NON-GOVERNMENT AGRICULTURAL EXTENSION IN MYANMAR: EXPERIENCES AND CHALLENGES IN PROMOTING IMPROVED AGRICULTURAL PRACTICES IN THE CENTRAL DRY ZONE

By

Kyu Kyu Thin

A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

Community Sustainability – Master of Science

2023

ABSTRACT

Extension serves as a vital link in transferring and exchanging knowledge among actors, including researchers, agricultural technicians, and farmers. However, the majority of extension programs in developing countries struggle with a variety of challenges. Furthermore, very little research has been conducted from the perspectives of extension agents. Extension workers provide smallholder farmers with extension services and work closely with them, and understanding their perspectives could help the government, private and international funding agencies gain valuable information to shape policies and programs to improve project efficacy and recommend any institutional adjustments that may be required to increase the effectiveness of the extension services and lessen the burden on extension workers.

This study takes a qualitative approach, using semi-structured interview questions and individual discussions with respondents to understand extensionists' perspectives, experiences, and challenges in promoting knowledge about improved farming practices. This study also reports information on the relationship between the project approach and the difficulties faced by the extension agents. The majority of respondents were adamant that agricultural extension could only function more effectively if the extension system were set up flexibly and the project approach was realistically and sustainably framed to address the issues faced by the project's beneficiaries. In addition, extension agents hoped that the organization would create a platform where all stakeholders, especially extension agents and project beneficiaries, could express their views and contribute to making the necessary adjustments in project interventions in light of the local situation. Finally, this research aims to shed light on what changes extensionists might like to see in how the system works.

ACKNOWLEDGEMENTS

First and foremost, I would like to express my profound gratitude for my adviser, Dr. John Kerr, who has been the most fantastic supervisor I could have wished for and has been very considerate and patient in guiding me during my master's journey. Without your support, this journey would not have been possible, especially considering that I suffered from an unstable mental situation for two years due to political conditions back home. I feel sure to say that you are the best counsel I have ever had; I appreciate your support, tolerance, and understanding. I would like to thank Dr. Kimberly Chung and Dr. Duncan Boughton, who served on my committee, for their guidance in helping me finish this master's thesis. Your enthusiastic support and belief in this project helped me become a diligent and conscientious researcher. I appreciate all of your time, patience, encouraging comments, and recommendations, which helped to make this study better.

My deepest gratitude is extended and dedicated to those who have contributed to this study and all who generously donated their time. Most importantly, thanks to the amazing interviewees whom I talked with throughout this journey for supporting me and answering my questions without complaints. Without your contributions, this research would never exist.

I also appreciate the Lincoln Scholarship Program funding my master's degree. My sincerity is also extended to them, as attending MSU would not be feasible without their financial and professional assistance. Finally, I want to thank my family for their unending support and for standing with me even when I doubted my ability to complete this. I am incredibly appreciative and fortunate to have met so many fantastic people throughout my time at Michigan State University, thanks to friends in East Lansing and Myanmar. It is impossible to thank each of you individually, but I appreciate your support.

TABLE OF CONTENTS

1. INTRODUCTION

Agriculture plays a vital role in Myanmar's economy and the livelihood of its rural communities, accounting for approximately 30% of the GDP and 60% of the labor force (MOALI, 2016). The central dry zone (CDZ) is home to around 12 million people, which is nearly one-fourth of the total population of Myanmar (IWMI, 2015; MOALI, 2016). Approximately 75% of the central dry zone farmlands are rainfed upland agriculture, and farmers mainly cultivate leguminous and oilseed crops (Cornish et al., 2018).

People refer to the CDZ as "the oil pot" of the country, and the production capacity of the central dry zone farmland significantly impacts the county's entire economy. Therefore, it is crucial to maintain the yield for the benefit of Myanmar's people (ADB, 2014; World Bank Group, 2016). However, the central dry zone is one of the least developed regions of Myanmar, and the region has been facing numerous problems, including inadequate food supply, water shortage, climate change, and the lack of natural resources (ADB, 2016).

Agriculture in Myanmar is highly susceptible to the frequent occurrence of extreme weather events and climate change due to the country's poor social and economic development, excessive reliance on natural resources, and inadequate infrastructure (Yi, 2004; UNDP, 2007; UNCT, 2011; WFP, 2013). According to Kerft et al. (2014), Myanmar ranks as the second most climate change-affected country among the top ten nations, and the country has been vulnerable to climate change and severe climatic conditions in the last couple of decades. These situations endanger the lives of the rural people of a country who mainly depend on agriculture for their livelihoods (Dumanski et al., 1998; Ravi et al., 2010).

Herridge et al. (2019)'s study indicate that CDZ cropping systems have low productivity, which threatens sustainability and future production. The occurrence of soil degradation is more

widespread in tropical regions than in temperate zones because of the inherent properties of tropical soils, which are commonly "coarse-textured with low organic matter, low water holding capacity and little nutrient buffering," and the region's extreme weather conditions (Asio et al., 2009). Conventional farming practices are the dominant crop cultivation practice in the CDZ, which is poor in applying soil erosion control measures (Tun et al., 2015). As a consequence, crop nutrient deficiencies are widespread across the CDZ and a major productivity constraint Herridge et al. (2019).

Extension serves as a vital link in transferring and exchanging knowledge among actors, including researchers, agricultural technicians, and farmers. Thus, extension agencies and extensionists are critical in bridging the gap between them (Adesiji et al., 2010). Despite this importance, the perspectives of people who provide smallholder farmers with extension services have not been adequately examined. Not only does the literature ignore this subject, but the top-down nature of many extension systems means that no one asks extension employees for their perceptions.

A great deal of literature exists on the perspectives of farmers and extensionists on extension services, and the majority of the findings are related to resource constraints and their negative effects on extension workers' performance, production capacity, and the adoption process (Cho, 2002; Anderson & Feder, 2004; Rodriguez et al., 2009; Sadati et al., 2010; Sulo et al., 2012; Tey et al., 2014; Oo et al., 2017). However, very little research has been done on the extension workers' perspectives on what it is like to provide extension in challenging situations, especially in a setting characterized by a top-down system with pre-determined goals, target orientation, and promoting advanced agricultural technologies among resistant communities in a challenging agro-ecosystem. Furthermore, survey research dominated older works of literature, with only a

few studies using a qualitative approach that focuses on learning the perspectives of extension workers in their own words.

Extension workers work closely with farmer communities, and understanding the insiders' perspectives could help the government, private and international funding agencies gain valuable information to shape policies and programs to improve project efficacy and recommend any institutional adjustments that NGOs may be required to enable the effectiveness of the extension services and lessen the burden on extension workers. In general, understanding the expectations and experiences of extensionists is critical for successful agricultural extension system development. Baig and Aldosari (2013) also recommended that reviewing the limitations and strengths of the current functioning extension system is a critical step before taking any actions to upgrade the whole system for improvements in many Asian nations. Because employees can contribute knowledge about issues driving organizational transformation, understanding their expectations and experiences is crucial for successful organizational diagnosis and development (Pond et al., 1984; Hobbs, 1999).

In order to fill the knowledge gap about challenges encountered by extensionists from their perspective, this research aims to understand extensionists' perspectives, experiences, and challenges in promoting knowledge about improved farming practices among high-risk communities, top-down system with target-oriented approach, and what changes extensionists might like to see in how the system works. In particular, this study addresses the following research questions:

- What are the experiences and perspectives of non-government extensionists who engage in different projects in the central dry zone of Myanmar?

- What challenges do non-government extension workers face in resourcefully and meaningfully helping farmers?
- What changes might extensionists like to see in how the system works?

This document is structured as follows: In the following section, I will provide a general context of this study, including an introduction to the central dry zone of Myanmar, and then there will be a review of the relevant literature on agricultural extension. I will introduce an overview of agricultural extensions, such as the role of agricultural extension in agricultural development, government, and non-government agricultural extension, and a summary of challenges in agricultural extension. The next section of the thesis is devoted to the study's methodology. After that, I will describe the results and discussion of the research questions, which focus on the viewpoints and experiences of non-government extensionists working on various projects in Myanmar's central dry zone. The difficulties that non-government extension workers encounter in resourcefully and meaningfully assisting farmers and changes extensionists might like to see in how the system works in the future are also included in the findings and discussion section. This thesis closes with a conclusion of the results, limitations of the study, and references.

2. LITERATURE REVIEW

2.1. The role of agricultural extension in agricultural development

> "Agricultural Extension is the system of introducing new agricultural techniques and ideas to the farmers for incorporating them into their farming practices. Therefore, the extension workers inform farmers to improve their lands, prepare a cropping pattern, and motivate them to use improved agricultural implements and adopt modern agricultural practices according to their socioeconomic status" (Ahmad et al., 2007).

In the earlier days, agricultural extension's definition mainly aimed to enhance farm productivity by transferring agricultural knowledge, information, skills, and technology to information receivers (farmers). Later definitions of agricultural extension highlighted the importance of a two-way flow of information/feedback between technical specialists and farmers (Pazvakavambwa & Hakutangwi, 2006).

According to Baig and Aldosari (2013), agricultural education and its services are initiated to support farmers, promote knowledge improvements and proficiencies concerning farming techniques, and accelerate enthusiasm about advanced agrarian technologies. Agricultural extension primarily functions in diverse social settings, and it involves a range of actors and organizations, such as government organizations, non-government organizations, and private service providers (Anderson & Crowder, 2000). Agricultural extension's mission is to offer farmers information from the global knowledge base and local research, allowing them to determine their own goals and prospects, train them to make better decisions, and promote appropriate agricultural development (van der Ban & Hawkins, 1996). Agricultural extension services aim to improve agricultural productivity by providing farmers with institutional support,

allowing them to address production and marketing issues and ensuring sustainable agriculture development (FAO, 2002; Rogers, 2003; Hu et al., 2009).

Furthermore, agricultural extension strives to transmit farmers' issues and requirements to agricultural research centers so that appropriate solutions can be found with the help of researchers. Therefore, agricultural extension agents provide a vital and successful role in assisting farmers in resolving agricultural issues (Altalb et al., 2015). Agricultural extension services play a critical role in the development of rural knowledge and new farming techniques. These services are critical for informing and influencing rural household decisions, particularly in developing nations where such assistance is most needed (ALEX, 2002).

2.2. Government agricultural extension and non-government agricultural extension

Agricultural extension serves as a link between farmers and agricultural research organizations, allowing farmers to learn about new agricultural techniques and apply them to their farmlands. Without it, the agricultural industry would be unable to benefit from improved agricultural techniques and information (Altalb et al., 2015). Extension plays an essential role in agricultural development, and it needs extensive public investment in order to perform decent services. Despite the fact that there are many public extension groups in developing countries, their funding is sometimes insufficient, and this limits their ability to do their jobs effectively (Anderson & Feder, 2004). This statement was supported by Mugwisi et al. (2012), who argued that insufficient government financial resources for agricultural extension is one of the most pressing issues in most developing countries. Furthermore, according to Kempel (2013), government outreach projects frequently employ a top-down approach, and many problems were brought on by insufficient resources for program implementation (Mugwisi et al., 2012).

Takenaka (2006) also stated that regional agricultural extension agencies in Asian countries are intended to share knowledge and educate local farmer communities. However, they are exposed to multiple constraints, such as weak involvement of target farmer groups in the program implementation & planning, no attractive incentives for the extension workers, lack of proper organizational structure, and wide communication gaps between different actors (technicians, researchers, policymakers, farmers, and the extensionists). Consequently, the extension agents cannot significantly and positively impact agricultural development. According to Baig et al. (1999) and Anderson and Feder (2004), the extensionists scarcely showed enthusiasm for their work due to poor working environment, low salary, lack of career improvement and opportunities for professional development, and less attraction to become a qualified agricultural advisor.

