa mleranthaka wa mtunduwa ndi zofanana ndi zomwe zalembedwa pamwambapa koma mikwasa ndi kutalikirana kwa mapando ndi zosiyanana monga zafotokozeredwa mu Tebulo 2 m'munsimu.

Tebulo 2: Mbeu yobzalidwa mophatikiza

Kubzala mophatikiza mbeu za m'gulu la nyemba pakati pamikwasa ya mbeu za m'gulu la chimanga	Kutalikirana		Kuchuluka kwa mbeu pa phando	Chiwerengero cha mbeu pa hekitala imodzi
	Mikwasa	Mapando		
Chimanga	75	75	3	53,333
Mapira	75	75	2	35,556
Nandolo	75	25	1	53,333
Khobwe	75	25	1	53,333
Nyemba	75		1	53,333



ULIMI WA MLERANTHAKA

Mawu otsiriza

Ulimi wa mleranthaka umathandiza kuchepetsa mavuto omwe amabwera chifukwa cha kusintha kwa nyengo powonjezera chonde m'nthaka, kuchepetsa ntchito yolima komanso kusamalira chilengedwe. Chitani ulimi wa mleranthaka motsatira ndondomeko zoyenera za kalimidwe ka mbeu monga kubzala mitundu ya makono, kubzala panthawi yake, kupalira pafupipafupi, kuteteza mbeu ku tizilombo ndi matenda, kubzala mbeu pampata oyenera komanso kuthira fetereza moyenera kuti mupindule.



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Appendix D: Letter of Introduction from College



ACTING VICE-CHANCELLOR
Prof. Al D Mtenje, BEd MEd, MA S. Illinois, PhD, London.

UNIVERSITY OF MALAWI
P.O. Box 280, Zomba, Malawi

Our Ref:
Your Ref:

Telephone: (265) 526 822
Fax: (265) 524 031
E-mail: vc@unima.mw

04 February, 2022

TO: WHOM IT MAY CONCERN

Dear Sir/Madam,

REFERENCE LETTER FOR MR WALLACE CHIPETA

I write this reference at the request of **Mr Wallace Chipeta** who is collecting data for his Masters dissertation to be submitted to the University of Malawi.

Mr Chipeta is registered in the Master of Arts in Theatre and Media Communications in Development (**MA TMCD**) at the University of Malawi.

Any assistance rendered to him will be highly appreciated.

Yours faithfully

A handwritten signature in black ink, appearing to read "Mufunanjani Magalasi".

Mufunanjani Magalasi PhD
Coordinator, MA TMCD

Appendix E: Some pictures captured during data collection



Image 1: KI Interview with AEDO in Mitundu EPA



Image2: KI Interview with AEDO in Chileka EPA



Image 3: FGD with Farmers in Mitundu EPA



Image 4: RBD experiment in Mitundu testing farmers interpretation of leaflet.