In 1927, the Department of Agriculture started the extension service program in Myanmar to address the problems of farmers and educate them regarding adaptable and relevant agricultural practices (Cho, 2002). Although the Myanmar government extension program was established with good intentions, Myanmar's agricultural extension sector has been facing a range of issues, including a lack of adequately equipped extension programs for the local communities, poor infrastructure, insufficient capacity-building programs, lack of skilled technicians, shortage of extension workers, lack of participation and cooperation by the local communities in the implementation process, and low technology adoption (Cho, 2002).

In addition, the well-rooted centralized administration system in Myanmar hinders the participation of the farmers in the decision-making and planning, and researchers are often the ones to address issues and find solutions on behalf of farmers. These situations triggered a massive knowledge gap between farmers, who are facing the problems, and researchers, who are

finding the solution to problems. These impediments have delayed the flow of information and could not address the problems in time (Cho, 2002). Furthermore, the research and extension institutions in Myanmar and their services are consistently under insufficient funding, which results in many farmers receiving subpar extension services or even a total lack of extension services (Haggblade & Boughton, 2013; Herridge et al., 2019).

The services provided by Myanmar's agricultural extension department are old-fashioned and emphasize increasing agricultural production rather than the value of helping farmers grow their skills, knowledge, and attitudes. In addition, the farmers' ability to flourish in a meaningful way is hampered by a number of factors, including that planning for extension programs continues to be a government responsibility with little input from male and female farmers. The services have been functioning in a one-way flow of information, from the extensionists to farmers, and farmers' needs are barely taken into consideration (Cho, 2013).

When the services delivered by government extension programs are inefficient due to several challenges, private and not-for-profit organizations carry out extension programs alongside the government in various countries and play a significant role in aiding farmers with improved agricultural technologies (Takenaka, 2006; Buadi et al., 2013). Extension services provided by non-government organizations (NGOs) are reported to be more efficient and cost-effective than government extension because of significant financing availability for project activities and employees, international linkages, and flexibility (Anderson & Crowder, 2000). Furthermore, it is assumed that all of these factors help extension educators increase their coverage networks and positively impact interactions between rural communities and extensionists (Anderson & Crowder, 2000). In addition, Edwards and Hulme (1995) posit there is mounting evidence that non-government organizations (NGOs) and grassroots organizations

(GROs) are not as effective as previously thought concerning poverty reduction, cost-effectiveness, sustainability, public engagement (including gender), adaptability, and creativity. Additionally, the authors point out that paying excessive attention to immediate outcomes and short-term targets triggered "a tendency to accountancy rather than accountability, audit rather than learning and sharing" (Edwards & Hulme, 1995).

Despite the assumption that NGOs are more cost-effective and efficient than governments in providing services to grassroots communities, some scholars have disagreed with that statement and demanded to prove that this is true (UNDP, 1993; van Dijk, 1994). In addition, Fowler (1988) stated that evaluating the effectiveness of a non-profit organization is a complex and complicated task, and these circumstances make it difficult to generalize the assertions that non-government organizations are "cost-effective" or that grassroots organizations are near to the poor.

2.3. Summary of challenges in agricultural extension

2.3.1. The challenges of top-down approaches

In the "top-down approach," researchers develop new advanced agricultural technologies, extension agents are in charge of sharing those technologies with farmers, and farmers are expected to accept and apply those technologies to their farms (Mukute, 2013). This method lacks a two-way information flow and fails to customize messages for each location and technology transfer without a framework for farmer feedback. According to FAO (2004), in many developing nations, most of the government planning processes are bureaucratic, and most of the decision-makers have little to no expertise in farming. As a result, inappropriate and ineffective extension programs are practiced by extension agencies, and farmers experience losses in terms of money or other resources, and they get furious and upset and do not want to

engage with the extension workers. One of the most significant issues faced by extension agents in developing countries is the top-down approach (Walter & Sarkar, 1996; Sigman & Swanson, 1993; Boyaci & Yildiz, 2016). In many developing countries, including Pakistan, extension programs continue to follow a traditional, top-down approach that ignores the complexities of the ground and farmers' needs in an era of increasing marketization (Baloch & Thapa, 2019). This statement was supported by Babu et al. (2013) that the top-down extension approach is one of the several factors that hampered the performance, effectiveness, and efficiency of the public extension system in India. Furthermore, according to Davis (2008), the majority of extension programs in developing nations struggle with a variety of complex issues, and top-down strategy is one of them.

2.3.2. The challenges of pre-determined goals

Many development organizations adopt "a pre-determined goal" approach with the intention of obtaining a specific outcome for the benefit of farmers. It emphasizes disseminating specific agricultural technology and obtaining a specific outcome developed and decided upon through prior discussions among donor agencies, implementation partners, and researchers. The "pre-determined goal" or "one-size-fits-all" approach ignores farmers' perspectives when developing and determining which agricultural technologies to promote or utilize to alleviate farmers' problems.

The emergence of environmental concerns such as climate change has prompted a transformation in extension service provision from an information distribution tool to a vehicle for stimulating conversation and innovation creation among stakeholders, especially between farmers, policymakers, and researchers (Kiptot & Franzel, 2015). The traditional extension strategy, commonly known as the technology dissemination strategy, prevents farmers'

knowledge and experiences from being included in the creation of advanced agricultural technologies, contributing to promoting farming practices that do not meet farmers' needs (Atela et al., 2018). Thus, collaborative innovation and technology development is required in order to address the issue of low productivity among small farmers in developing nations, which allows farmers to not only demand but also participate directly in technology development (Kirsten et al., 2013).

Previous studies (Anderson & Feder, 2004; Masangano et al., 2017; Masambuka-Kanchewa, 2020) found that extension personnel dictates which technologies farmers should adopt rather than providing technical options. Then, Masambuka-Kanchewa et al. (2020) suggested that it is critical that extension agents give farmers technology options rather than imposing technologies.

2.3.3. The challenges of target orientation

Performance indicators are measurements of a project's impacts, outputs, and inputs that are kept track of throughout project implementation to judge how well the project is doing toward its goals, and they are also employed subsequently to assess the success of a project (Mundial, 1996). Project outputs (e.g., the number of trainings held, the number of participants joining the training, and the training materials given out to participants) are directly generated by implementing project activities and are often measured in terms of completion rate (Hatry, 1996). The term "project impacts" refers to any immediate and long-term advantages derived from participation in the program, and examples of project impacts include improved production capacity, more effective responses to climate change, and greater financial stability (Hatry, 1996). To demonstrate how the project is attempting to achieve the impacts it was designed to get, the project implementers work diligently to complete the project targets. However, when

project implementers are solely concerned with achieving the targets, they cannot focus on the quality of project interventions, such as the applicability of project interventions, as well as inviting the participants who are the actual target audiences of the training program. As a result, it is questionable whether they will achieve the project impacts they wanted. In addition, the target orientation strategy poses challenges for extension agents.

It has been discussed in the literature that when NGOs carry out projects, they occasionally may solely be concerned with accomplishing predetermined goals & targets, such as the number of villages covered and the number of beneficiaries reached, and this might prevent the project area from experiencing sustainable developments when the project period is over. Therefore, project interventions should take a holistic, adaptable, and balanced approach to meet the requirements of the intended beneficiaries, focusing on both soft skills and material development (ESCAP, 2016). Masambuka-Kanchewa et al. (2020) found that in Malawi, in most cases, the information supplied to farmers does not fulfill farmer demands. The authors found that the problem originated from the target-oriented monitoring system; the extension agents are assessed on the number of technologies they have disseminated and the number of farmers who have adopted them. This target-oriented reporting system perpetuates extension agents' urge to impose these technologies on farmers in order for them to appear to be effective (Masambuka-Kanchewa et al., 2020). Then, the author suggested that the performance of extension agents must be assessed on their ability to reach out to farmers, work with them to understand their needs and develop solutions.

2.3.4. Challenging socioeconomic & ecological conditions

Extensionists may encourage farmers to use innovative agricultural technologies; however, technology adoption varies widely based on the socioeconomic and ecological

conditions around them. According to Tey et al. (2014), adopting new technologies is significantly influenced by several variables, such as socioeconomic conditions, agroecological conditions, and the perceived advantages of sustainable agriculture practices. Chi & Yamada (2002) noted a lack of trust in the technologies offered by extension agents due to farmers' limited exposure to new technology, less educated farmers, older farmers' resistance to changing from their tried-and-true farming methods, and they are also worried that the technologies might produce lower yields than conventional practices. Rogers (1983) and Altalb et al. (2015) also noted that technology adoption is a mental process involving numerous steps leading to a farmer's decision to accept or reject a specific practice decision and to accept an innovation depends on the individual's perspectives on the benefits and drawbacks connected with a new practice.

Since farmers depend on their harvest to maintain their livelihoods, farmers will be hesitant to adopt new agricultural practices if they perceive unpredictable risks involved, such as lower production capacity than conventional farming practices, and it will take them some time to see the benefits of the new practices. Therefore, farmers must have adequate capital to overcome the risks of uncertainties and incomes for a risky investment; however, nearly 80% of the households in the CDZ of Myanmar rely on loan programs to help them pay their living expenses (LIFT, 2014). Chi & Yamada (2002) stated that a lack of capital and credit resources is also one of the contributing factors to farmers' failure to adopt technologies offered by extension agents. In addition to socioeconomic factors, ecological factors such as unforecastable monsoon duration and limited rainfall, combined with soils of generally low water holding capacity, make the central dry zone of Myanmar a challenging cropping environment (Vaughan & Levine, 2015; Cornish et al., 2018). Consequently, all those conditions mentioned by former researchers

impose challenges for extension agents because farmers' interest in and desire to participate in project activities and their choices over whether or not to use the improved agricultural technology are negatively impacted by those factors.

3. METHODOLOGY

3.1 Overview of the study design

This study explored the experiences and challenges of non-government extension agents in promoting improved agricultural practices in the central dry zone of Myanmar through qualitative research. According to Fossey et al. (2002), the goal of qualitative research is to understand the crucial aspects of people's lives and social environments. Additionally, it employs inquiry techniques that are distinct from quantitative research and concentrates on the "why" rather than the "what" of comprehending social phenomena.

Qualitative research used in-depth interviews with semi-structured interview guidelines. This approach takes persons as its starting point and assumes that individuals have unique and relevant knowledge about the social world that may be discovered and conveyed through verbal communication. This strategy is beneficial when the researcher has a certain issue in mind that they want to focus on and gather information and insight from individuals about it (Hesse-Biber, 2017). Furthermore, in-depth interviewing attempts to replicate a typical discussion in which the respondents' viewpoints emerge via the stories they tell.

Bariball and While (1994) and Fylan (2005) recommend that if the researcher anticipates getting exploratory answers and exploring an interviewee's perspectives and opinions on complicated and often delicate & sensitive matters, semi-structured interviews would be a more suitable tool for conducting qualitative research. Semi-structured interviews are used to collect

data based on preset specific research questions or themes that need to be studied further (Alexiades, 1996). Semi-structured interviews are guided by a set of questions and attempt to keep the conversation focused on those questions (Hesse-Biber, 2017). This method allows interviewers to be more flexible as they can add prepared questions with others that arise during conversations with the interviewee or eliminate some predetermined questions from the guide entirely based on the subsequent conversations (Campion et al., 1988; Alexiades, 1996). The main difference between semi-structured interviews and structured interviews is that the interviewers of the latter strictly follow the predefined questions, and the order of the question is sensitive in this case (Fylan, 2005).

3.2. Description of the study areas

The central dry zone (CDZ) is a low-lying region of about 80,000 km2 in the center of Myanmar, accounting for about 12% of the country's land area (Herridge et al., 2019). According to FAO data from 2014 and MOALI data from 2016, nearly 80% of the CDZ population, or 10 million people, are categorized as rural communities. The average CDZ hamlet has 170 homes, each household containing 4.9 people. Farming is the main occupation of the people in the CDZ, and 60% of households engage in farming and earning their livelihoods through agricultural-related activities (LIFT, 2014). The CDZ is believed to be where 46% of Myanmar's pulse and oilseed legumes and 74% of its sesame and sunflower are farmed. Pulses and oilseed crops occupy most farmlands in the CDZ, and the CDZ has a production capacity of 2.5 M ha for pulses and 1.5 M ha for oilseed crops, including sesame and sunflower. Furthermore, rice is farmed as a rainfed monsoon crop and an irrigated crop, 15% of Myanmar's total land area is used for the cultivation of rice. (MOALI, 2016).

According to the 2013 LIFT study, the sale of labor, cereal grains, pulses, and groundnuts, and earnings from small companies engaged in manufacturing and trading were the top four sources of household income in the CDZ. People there considered groundnuts and pulses as income sources rather than staple foods (LIFT, 2014).

There are three seasons in Myanmar, and the country has varying climates based on the country's geographical zones. The tropical/summer season lasts from mid-February to mid-May; the rainy season lasts from mid-May to late October; and the winter season lasts from late October to mid-February. The central zone is drier than the other parts of the country and normally gets 500–1,000 mm of rain annually (World Bank Group). Despite the fact that the typical climate condition of Myanmar's CDZ is tropical monsoon, the region receives significantly insufficient rainfall compared to the rest of the country (FAO, 2009; Tun et al., 2015; IWMI, 2015). The study locations and organizations are purposefully selected for the following reasons:

- the dominance of farming activities for livelihoods,
- the areas populated with small-scale resource-constrained farmers
- the areas where challenging agroclimatic conditions severely impacted the communities
- the presence of non-government organization activities promoting improved agricultural practices for more than a decade.

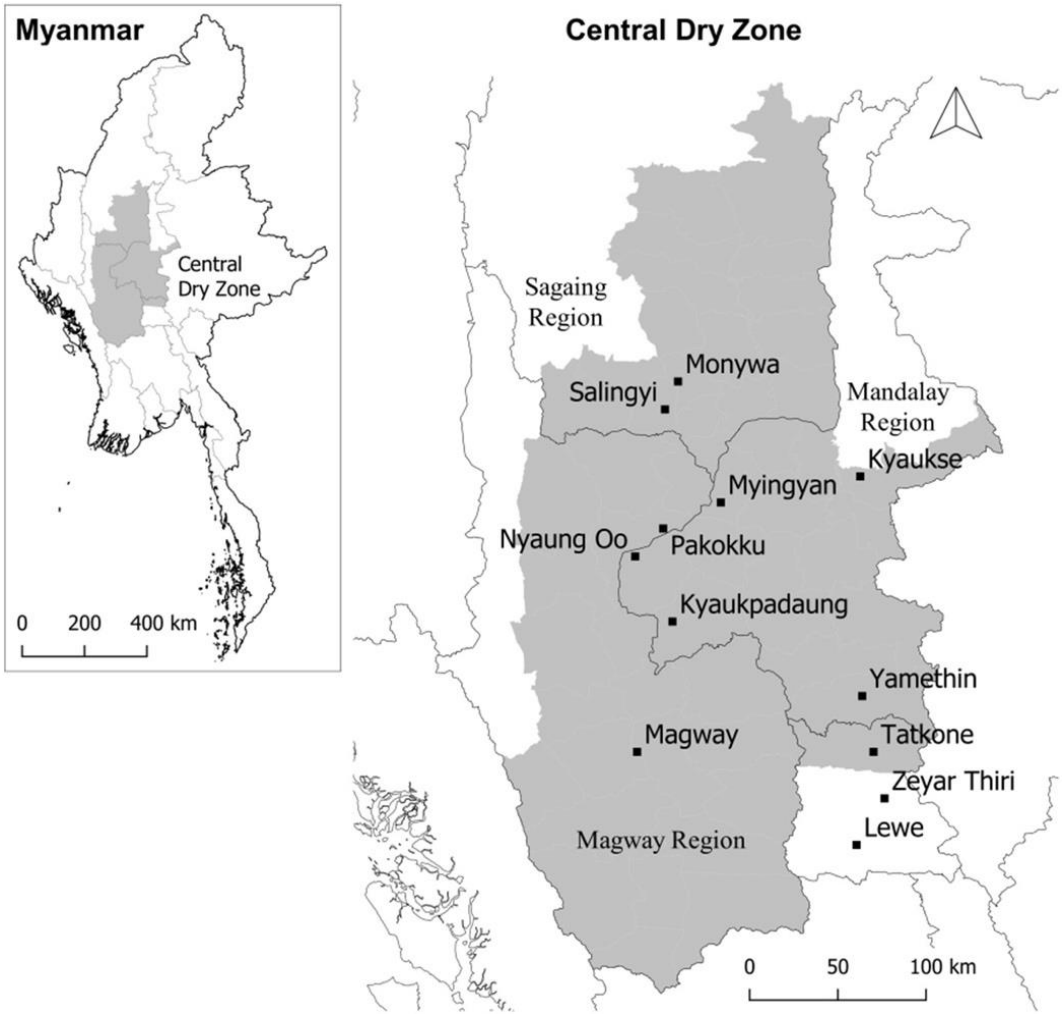

Figure 1: Map of Myanmar with the Central Dry Zone (CDZ) highlighted

3.3. Sampling respondents and description of respondents

For NGOs selection, the researcher of this study first approached knowledgeable extension workers in the central dry zone who had experience working in government & non-government organizations for at least ten years and asked for their recommendations in order to discover additional suitable respondents for this study. Then, the organizations were chosen based on the following four criteria;

(1) The organization has to be a non-government organization.

(2) The organization was implemented in the central dry zone of Myanmar.

(3) The organization was tasked with implementing agricultural-related activities.

(4) The agricultural extension has to be a main component of the project implementation process.

In addition to the criteria mentioned above, the study's respondents rarely mentioned projects other than the organizations suggested by the key informants. Even though some respondents mentioned other projects other than those of the selected five organizations, those were implemented in other parts of Myanmar, or else agricultural extension is not a major component of the project. Therefore, the researcher believes that the selected five organizations could represent the experiences and challenges encountered by extension agents who worked for NGOs in the central dry zone. The study focused solely on the perspectives of extension workers with internet access and organizations operating in Myanmar's central dry zone, thus making the findings and generating interpretations less accurate and area-specific. While the findings, conclusions, and recommendations cannot be applied universally, they can nevertheless provide valuable insights that can be applied to other parts of the country and the world dealing with similar problems.

Respondents were selected using purposive sampling to include persons with intensive experience working with rural populations. Purposive sampling is the purposeful selection of respondents based on the qualities possessed by the participant (Etikan et al., 2016). The researcher can spend less time interviewing, transcribing, and analyzing redundant or irrelevant data by concentrating on where valuable information might be obtained (Patton, 2002). It is based on the idea of focusing on people with specified characteristics who will be better able to assist with relevant information. The researcher evaluates what information is needed and then

searches for people who can and will provide it based on their expertise or experience, availability and willingness to engage, and ability to articulate experiences and opinions in an expressive and reflective manner.

The potential candidates were then asked if they were interested in participating in the study. Individuals were chosen for participation based on their previous work experience, the type of project they had been working on, the area in which they worked, and their knowledge of extension and agricultural and rural development. The majority of the projects chosen for this study have already completed their activities in Myanmar, and some of the participants are now employed by different organizations or on different projects within the same organizations. The researcher strictly followed the procedures pertaining to the confidentiality of participant responses and the organizations they worked for, as well as the preservation of individual privacy and identification, both during and after the data collection process. Before conducting fieldwork, the study (ID STUDY00007762) was approved by MSU's Institutional Review Board (IRB), and it has adhered to the university's ethical standards, which are required of all researchers who include humans in their data collection.

3.4. Data collection

After the respondent selection, I contacted respondents to know the convenient communication channel, date, and time for them in order to join the interview. Before the interview, I wrote down the purpose of the interview and tried to stick to it, but I was also flexible enough to make changes as per the interviewees' responses. For this study, the interviews were conducted virtually in collaboration with five NGOs in three regions, Magway, Mandalay, and Sagaing Regions, commonly called the Central Dry Zone of Myanmar. I interviewed the participants via Zoom, Facebook Messenger, and Google Voice call; all were

audio-recorded. Just before the interview, the goal of the study was discussed, and only those who gave informed consent were included in the interviewing process. All interviews were voice recorded after the respondents gave permission to do so.

Respondents of this study fall into two categories, senior management officers and extension officers. Even though some respondents (see the exact number of respondents in Table 1) of this study identified themselves as senior management officers, they actually began their careers as extension officers before being promoted to senior management positions.

Then, the respondents in this study were asked to answer semi-structured questions about their experiences working on NGO projects. In the semi-structured interview, the interviewer has a plan for what questions to ask and what information they want from the respondents when using this strategy. The questions' wording and order are not fixed and are flexible enough to revise as per the flow of conversation between the interviewer and interviewees. Furthermore, the responses of participants can help the interviewer construct more robust follow-up questions based on new information gleaned from subsequent interviews. The semi-structured interview provides individual participants considerable flexibility and freedom to talk about whatever interests or concerns them. In other words, while the researcher tries to ask each respondent a particular set of questions, he or she lets the dialogue flow more spontaneously, allowing for unforeseen twists and turns. Interviewees frequently have information or knowledge that the researcher may not have considered in advance. When such information emerges, the researcher adopting a semi-structured design is more likely to let the talk flow naturally, allowing the interviewee to explore new meaningful themes (Hesse-Biber, 2017). By conducting semi-structured interviews and gathering qualitative data from extension agents who have experience working for NGOs, I was able to explore the individual agricultural extensionists' experiences,

the strategies utilized to promote improved farming practices, as well as their viewpoints, challenges, and constraints in the technology transfer process from the extensionists' perspective.

Interviews lasted one to two hours and took place at a time and place suitable and comfortable for the respondent. After each interview, I relistened to the recorded tape; I tried to review the interviewing process, review the data and write down the summary of the data, including the key topics mentioned, thoughts that stuck in my head, things I did not manage to get, improvements for the next interview, and questions to ask in a follow-up interview. According to Rubin and Rubin (2012), when the researcher hears anything that seems essential and relevant to the study but is ambiguous, incomplete, or contradictory or if an interviewee makes a remark that seems too broad, too narrow, or too extreme, follow-up interviews are necessary and may be required. Therefore, I compiled a list of follow-up interview questions based on the responses provided by the candidates and the points that I still needed to explore more in the follow-up interview, and then I conducted a follow-up interview as needed. In the second interview, I stressed getting unclear facts from the first interview, and it took around 30 to 45 minutes. The data were collected and transcribed verbatim, and respondents' identities were concealed through pseudonyms. All recorded discussions, notes, and transcripts were examined and shared if the interviewees wished.

Table 1 displays the number of senior management offers and extension officers selected for interview. The organizations and participants are not named to protect their identity. Seven pure extension officers, one senior management officer, and nine participants who used to work as extension officers and were then promoted to senior management officers were selected from a total of five NGOs.

Table 1: Number of Respondents Chosen

Organization		Respondent Number	Position (Senior management officer/Extension officer)
Organization 1	**1**	Respondent 4	Extension officer
	2	Respondent 6	Extension officer
	3	Respondent 19	Extension officer & Senior management officer
Organization 2	**4**	Respondent 1	Extension officer & Senior management officer
	5	Respondent 3	Extension officer
	6	Respondent 12	Extension officer & Senior management officer
	7	Respondent 13	Extension officer & Senior management officer
Organization 3	**8**	Respondent 7	Senior management officer
	9	Respondent 20	Extension officer & Senior management officer
	10	Respondent 21	Extension officer
Organization 4	**11**	Respondent 2	Extension officer
	12	Respondent 5	Extension officer & Senior management officer
	13	Respondent 8	Extension officer & Senior management officer
	14	Respondent 11	Extension officer & Senior management officer
	15	Respondent 9	Extension officer
Organization 5	**16**	Respondent 10	Extension officer & Senior management officer
	17	Respondent 14	Extension officer

3.5. Data analysis

The process of analysis started during the data collection phase. I made notes after each data gathering regarding the key ideas and themes I discovered during the data collection process. As I collected more data, I reflected on the list of concepts and themes I had developed for the previous collection and made amendments to it. As the first step in data analysis, all audio and video recordings were transcribed directly, listening to the conversations. All the data were transcribed into Burmese (the language in which the interviews were conducted and the native

language of the researcher) in order to catch more accurate data, and then all the data were translated by the researcher. In addition to most of the translations being done by the researcher, a professional translator was hired to translate some parts of the transcribed data in order to ensure accuracy. Names were removed from the data before it was transferred to the translator to preserve the respondents' privacy, and pseudonyms were used instead.

The transcribed & translated data was then described, categorized, and interpreted into codes and themes. The theory, the literature review I conducted, and the interviews were sources for the codes. The study begins with a set of codes from the literature review & the research questions, and then new codes emerge throughout the coding process. During the first cycle of coding, I determined what type of information should be coded and included in the coding process to provide rich responses to the research questions. “A code in qualitative inquiry is most often a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data” (Saldaña, 2021). Interview transcripts, participant observation field notes, journals, documents, drawings, artifacts, photographs, video, Internet sites, e-mail correspondence, literature, and other sources of information can all be included in the data (Saldaña, 2021). In general, the following were coded and analyzed: the extension approaches utilized by the extension agents, how the extensionists defined a good extension agent, the philosophy behind the decision-making of what agricultural practices to promote, the project approaches, the extensionists' perceptions of extension & project approaches, extension agents' experiences working for NGOs and their challenges, the extensionists' perceptions on the effectiveness of the extension program & projects and their expectations of how the extension system works.

The researcher used MAXQDA software for electronic coding and the data condensation process followed (Rubin & Rubin, 2012) to explore emerging codes, themes, categories, and concepts. I tried to use the developed (not-finalized) codes across at least five data collections to see what did and did not work so I could begin adjusting the codebook. Revising the name of the codes, definitions, examples, and rules occurred all the time; since I tried to get a definition that could clearly describe and represent all of the emergent themes and concepts I had encountered across all data collection. During the second coding cycle, I revised both the codebook and the data and looked at categories, themes, and linkages among the codes. The codes and transcripts were analyzed and classified in order to identify emergent themes/concepts and topics (Miles & Huberman, 1994). "In qualitative data analysis, a code is a researcher-generated construct that symbolizes and thus attributes interpreted meaning to each individual datum for later purposes of pattern detection, categorization, theory building, and other analytic processes." (Saldaña 2021). Both inductive and deductive data analysis methodologies were used to analyze the data (Thomas, 2006). Deductive analysis entails the researcher's interpretation of data in order to determine whether the data is consistent with the assumptions or aims that led the research. In contrast, inductive analysis entails the researcher's interpretation of data in order to develop themes and concepts (Thomas, 2006). According to Charmaz (2001), coding is the "essential connection" between data gathering and interpretation.

By combining all the information from all 20 data sources (17 interviews and three follow-up interviews), I created a codebook. The codebook can be found in the appendix. Once I had a finalized codebook, I tested the codes for all data collections. The process of transforming the code and themes into more general interpretations or meanings of the data came next. I carefully checked the data and considered my research questions to help me see past the obvious

ideas or go beyond the surface-level concepts. I was aware that I would need to change my codes if a crucial piece of data was not encoded in order for them to be able to access it. Coding was followed by extracting the coded data. Following each coding step, I produced summary reports and memos highlighting the main issues raised by respondents. In the memo, I jotted down all the connections and similar and different perspectives I observed across the data and summary statements. I created a separate memo for each respondent, each code, and each organization. In order to detect emerging themes/concepts and topics, the codes were categorized into a table and figured out which portions would be relevant in answering which research questions.

As suggested by Löfgren (2013), I classified themes that featured frequently, were deemed relevant by the interviewees, and may be connected to a theory or concept relating to my research questions. Although my research questions are closely related, some needed more data to be answered, and some needed to be combined to answer the research questions perfectly; therefore, I ultimately opted to modify some of them. I then started producing a display based on the first research question, the memo, and the summary statement from the coded data. Lastly, I typed down the summaries utilizing the coded data I created during the data condensation process. I allocated every code in the codebook (table) to each research question in the hopes that the information from that code would aid in resolving the query. I created a row for each data collection; specifically, each respondent was assigned under their own organization and a column for all the codes that had been assigned to each research question 1 in the display. I filled in the boxes of the table with the summaries I had prepared in the data extraction memos; for instance, the summary for the data from all respondents from Organization 1 corresponding to the code "challenges" went in the box corresponding to the column for challenges.

I then built a new row in which I wrote overarching summaries characterizing the data for each code based on the summaries from all data collections after all of the summaries from the related data extraction memos were in the display. Then, I wanted to be able to explain the relationships between and among the codes; therefore, I developed a conceptual framework and described links using the overall summaries of the codes that exist between and among them. I outlined the main links in a note that served as the foundation for this thesis' results and discussion and conclusion sections.

3.6. Data validity

Researchers who use quantitative research prioritize measuring and analyzing the interrelationships between variables and use experimental procedures and quantitative methods to test "hypothetical generalizations" (Hoepfl, 1997., Denzin & Lincoln, 1998). Comparatively, qualitative researchers employ a lens based on the perceptions of individuals who conduct, participate in, read, and evaluate a study as opposed to a lens created using scores or research methodologies (Creswell & Miller, 2000). "Member-checking, triangulation, thick descriptions, peer reviews, and external audits" are frequently used in qualitative research for validity (Creswell & Miller, 2000). Researchers use one or more of these techniques and present their findings & validity.

Researchers use a validity technique called triangulation, where they look for convergence across numerous, diverse sources of information in order to develop topics or categories for a study. Four types of triangulation were recognized by Denzin (1978): "across data sources (such as participants), theories, and methodologies (i.e., interviews, observations, and documents), and among various researchers." The narrative account is trustworthy because triangulation, utilized as a validity process, is a step undertaken by researchers that relies on

several sources of evidence rather than a single incident or data point in the study (Creswell & Miller, 2000). I employed data triangulation to increase the validity of the research findings. Using many data sources (such as time, place, and people) in a study is known as data triangulation. Findings can be supported by further data, and any shortcomings in the data can be made up for by the strengths of other data, boosting the validity and reliability of the conclusions (Denzin, 2010). The coding scheme also has through multiple modifications and has been checked with my adviser, a member of the committee, and a colleague, enhancing the precision of the coding choice rules and the scheme as a whole. The design of this study aimed to lessen the possibility of coming to the wrong conclusions by interviewing extension agents from five different organizations. Triangulation is a systematic process of sorting through the data to find common themes or categories by removing overlapping areas and relying on multiple sources of evidence rather than a single data point. The respondents in this study only have one thing in common: they are all Yezin Agricultural University alums who work to promote sustainable agricultural development in Myanmar's dry zone and educate local communities. The varied job duties and positions held by NGO employees contributed to the data's validity in substantiating the conclusions drawn.

Another procedure for establishing credibility in a study is to describe the setting, the respondents, and the themes of a qualitative study in rich detail. Denzin (1989) defined, thick descriptions as in-depth, dense, thorough accounts, and the goal of employing thick descriptions in writing is to include as much information as possible. In addition to the validity purpose, readers can decide whether the findings can be applied to different circumstances or ones that are comparable, thanks to the rich description (Creswell & Miller, 2000). In contrast, thin descriptions are factual and lacking in detail. In this study, the likelihood of generating shallow

descriptions was reduced by conducting lengthy, detailed & in-depth interviews and asking for examples that were voice recorded or videotaped and transcribed. In addition, using prompts frequently to get the whole scenario with the vivid, detailed description written in the result & discussion part of this thesis helps readers understand that the narrative is reliable.

Member checking is the third validity approach applied in this study. Member checking transfers the validity process from the researchers to the study subjects. Member checks are referred to as the most critical approach for creating credibility by Lincoln and Guba (1985). Member checking entails returning data and interpretations to study participants so they can evaluate the validity of the facts (Creswell & Miller, 2000). All respondents received the complete transcripts of the conversation along with the conclusions that were reached; at the completion of the data-collecting period, checks were made by the respondents to ensure that they agreed with the conclusions. Throughout the data collection process, respondents were questioned to determine whether the themes or categories make sense, were asked to assess the results and the translated and transcribed raw data, whether the overall narrative was plausible and accurate, and whether they were generated with enough support.

Furthermore, I made an effort to critically consider how my actions might influence the study participants' responses and avoid reacting to anything that seemed unexpected or inadvertently encouraging respondents to provide an answer that matched my expectations. According to (Creswell & Miller, 2000), researcher reflexivity is the process by which researchers report on personal reflection on the social, cultural, and historical forces that shape their interpretation and inquiry. It is also a validity procedure for researchers to self-disclose their assumptions, beliefs, and biases. The researchers can separate themselves apart by expressing personal experiences, including an epilogue, separating a section on the "role of the researcher,"

or utilizing interpretive commentary throughout the explanation of the findings (Moustakas, 1994). The researcher in this study identified the "Positioning Myself" portion in the opening section of this thesis as one of the research reflexivity validity processes. Also, the researcher avoids using leading questions and is aware of how the leading questions affect the information participants provide throughout the data collection because the researcher has experience working for NGOs. In analyzing the interview data, the researcher closely considered how the participant came to offer some evidence for a hypothesis; for instance, information that is presented voluntarily and is rich in detail may be more weight than evidence that is provided in a brief manner in answer to a leading query.

Many of the validity concepts were applied in this study to increase the validity of the findings and guarantee that the outcomes are reliable.

3.7. Positioning myself

The researcher's and participants' identities could impact the research process because the research is a shared place shaped by both parties (England, 1994; Bourke, 2014). The researcher is a crucial component of qualitative research, and developing a relationship with the participants is essential to how the study is conducted. This is because the researcher's personal experiences and social background will impact the study's research questions, data collection, analysis, and interpretation (Naples, 1996; Foote & Bartell, 2011). Another critical aspect of performing qualitative research is fostering ethical interactions and being open about relationships and experiences during the research process (Subedi, 2006; Sultana, 2007).

Then, positionality comes into play; it is the concept that a researcher's social-historical-political location influences their research orientation. A positionality statement is a disclosure of how an author's self-identifications, experiences, or privileges influence the way research is

conducted, including data collection, analysis, results, and discussion (Malterud, 2001; Massoud, 2022). Therefore, explaining the researcher's positionality gives a reader a better perspective on how data were gathered, who agreed to talk to the researcher, and why they did so. As a result, the reader will be better positioned to judge the researcher's influence on the research process and how "truthful" they feel the research data is. Thus, a critical awareness of the relationship between knowledge and the condition of the knowledge it produces could result from knowing the researcher's positionality or experience with the topic or subject of inquiry (Rowe, 2014; Holmes, 2020; Massoud, 2022).

This research examines extensionists' perspectives and challenges in promoting knowledge about improved farming practices among high-risk communities, a top-down system with a target-oriented approach, and any changes they would like to see made to the system's operation. My experiences working with NGOs as a non-government extension agent and working with farmers ultimately led to my interest in conducting qualitative research to learn more about the in-depth experiences of extension agents. Thus, it is essential for me as a researcher to articulate my positionality, which includes the dynamics of the research process and context, as well as my rapport with the research participants. My prior work experience proved crucial to how I approached the research issue, as well as how and why I began this research project. I have worked for NGOs for over five years as a project implementer, and I have seen a variety of difficulties in the project implementation process. And I assumed that exploring the perspectives of project implementers was one of the best ways to identify a strategy to improve the effectiveness of the extension services that were provided on the one hand and that, on the other hand, we could probably design better extension programs if we had a better understanding of the challenges that extension workers face.

I worked for one organization that I included in this study, and some of the respondents are my acquaintances. Even though I resigned from the organization I included in this study after one year and eight months, I have maintained a good relationship with that organization. Yezin Agricultural University (YAU) is the only agricultural university in Myanmar, and most of the graduates know each other, and YAU becomes a source of friendship for every graduate. YAU networking and prior employment helped me get to know some of the respondents of this study and the nature of their work. Some participants consider me an insider because of my prior work experiences working for NGOs; they see me as one of them and are honest with me. In contrast, some respondents regarded me as an outsider because I was conducting research while I spoke with them. In order to obtain honest and valid responses from them, I introduced myself to them as a graduate student who conducted this study for my master's degree. I said this study intends to find the approach to boost the effectiveness of the delivered extension services and that we could probably design better extension programs if we had a better grasp of the obstacles that extension workers encounter. I also assured them their responses would only be used for this study's purposes.

4. RESULTS AND DISCUSSION

In this section, I answer my three research questions, which are divided into different subsections. I first address research question 1: What are the experiences and perspectives of non-government extensionists that engage in different projects in the central dry zone of Myanmar? To answer this question, I will explain extension agents' experiences and perspectives on agricultural extension approaches in section 4.1. In subsections, I will elaborate on what qualities make a good extension agent from the perspectives of extension agents. To answer the

second research question, what challenges do non-government extension workers face in resourcefully and meaningfully helping farmers? I will describe the difficulties of non-government extension workers in Myanmar's Central Dry Zone and address the causes of those challenges in subsections 4.3, 4.4, 4.5, 4.6, and 4.7, respectively. In this subsection, I will also go into more detail about the impact of other factors on farmers' interests in improved agricultural methods. The third part of the results & discussion section answers the question: What changes might extensionists like to see in how the system works? To answer this question, in subsection 4.8, I will explain extension agents' expectations for a better extension system to support the communities more effectively and efficiently.

RQ1: What are the experiences and perspectives of non-government extensionists who engage in different projects in the central dry zone of Myanmar?

4.1. Extension agents' perspectives on extension approaches

All respondents shared their thoughts on extension tactics and talked about the extension strategies they employed to educate the project's beneficiaries, and this section presents their views about good and bad extension approaches. Almost all respondents stated that lecturing is not the appropriate strategy for educating farmers. The majority of the study respondents stated that tailoring the extension strategy to the intended audience is key, and it is crucial for the extension agents to carry out the extension program by using appropriate language and a two-way flow of information and demonstrate how the improved agricultural practices work in the field situation are the features of appropriate extension approach.

Regarding the correlation between the extension approach and technology adoption, the majority of the respondents of this study believe that whether or not the farmer adopts the technology changes significantly depending on the extension approach. Almost all extension

agents argued that lecturing farmers was not the most effective method of educating them and that communicating with them required a great deal of listening to and learning from them.

> "The issues that farmers encounter are not the same as what we had anticipated; we cannot just educate them; we also have to learn from them."- R10, male respondent.

In addition, most respondents claimed that two-way information sharing contributes significantly to farmers' decision-making on technology adoption. When there is two-way communication, farmers tend to study the discussed topics in order for them to be able to discuss them in training. The more they study, the more in-depth they will learn about the improved technologies, and there is a greater probability that they will embrace the practices or not.

Moreover, some of the extension workers explained during the interviews that providing the space for farmers to raise their perspectives freely and discuss with each other is one of the useful agricultural extension approaches because when they tell each other if they disagree with the facts, they tell each other right away and openly.

> “We don't need to teach farmers too much, so we are just facilitators for them. It's better to discuss with them and let them discuss with each other than to teach them myself because when they told each other if they disagreed with the facts, they told each other right away and openly. If you are educating them, they will not talk to you about what they agree or disagree with, even if they feel like the information you gave them was not logical or pragmatic. In the past, the farmer didn't know the technology at all, so we had to lead and educate them, but the situations are different now.” – R1, male respondent.

Many respondents also recommended avoiding the use of too many technical terms when delivering presentations during training. According to many respondents of this study, some extension approaches focus only on training, and there is no demonstration. In that case, farmers

are less likely to utilize the promoted technology on their farms. Farmers do not accept or do not believe in improved agricultural practices without seeing them; therefore, extension agents who participated in this study believe that it is crucial to educate farmers both theoretically & practically because in training, they only get a chance to explain them verbally, but in field demonstration, they can show farmers how certain technology discussed in the farmer training operate in practice.

> "Depending on the extension approach, whether or not the farmer adopts the technology changes significantly. If the farmers see the success of innovative technologies through project activities, if we can show them how the technology increases the yield, the farmer will follow the promoted technologies. If your project is not in that design, but in another approach that only focuses on training, farmers will not follow the practices."- R10, male respondent.

The comments raised by this study's respondents above are consistent with other findings from the literature. Baig and Aldosari (2013) also indicated that every extension approach employed by extension specialists has unique characteristics. The choice of an extension method is influenced by a particular message to deliver or a particular impact to produce, and also the level of client acceptance is different depending on these strategies. According to a previous study by Chowdhury et al. (2014), the two-way flow of information should be the main principle of any extension program which gives farmers a chance to learn about technologies for increasing production capacity, improving livelihoods and problem-solving skills instead of applying a traditional top-down extension approach. Furthermore, earlier articles on this subject (Birner et al., 2009; Davis, 2008) defined agricultural extension as a practice in which all

stakeholders participate in problem-solving and providing suggestions for creating agricultural technologies to improve farmers' standards of living.

4.2. From the perspectives of extension agents, what qualities make a good extensionist?

Respondents were asked their perspectives on what qualities make a good extension worker. Respondents in this study defined good extension agents as those who can learn from and listen to farmers, are skilled in both technical and social aspects, are patient and honest, can understand farmers' needs and challenges, and are able to get the trust of the community. In addition, good extensionists are those who can adjust or close gaps between farmers' needs and project objectives, are knowledgeable about the local context, can withstand fatigue, can solve problems for farmers and offer advice when necessary, and can explain the promoted technology and in a way that farmers can understand, and can demonstrate & persuade farmers to apply the improved agricultural practices.

Most respondents were adamant that extension agents could be recognized as good extension agents only if they could listen to farmers' voices and learn from them, not only by educating them. This is because farmers are the ones who are in the fields all the time and are, therefore, the most familiar with farms' conditions.

> "Speaking of educating farmers, it is adult learning; it is not like teaching children; we cannot make a one-way approach. For farmers, we have to make a two-way approach, and the extensionists will only get farmers' interest by following that way; the good extension agents have to listen to farmers' voices. Because in reality, farmers are the ones who are in the field all the time, they are the closest to the farms, and the extensionists have to learn from them as well." – R11, female respondent.

In this study, some respondents also mentioned that in order to be a good extension worker, one must concentrate on what farmers need rather than what one wants to offer them because if the extensionists focus on their needs, most extension agents think about what kind of technology they want to give to farmers and believe that if they provide this technology to the farmers, the problems will be solved. However, what they believe to be important is not always the case in reality; thus, one of the qualities of a good extension agent is the competence to adapt to the farmers' demands.

> "A good extension agent should first have good listening skills. Some extension agents feel that they are only there (the village) to provide training and are not interested in what the farmers have to say. It is not good. A good extension agent must be able to comprehend the requirements and challenges of the farmer. Sometimes, there is something we want to deliver and what the farmers want to know is different, like a buffer zone, then we have to adjust it; a competent extension agent has to have that skill, and must be patient" - R 19, female respondent.

To conclude, as per responses from this study, listening to farmers and adapting the promoted technology to the needs of the farmers are the characteristics of good extension agents. However, the opportunity of extension agents and farmers in the decision-making process is still problematic. According to data collected in this study, the respondents' descriptions point to meanings of the top-down system, target-oriented system, and pre-determined goals that prevent the extension agents from practicing how they imagined a good extension agent. Extension workers face a variety of challenges due to those organizational management strategies during the actual project implementation process. These challenges are interconnected, and their combined effects have a more substantial negative influence on extension agents. The challenges

in this study are classified into four main categories: the challenges caused by the top-down system, pre-determined goals, target-oriented system, and challenging sociological & ecological conditions.

The respondents' perspectives on the characteristics of good extension agents are in line with other findings in the former research. According to Ingram (2008), extension agents must have strong interpersonal skills, they should be able to diagnose farming issues accurately and be technically proficient at presenting verified agricultural solutions to the farming community, they must be able to sympathize, and they should be able to listen to farmers and learn from them and value farmers and other actors' perspectives.

RQ2: What challenges do non-government extension workers face in resourcefully and meaningfully helping farmers?

4.3. Challenges caused by the top-down approach

According to the participants' descriptions in this study, the top-down system prohibits extension agents from acting in the way that they envision a good extension agent should act. Limited flexibility is one of the consequences caused by the top-down extension system; the respondents said they hardly had the chance to listen to farmers and modify the promoted technology to fit the challenging agroecosystem. Additionally, information collected from the respondents indicates that when the extension system is structured top-down, the management team gives little attention to the viewpoints of farmers and extension agents; their ideas or concerns are not getting into the decision-making meeting arena. In addition, due to the lack of a place or atmosphere where all project officers may openly discuss their concerns and difficulties, extension agents are reluctant to offer feedback to the management team.

4.3.1. Limited flexibility and decision-making process

The majority of respondents mentioned that the top-down system puts extension agents in a difficult situation because it prevents actors in the system, particularly farmers and extension workers, from participating in decision-making meetings and because the system is set up with rigid rules that are challenging to modify in response to the situations encountered at the time a project is implemented. Furthermore, the current study's information indicates that extension agents, who work directly with farmers, don't have their viewpoints taken into consideration when making decisions in the top-down extension system. Consequently, it presents a lot more obstacles for extension agents to overcome than they would if they worked in a more accommodating environment where they could express their opinions, ideas, and struggles.

> "The problem is that the project manager is a little difficult to negotiate with, so we have to argue with him, and he was like he is project manager, so we had to follow what he told us to do, so things were like that" – R6, female respondent.

> “In agriculture, the success of the project can only be achieved if the farmers' needs are always taken care of; the success or failure of the project depends on it"- R10, male respondent.

According to the respondents, top-down structured organizations' meeting topics were centered on the challenges extension agents had with their assigned tasks (target-oriented way) and what they needed to do in the future, progress updates, and then the senior team gave them goals and orders.

> "In weekly team meetings, we mainly talked about the jobs I was responsible for. They did not ask anything about farmer feedback. I think it is rare that we talk about extension agents' difficulties. The way the project operates was a bit bureaucratic, like "if I asked

you to do things like that, you have to do it." The employees did not really know how to reach the target; what is the logical framework? " – R5, male respondent.

In addition, responses from some of the extension agents indicated that creating an environment where everyone can have a positive discussion is crucial, and the senior management team should consider the opinions of junior project workers when making decisions, maintain a two-way information flow, and recognize the value of flexibility in the project approach.

" According to my experience, sometimes the employee who did the field implementation tried to talk back to their supervisor if they found the project design was not okay; they attempted to negotiate with their supervisors. But, sometimes, there are things that the field staff does not dare to talk back to the senior team; the project team has to have a positive discussion, and those who supervise the project should accept the idea of field staff if it is relevant." – R14, female respondent.

In this study, some respondents also stated that the project approach and extension agents are both essential to the project's success because only extension workers have access to information that main office employees do not, and as a result, extensionists are responsible for updating supervisors on field implementation activities. Additionally, some extension agents mentioned that in order to successfully and efficiently implement the project, everyone in the agricultural extension system, including those who carried out the field implementation and those who oversaw the field employees, must be flexible. Furthermore, there has to be a balance between the top (management level) and the bottom (field level), and they need to support and learn from one another.

" The effectiveness depends on the project approach, and it also depends on the extension agents. Some extension agents just did what their seniors said, and their supervisors thought the approach was right (even if it was wrong), so they continued doing it. Therefore, if we faced some difficulties in the field, we had to tell our supervisors how things were on the ground. Sometimes, the senior team is not interested in what is happening on the ground or the field workers. In my opinion, to implement the project successfully and efficiently, everyone needs to be flexible." - R 9, male respondent.

The challenges identified and recommendations for a better extension system put forth by the study's interviewees align with those of earlier researchers. Baig & Straquadine (2011) pointed out that many extension operations fail because they are not properly coordinated and integrated into the system by taking a top-down strategy while utterly ignoring the clientele. Ali et al. (1994) and Anderson & Feder (2004) also stated that farmers' involvement in planning, management, and evaluation of extension activity is still small to nonexistent, particularly in Pakistan and India (Baig, 1992). Furthermore, Masere (2015) documented that the extension tactics that AGRITEX, the Department of Agricultural, Technical and Extension Services in Zimbabwe, has employed top-down technology development and dissemination is a contributing factor in the failure of AGRITEX's extension system. Then, the author explained that the top-down nature had prevented smallholder farmers from adopting technology, primarily because they failed to include farmers in technology development and they failed to account for the uniqueness of the local environment. Agholor et al. (2013) reported that the extension services provided in developing nations lacked precision and relevance to utilize in solving farmers' issues, and those are created by the top-down extension strategies that dissuade farmer involvement in all phases of the problem identification, definition, and solution development.

Therefore, it is advocated that decisions be made at the farm level and lower levels of project management because decentralizing decision-making will also make it possible for lower-level extension agents and farmers to connect with each other more frequently (Antholt, 1994; Anderson & Feder, 2004; Urama & Ozor, 2010). A prior study by Baig & Aldosari (2013) also suggested that each extension program should be created with relevant and appropriately worded messages and by using approaches appropriate for the needs of each part of the farming community.

4.4. Challenges caused by the pre-determined goals (one-size-fits-all approach)

The findings of this study indicate that donor agencies dominate funding availability. Then, while writing a proposal's narrative, implementation agencies follow trends in order to secure funds; as a result, the extension agents are caught in the middle of them and encounter challenges when implementing a project. Most respondents said during the interview that the one-size-fits-all approach had caused the data discrepancy problem. Additionally, the situation worsens for the extension agents when the project has limited room for them to raise their voices regarding their struggles. Data discrepancy and pre-determined goal also have a negative impact on trust-building; many extension agents said the trust between them and the local community could be damaged due to the one-size-fits-all approach. Consequently, farmers are uninterested in project activities because the promoted technologies do not meet local needs or make it easier for farmers to accept technology.

4.4.1. Discrepancy between project assumptions and ground reality

A pre-determined approach, also known as the one-size-fits-all approach, encourages project beneficiaries to adopt a certain agricultural technology and achieves a specific objective

designed and chosen by prior agreements, including donor organizations, implementation partners, and technical experts.

All respondents discussed the decision-making process of how different non-government development organizations decide which agricultural practices to promote, and most of them have a common understanding of the steps of how the decisions were made. According to their descriptions, development organizations carry out desk research or survey to gather secondary or primary data to determine the needs of the targeted community, and then they write a proposal outlining the steps they will take to improve the situation by carrying out specific activities, submit it to donor agencies, and finally carry out the project.

According to most respondents, the discrepancy between the information or scenario described in the proposal and the circumstances the extension agents encounter while carrying out the project is one factor that increases the likelihood that extension agents will encounter more difficulties when interacting with the project beneficiaries. Many extension agents stated that foreigners wrote and designed the majority of the proposals. They said that occasionally the scenario in the actual implementation process differs from how the proposal writers envisioned it and described it based on their own experiences. The situation worsens for the extension agents if the project has limited room for them to raise their voices regarding their struggles and fails to modify the promoted technology or project approach per the local context.

> "We have to be patient in transferring technology to farmers because sometimes the situation is not the same (the proposal and actual implementation process), and farmers hesitate to accept the technology. For example, the education level of the farmers in their (proposal writers) country is different from the level of their country, and their experience is only in their country. They imagined the situation and wrote it, which is inconvenient

to do in Myanmar. But the proposal has already been submitted and got funding from donors, so we have no choice, and it is mandatory to do as written in the proposal." – R21, female respondent.

"When I worked in NGOs, the main problem I faced was that foreigners compared the situations we experienced here to those in their home countries. If anything happened, they told me what to do, how to get it, and which model was successful in their country. What I wanted to highlight here is that it is more convenient for us to implement the project if it has enough flexibility to make changes. And also, if there is no flexibility, the project goals will be affected, and the community won't gain anything " – R9, male respondent.

The majority of interviewees' responses suggest that using a one-size-fits-all approach to addressing the local issues experienced by smallholder farmers is not the best option, and using the predetermined technique in the project implementation process poses some difficulties, primarily when the project operates in a top-down way. Many extensionists also mentioned that using the "predetermined goal" technique makes extension agents difficult since farmers are uninterested in project activities because they do not meet local needs or make it easier for farmers to accept technology.

"Some technologies are only promoted but do not fit the region's needs. If it is all, the farmer will not follow or adopt the technologies" - R12, male participant.

The decision-making process of how NGOs made described by respondents in this study is similar to what Masere (2015) emphasizes in their study. The author discussed that although the Department of Agricultural, Technical and Extension Services (AGRITEX), the Zimbabwean government's primary extension agency and the largest public rural intervention agency, applied

participatory approaches to understanding farmers' perspectives on their problems and ways to solve the problems, the participation has largely been restricted to trialing of agricultural practices in reality and the technologies are typically created without involvement from farmers.

Additionally, many researchers have explored the consequences of the one-size-fits-all strategy in the literature, and the majority concur with this study's results. Masambuka-Kanchewa et al. (2020) reported that using a one-size-fits-all approach to address the local issues experienced by smallholder farmers may not be the best option. Masere (2015) also claimed that in a system with a one-size-fits-all approach, learning processes are one-way and leave limited possibility for feedback; farmers are seen as the recipients of technology, and minor partners in research, whereas extension agents and researchers typically see themselves as experts. Masere (2015) asserted that technology adoption is slowed down by using a "one-size-fits-all" approach to impose remotely developed technologies and innovations to farmers on the assumption that they will accurately address their problems and do so while ignoring farmers' problems and circumstances. Similarly, Birner et al. (2009) discovered that technology adoption is limited among smallholder farmers due to the imposition of "one-size fits all" extension tactics. Many other researchers reported a similar finding and (Masere, 2015) stated that low technology adoption would continue unless the discrepancy between the technologies that farmers require or demand and those that extension agents advise or "impose" on farmers is resolved. Then, Baig & Aldosari (2013) suggested that all agricultural technologies should be developed in accordance with the social, economic, and physical conditions of a specific circumstance. Also, farmers should not be forced to use any farming practices that have been successful in other areas. In order to boost technology adoption, farmers' opinions, experiences, and viewpoints should be taken into account while designing and testing agricultural technologies (Masere, 2015).

4.4.2. Trust-building

Most respondents of this study believed that establishing trust is a crucial part of agricultural extension; the interaction between the extension agents and farmers is based on trust. However, many respondents said that the trust between extensionists and the local community could be damaged due to the one-size-fits-all approach, as the works done by the project do not benefit the community as intended. One of the extension agents explained to me that the pressure in communicating with farmers began with the questions that the farmers asked and that there was a gap between what the farmers wanted to know and what the extension agents had to offer them. And as a result, farmers have less inclination to seek information from the extension worker because the project is trying to launch irrelevant technologies, as opposed to the requirements of the rural community.

> "I think the most important thing is if the extension workers are trying to deliver topics opposite to farmers' interests, then farmers might not be interested in the topics and don't want to listen to you and not even think of adopting the promoted technologies in their farms. And as a consequence, they don't trust that extension worker and don't have much desire to get information from them. According to the adult learning principle, adults only want to know what they want to know; if they think technology is beneficial for their work, they will listen and learn."- R5, male respondent.

In addition, most respondents cited that they had to deal with low technology adoption and farmers' unwillingness to participate in project activities problems due to the one-size-fits-all. When the extension agents were contracted with both pre-determined goals and worked in a top-down system, their voices were rarely included in the decision-making process, even though they were the ones who faced the consequences of the actions.

> “Unfortunately, C-technology has not been successful in our country, but that technology started in A-country and then went to B-country, and they introduced it to the farmers, and it was pretty successful there. It is quite productive and not like in our country; it’s successful. Then, the organization tried to replicate the project in Myanmar, and they expect they will be successful. But the farmers in our country are not so enthusiastic, so the project is not so successful. And most of our farmers have a low education level, so they do not know much about the importance of the promoted technology and its benefits” – R19, female respondent.

This study's findings on respondents' perceptions of the role of trust-building in agricultural extension are similar to Vanclay's (2004) findings that trust and credibility of extension agents are "built over time through the supply of credible, realistic, and valuable solutions that support farmers in day-to-day operations. In addition, Baig & Aldosari (2013) described that launching irrelevant technologies, as opposed to the requirements of the rural community, across the farmer communities could lead to undesirable outcomes and consequences. Both extension agents and services would lose the trust of the rural people. Similar findings from another study conducted in Zimbabwe show how the one-size-fits-all approach has led to inadequate adoption of the technology recommended to farmers and farmers losing their trust in the extension personnel. The one-size-fits-all strategy eventually leads to situations where farmers lose their trust in the extension workers, and farmers are less inclined to accept the technologies extension workers suggest and even less likely to be eager to test the technology when they view them as unreliable sources of information (Masere, 2015).

4.4.3. Following trends and funding opportunities

Some interviewees argued that NGOs had followed the trend too much lately. As a consequence, there are too many projects in the same areas, and they all are working for the same areas for development (for instance, market system development, nutrition, and value chain). Because if the organization follows the trends, there is a higher chance of getting funding opportunities. However, the downside of it is that farmers are receiving the same knowledge from different organizations, and then farmers are less likely to involve in project activities, and their willingness to learn from the project decreases. In these cases, it is challenging for the project implementers to run the project in the actual implementation process because farmer participation is low.

> "In some townships of the dry zone, farmers were not interested in project activities or the topics delivered in the training because NGOs come to their villages frequently and provided the same information by different NGOs." - R10, male respondent.

> "Lately, NGOs have followed the trend too much. For example, in the dry zone, around 2015-2016, every project in Myanmar was implemented only in the dry zone, focusing on malnutrition. Then, the trend shifted to the value chain. " - R19, female respondent.

Additionally, the majority of respondents made a similar statement that most of the proposal writers in Myanmar have designed projects that match the donors' preferences because if the donors like the project approach, they will get the funds. However, obtaining funding for the project is given priority, and the project pays less attention to the quality of project interventions, which damages the project beneficiaries' trust in the project staff.

> “We need funds to help our community, but in reality, we use the community to get funds. Later, getting funds or a project extension is prioritized, and they end up paying

less attention to the benefit to the community and the quality of project interventions. I think it should be changed. If we do not change, NGOs are just for generating money, and the community will less trust in NGO staff. " – R9, male respondent.

Then, extension agents recommended that the project must reflect reality even if the proposal writers design it in accordance with the donor's preferences. Before or during project implementation, necessary adjustments should be made to ensure that project beneficiaries are highly likely to participate voluntarily in project activities and that project interventions would aid in resolving issues that farmers face in the field.

“Some projects got funding from donors because they mentioned in their proposal that a specific model was successful in that country, so we will replicate the same model and implement the same program in this country. Instead of following such an approach, we should make proposals and goals that reflect what is happening on the ground in this country and then implement them.” – R9, male respondent.

4.5. Challenges caused by the target-oriented system

As discussed in section 2.3.3, performance indicators such as public involvement, knowledge awareness, technology uptake, and yield enhancement are used in agriculture to gauge project success. In addition, monitoring and evaluation is one of the critical components of implementing a project. By examining the targets, the project implementers can keep track of and assess how well the project's team is doing, which is essential for every project. Data is routinely gathered and analyzed through monitoring and evaluation processes to track project progress toward goals and assess outcomes.

In this study, some respondents revealed that heavily relying on subsidies to persuade project beneficiaries to participate in the project to meet project targets could negatively impact

the project's initial goal and present difficulties for the project employees. Furthermore, most of them explained during the interviews that the project staff was unable to focus on the quality of the project interventions because of the target-oriented system, they put the project targets over the quality of their work, and then it had an impact on the reputation of the organization, and then all these lead to low participation and technology adoption.

4.5.1. Quality of the project interventions and reputation

The majority of the extensionists explained during the interviews that the project staff was unable to focus on the quality of the project interventions because of the target-oriented system and tradeoffs that came with running the project. They mentioned that they have to put forth every effort to accomplish the goals outlined in the project proposal, and as a result, they put the goals ahead of the quality of their work, and it has become a source of pressure for them.

> "When the project coordinator comes to the office, he is just interested in how the target has been reached and why the target is not met. And when we go to the villages, the home gardens that have been established do not work very well, and other farmers who have not installed the home garden yet also do not want to adopt the technology, so we face those kinds of problems. Then, I have to negotiate with my supervisor.

Then, I asked her a follow-up question on how the negotiation process with her supervisor went and whether she successfully negotiated with her supervisor, and she replied,

> "No, it was not. They replied that the target was fixed in their proposal. The lack of flexibility is inconvenient and not effective at all"- R6, female respondent.

Furthermore, according to some interviewees, while operating the project, time is one crucial factor that the project implementers take seriously. Most projects have a timeframe, and the project implementers have to put in all of their best efforts to attain the project goals within a

certain timeframe. The majority of respondents discussed the topic of time bounding; they said there are some tradeoffs involved and things that take time needed to be done quickly to be completed within the project's lifetime. Therefore, time bounding could be one of the main causes of target accomplishments over the quality issue in addition to the target-oriented strategy that led to it, and it has become difficult for the extension agents to deal with.

> "When there are too many things to accomplish this month, I sometimes find that I can only concentrate on finishing the tasks. In these cases, the targets and quantity can be counted, but the quality is not too good. We have to deliver some training because of the target, and we cannot think for sure whether the farmers understand it clearly or not. When there is a lot of stress, the quality is affected "- R13, female respondent.

> "When we have to prioritize the budget and target, we cannot focus on the rest, and some parts are not qualified at all, and it has become pressure." – R10, male respondent.

Some respondents have concerns about the reputation of the NGOs. Some participants asserted that emphasizing too much on accomplishing project targets and having little attention to the quality of the project interventions could harm the organization's reputation. Since the respondents of this study noticed that the target-oriented system has a bad effect on the NGOs' reputation, some interviewees argued the project should focus their attention on both project interventions and targets equally.

> "Some of my colleagues (who worked on the same project) even said that we were implementing a project by just going with a car and delivering training; it is casual (nothing special) and easy to do. I was not too fond of it when they said it to me like that; even if one of my acquaintances says that to me, how will others see the project, you know" R5 -male respondent.

ESCAP (2016) also noted that interventions applied by the development projects primarily focus on achieving the project or program goals rather than fulfilling local needs, which has negatively influenced people's perceptions.

According to evidence gathered from a few respondents, when operating under a target-oriented system, project implementers, especially field employees, have a tendency to falsify the data in order to meet the project's established targets.

> "Sometimes, when the monitoring & evaluation team asked the farmers questions, they did not know how to mention the indicators that the monitoring team wanted, so occasionally I have to do stuff like, you know, teach farmers beforehand how to respond to the questions."- R10, male respondent.
>
> "When it comes to achieving the project target, sometimes we had to do everything to reach it. We even had to lie to get the targets we want; sometimes I feel like the project is teaching us how to lie or trick the data" - R3, female respondent.

A similar finding discussed by Cho (2013) in her study that there were frequent tendencies of the staff at various levels to report on-paper progress with overestimation, manipulation, and make-up of the data, which eventually became almost a normal practice of the public agricultural extension department in an effort to attain the targeted figure, which in reality is a huge job. When Myanmar Agricultural Service engages in such data-reporting processes, they sacrifice time and staff that could be used to supply technology. It seems that the overly focused & unrealistic targets made the mindset of most of the government agricultural staff have a tendency to report the figure close enough to the planned figure because if they report figures well below the level corresponding to a planned target, they have to put forward several explanations to the authorities and officials of the upstream.

4.5.2. Subsidies, its pros and cons

Most non-government organizations provide farmers with financial assistance and/or materials to entice them to participate in project activities, make it convenient for farmers to adopt the promoted technologies, and many other good reasons. Although providing incentives is supposed to have positive impacts, most of the extension agents interviewed in this study shared that they encountered unexpected results due to heavily relying on subsidies to persuade project beneficiaries to participate in the project in order to meet project targets. According to most respondents, the project's beneficiaries are unwilling to join, but they only participate in project activities because they get everything from the project free of charge, which has a favorable effect on participation, rather than learning more, which was the project's initial goal.

> "Some villagers are just establishing the farms because they are given by the project free of charge, so they do not really care. The farms become unproductive as a result. And on the project side, we have a project target, so, when farmers do not pay attention and get nothing, it becomes the pressure for us" - R19, female respondent.

As per responses from many respondents, later on in the project, it developed into a challenging situation for extension agents, such as project beneficiaries are not interested in project activities and farmers adopting the technology during the project, but there is no assurance that the project interventions will continue when the project is finished. As per gathered information from interviewees, heavily depending on incentives to persuade farmers to participate in project activities does not always generate positive outcomes; there are side effects of incentives coupled up.

> "If the project encourages farmers to join the project by saying, "If you do this, then I will pay you this," then farmers will only join the project because they expect to obtain

something from the project, not because they want to learn, and it will not be particularly sustainable. Thus, don't place too much emphasis on the incentive strategy” - R7, male respondent.

Another drawback of subsidies discovered through this study is that it unintentionally impacts the government sector. It is challenging for the government to carry out operations when NGOs leave since they are unable to support the public in the same way that NGOs do.

“NGOs give a lot of subsidies. What the government cannot do is that they cannot go down to the village and provide subsidies to farmers; they have limited resources, and the government staff cannot give the same as NGOs, so it is hard for them to continue implementing the activities after the project left" - R21, female respondent.

As reported by some respondents, the interaction between government officials and farmers is also indirectly impacted by NGOs' provision of subsidies to local communities because the government cannot provide as many incentives as NGOs did, and farmers expect to receive incentives from the government when they are invited to participate in activities. Additionally, the communication between government officials and extension agents is indirectly impacted by NGOs' provision of subsidies; the participant mentioned the feedback from the government official, specifically disappointment in/concern about the detrimental effects of NGOs on government projects.

"A department I have previously worked with told me they do not like NGOs' support because they said NGOs give children chocolate and only teach them how to eat it, and the children wept when they did not have chocolate" - R12, male respondent.

According to the literature, for an extension to be effective, farmers must have timely and adequate access to pertinent advice suitable for their socioeconomic and agroecological

conditions as well as proper incentives to accept the new technology. Additionally, the accessibility of advanced technology & resources and profitability with a manageable risk are essential for technology adoption (Anderson & Feder, 2004). Guerin and Guerin (1994) also reported that greater financial capital empowers farmers to make investments and take risks arising from adoption. However, all the data gathered through this study indicated that focusing excessively on incentives in order to grab the project goals bring loads of benefits for both community and the project implementers. Furthermore, there is the inevitable downside that could bring by subsidies, so the program actors need to keep that in mind and take it into consideration in order to diminish the side effect of incentives and bring more positive and lessen the challenges faced by extension agents in the project implementation process.

4.6. Job satisfaction

The respondents shared how the project approaches had affected their job satisfaction during the interview. As per responses, when the system is set up to have top-down, pre-determined, target-oriented approaches, extensionists' voices are rarely included in the decision-making process, even though they are the ones who face the consequences of the system. Additionally, these approaches make them deliver the extension services in a way that is different from how they have imagined a good extension agent or good extension practices. Eventually, the extension agents are not particularly pleased with the project outcomes and have low job satisfaction.

Even though the respondents to this study are non-government extension workers, and as mentioned in section 2.2, non-government organizations receive stronger funding than public extension organizations, non-government extension workers still face some challenges. This study collected the respondents' opinions about the contributions the agricultural extension or the

project has made to the community; then, participants indicated whether they were satisfied or dissatisfied with working on the project. The findings of this study revealed some of the extension agents have low job satisfaction when the project does not benefit the community as expected.

> "I feel stressed when the project does not meet my expectations during implementation. I feel pressured if my expectation does not in line with what is happening in reality"- R5, male respondent.

Furthermore, the data indicate that the top-down system, pre-determined goals, and target-oriented system have an unfavorable impact on the project staff's job satisfaction. Some of the extensionists believe the project is not as successful as anticipated due to failure to adapt the project interventions as per responses from the project beneficiaries. Management-level personnel are more interested in how the target is progressing and why it wasn't accomplished than in getting input from the field staff and making any necessary adjustments to the promoted technology. When the extension agents have limited opportunity to change or modify the way they operate the project activities as per situations they encountered in the project implementation process, they are not particularly pleased with the project outcomes, are unhappy with their contributions to the community, and have low job satisfaction.

> “When I worked on that project, I was unsatisfied with the results. I feel like we could not have given anything good to the farmers. The project tried to give and do good for farmers, but I felt nothing was left after the project. I feel like that, and we did not reach the targeted goal we wanted. After working on that project, I no longer want to work at an NGO. If the farmers willingly take what we give, I am happy with my work; I feel like

my work is really beneficial for them; I think that feeling is quite motivating" - R19, female respondent.

A few respondents expressed satisfaction working with flexible donor organizations and implementation agencies. The project makes the required adjustments in response to the circumstance or the requirements of the community, so they can see that progress is occurring on the ground. Then, farmers are interested in the topics discussed, extension agents believe it is worthwhile to provide training to farmers in those circumstances, and extension agents are happy to do so.

> "If you are an implementer working with a flexible donor agency and organization, you feel good & happy, and also development is really happening on the ground." – R1, male respondent.

The earlier studies (Cho, 2002; Cho, 2013; Okwuokenye, 2018; Mansour et al., 2022) also discovered that the top-down management system, weakness of the operational budget, and low level of remuneration were the root causes of the public extension agents' low job satisfaction. In addition, the earlier literature discussed job satisfaction and how it affected agricultural extension that self-assurance and motivation to perform their job are requirements for extension agents. Agents must be persuasive and self-assured if they are to offer their technologies to farmers (Oakley & Garforth, 1985), and they can gain the trust of the farmers in this way. If extensionists lack "trust and confidence," farmers have little to no chance of adopting the technologies they disseminated (Mika & Mudzimiri, 2012).

Overall, as per responses from the majority of the interviewees, when the system is set up to have a top-down system, pre-determined goals, and target-oriented system, the information distributors hardly ever take into account or collect feedback from the information recipients and

junior project staff. These approaches influence the interaction process among key stakeholders, and it is more likely that there will be significant communication gaps among different actors in the system, especially management-level officials, extensionists, and farmers. Ultimately, extension agents are dissatisfied with the project's outcomes and their jobs when the project gives them little room to express their problems, offers them little leeway to adapt the technology being promoted to the local environment, is intensely focused on meeting project targets while paying less attention to the quality of project interventions, and the way the project run prevents them from performing their duties in a way that exemplifies what a good extension worker is.

4.7. Challenging sociological & ecological conditions

Challenges experienced by extension agents are not only brought on by organizational management and extension systems, such as target orientation and top-down system but also by factors outside of the extension system, which influence the farmers' interest negatively. Farmers' interest in and desire to participate in project activities, as well as their choices over whether or not to use the improved agricultural technology, are negatively impacted by a number of external factors. Almost all interviewees of this study mentioned that it is difficult to convince farmers to change their ways of thinking, especially elderly farmers who are reluctant to accept the improved technology, to replace traditional practices with modern practices. Although young farmers tend to accept new technology, youth communities seek alternative employment in the neighboring regions or foreign nations as migrant workers. Additionally, farmers' limited financial capacity, education & knowledge level hinders their interest in project activities. Most respondents explained during the interviews that the drought problem is the worst in the dry zone they face every year.

4.7.1. Not seeing immediate benefits and changing farmers' mindset

Many interviewees mentioned that attaining farmers' trust and gaining their belief in the promoted technologies is not easy. One of the respondents recalled a case in which most farmers listen to extension agents when they educate them but are not interested in applying advanced agricultural practices in their farms and still cannot accept the technology. There are so many reasons behind farmers' hesitation to adopt the technology; not seeing the significant impacts of the promoted technology immediately after the application is a major one.

> "Farmers' main interest is yield, there is no direct effect on yield increase after using the promoted technology for one year, so the farmer does not want to accept it. Asking farmers to change from what they traditionally do is really difficult; they will not change immediately, and it takes time." - R14, female respondent.

Almost all participants of this study mentioned that it is difficult to convince farmers to change their ways of thinking, especially elderly farmers who are reluctant to accept the improved technology, to replace traditional practices with modern practices. The average age of farmers is old in Myanmar. Hence, their ability to accept the improved agricultural technology has limits, and they can no longer keep up with their capacity for some new technologies. Even though old farmers have more experience than young populations in farm management, the former community is hesitant to adopt advanced practices in their farms.

> "Farmers are hesitant to adopt the promoted technology because of the farmer age and literacy level; we can even say the average age of farmers is old in Myanmar, and their ability to accept the improved agricultural technology has limits, and they can no longer keep up with their capacity for some new technologies." – R12, male respondent.

The same finding was documented by Sadati et al. (2010); older farmers have a lower attitude toward sustainable agriculture than younger farmers. Tanui et al. (2012) also observed that technology adoption was significantly affected by benefits awareness and cost awareness, which might be attributed to the fact that the perception of increased benefits incentivizes farmers to adopt more productive technologies. Once people can increase crop production without waiting a great deal of time to see the positive outcomes or economic profits of technology, many people will accept or adopt such technology without hesitation. In order for farmers to give up their old practices and implement new ones, the improved agricultural practices require generating at least a 50% improvement in yield (Baig, 1992).

4.7.2. Limited financial capacity

The other thing is financial capacity; almost all the respondents stated that some technologies are inconvenient to follow because of financial limitations.

> "I think if something must be changed or inevitable, the farmer will do it, but if not, they will not do it because they have to prioritize their livings and incomes like they know it is not good to cut trees and make charcoal, but they cannot avoid it because they have to rely on that for their incomes"- R3, female respondent.

According to a LIFT (Livelihoods and Food Security Fund) mid-term review conducted in 2013, the majority of farmers from project implementation areas in the CDZ of Myanmar are hesitant to accept new technologies due to the level of risk they perceive and their lack of capacity to cope with potential failures that can be faced when implementing new technologies (Kempel, 2013). In addition, the CDZ's households are in financial distress, and almost 80 percent of them are covering their living expenses with the support of loan programs. About a third of households said their debt was rising, implying that they had limited financial capital to

invest or take risks with farming practices (LIFT, 2014). Most smallholder farmers cannot secure loans from banks and microcredit organizations because they lack collateral. It has become their most prevalent limitation, and farmers are unable to experiment with new technology that could necessitate using expensive agri-inputs (Mushunje, 2005; Salami et al., 2010).

4.7.3. Literacy

According to the study's respondents, farmers' limited education & knowledge level hinders their interest in and participation in project activities and technology adoption.

> "When I worked in NGOs, the main problem I faced was that foreigners compared the situations we experienced here to those in their home countries. If anything happened, they told me what to do, how to get it, and which model was successful in their country. That model was successful because their farmers are well-educated, then farmers from our country might or might not be as educated as farmers in their country." – R9, male respondent.

Furthermore, many interviewees mentioned that most farmers have poor levels of education & knowledge, which means they are unaware of specific project subjects or issues like climate change, modern agricultural techniques, and nutrition; as a result, farmers are not particularly interested in the project.

> "Most of our farmers have a low education level, so they do not know much about the importance of the promoted technology and its benefits" – R19, female respondent.

Previous academics have extensively discussed the role of education in agricultural extension, and the current study likewise came to similar conclusions. For instance, Elkind (1993) also reported that education is likely to be positively associated with adoption; growers who accessed higher education or passed middle-school education programs are more likely to

adopt sustainable agricultural practices (SAPs) and are more likely to be early adopters. Farmers with higher literacy levels have a greater capacity to adopt SAPs and develop new ideas to handle the affiliated consequences, namely, risks and benefits (Elkind, 1993). The probability of high adoption is directly linked to the education levels of the household head and their farming experience (Oo et al., 2017). Moreover, Elkind's (1993) study of sustainable agricultural practices (SAPs) reveals a similar finding of how education has a decent ability to act as a bridge between farmers and modern agricultural practices. Sadati et al. (2010) also stated that farmers with a high level of literacy, off-farm income, farmers' knowledge about sustainable agriculture, and extension contacts positively correlate with farmers' attitudes toward sustainable agriculture. Anandajayasekeram et al. (2008) posit that literacy level significantly influences the acceptance of extension support and technology adoption in rural communities. Knowledgeable & educated farmers tend to accept the technology and apply the new technology that the extension agent has imparted to them since they understand the ideas behind modern farming practices more than farmers with a low level of education.

4.7.4. Migration

According to some respondents, despite the fact that young professional farmers tend to accept new technology and apply it to their farms without reluctance, in rural areas, youth communities seek alternative employment in the neighboring regions or foreign nations as migrant workers, and their interest in agriculture-related work has declined. Low profit from farms can also be held accountable for such worsening trends. In addition, this research shows migrating to neighboring countries for better job opportunities somehow created a challenge for extensionists since farmers quit participation in the middle of the project implementation, and the

project staff had to find a substitute as they also have the responsibility to attain the targeted number of project participants.

> "Sometimes, in the dry zone, the project beneficiaries already agreed to work with the project, but the whole family migrated to neighboring countries; in that case, it was difficult for me; quite a lot, I encountered about two families even in one village. What was happening in that project was, you know, only old adults left in the villages. Young people went to Yangon, Mandalay, or foreign countries."- R4, female respondent.

Teerawichitchainan (2021) also reported that people from the dry zone of Myanmar have long used labor migration as a leading livelihood strategy; lack of year-round job opportunities, crop failures and income-related shocks, severe climate conditions, and better job opportunities in destination areas are the significant drivers of migration in the dry zone.

4.7.5. Limited water availability

Most of the participants explained during the interviews that the drought problem is the worst in the dry zone they face every year, and there are also problems with the underground water level. Additionally, they said the availability of rain typically determines the profitability of agricultural production in the central dry zone since public irrigation systems are not developed well enough to cover all production areas.

> As R11 narrates, "I felt the most pressure on that project because I was in charge of the demonstration section; we had to rely on the rain for everything. There's a lot of pressure because we have to catch rain to grow the plants, and then I feel mentally and physically stressed and tired."

A study focused on non-government organizations conducted by ESCAP (2016) stated that heavy reliance on rain makes for a challenging cropping environment not only for farmers

but also for agencies attempting to promote sustainable and climate-resilient agriculture effectively.

RQ3: What changes might extensionists like to see in how the system works?

4.8. Extension workers' recommendations to improve the extension programs

As per answers from most respondents, NGOs advocate for important issues that require the government's attention, and NGOs benefit the community in numerous ways. However, there are several challenges faced by extension agents when they are operating the project activities, and all respondents shared their perspectives on future improvements they would like to see in the extension system, as well as suggestions for making it function more successfully.

4.8.1. Sustainability oriented and flexible approach

All respondents discussed their perspectives on the project approach, and most of them were adamant that agricultural extension could perform better only if the extension system was set up flexibly and framed the project approach in a sustainable and realistic way to tackle the problems encountered by the project beneficiaries. Some respondents also pointed out the importance of funding agencies' strategies in order to attain the sustainability of project interventions. They anticipated that both financing and implementation agencies would need to be adaptable in their project approaches.

> "From my experience, the organizations often go to the parts they want to do and the parts they think the community need.
>
> What happened in our country is that an NGO came, and they did as much as they could. After that, frankly speaking, that it was nothing special happened. During the project period, it was like the project went well and used a lot of budgets. But sustainability is a

kind of issue for NGOs. I want to say that the decision-makers must carefully discuss the design, think strategically, and build a sustainable model"- R21, female respondent.

Almost all respondents explained in the interview that the project must carefully analyze the context of the area if it is to be sustainable; otherwise, farmers will adopt the technology during the project term and abandon it after a certain project period. Additionally, the majority of the interviewees revealed that they anticipated the project management teams would need to be adaptable in their project approaches; they hoped that the organization would create a space for all stakeholders, particularly project staff and project beneficiaries, could voice their opinions and help make the necessary adjustments in light of the local situation.

"I think the project should add the farmers' needs to the project log frame and always update it. Even if an existing activity is intended to be implemented, we have to think carefully, like "Is it okay to do this?" We have to discuss this with local communities; otherwise, if what farmers want is different from what we want to give them, it is not good for all"- R3, female respondent.

The unsustainability of project interventions was discussed in previous studies, and the current study showed it once again. ESCAP (2016) reported in the "Assessment of Stakeholder Interventions for Sustainable Agriculture in Myanmar's Dry Zone" report, non-government extension organizations play a crucial role in achieving sustainable and climate-resilience agriculture in the central dry zone of Myanmar. Although international and local NGOs contribute to significant positive impacts on the overall development of tropical regions, there are uncertainties in maintaining the sustainability of the project interventions and stakeholders' collaboration (ESCAP, 2016). A prior study from Purcell & Anderson (1997) noted that more

than 70% of extension programs funded by the World Bank had "unlikely" or "uncertain" sustainability.

To summarize the points I made above, the majority of study respondents expressed their hope that the writer would develop the proposal based on regional needs and emphasize sustainability, reliability, and a realistic strategic approach to tackling the problems they intended to solve. So that the project interventions match or correspond with the community's needs, and then the community will be interested in project activities, and then there will be more benefit for the community. Then, the difficulties that the extension agents and anyone else in charge of carrying out the project will have due to the top-down system, target-oriented approach, and pre-determined goals will be indirectly decreased.

4.8.2. Collaboration between organizations

As government employees are left behind when a project is completed, most respondents said they want to see more projects collaborating with them, and they wish to see improved future collaboration between government organizations and NGOs.

> "It is more convenient if NGOs and government do it together. In some areas, if you are not a government employee, it is difficult to go and talk; it is more convenient to go together with them. But the government does not have a lot of budgets so that we can work together in the future" - R21, female respondent.

Some respondents of this study also made the point that the project should avoid being a burden for the community because of the project's actions. Sometimes, NGOs formed many groups and committees in the villages. If five NGOs are implemented in the same village, then there are five committees in one village. Actually, there are only these people on each committee. The burden is on the person who does it and takes the different positions in several

groups, and the next thing is that there are no new beneficiaries (because five projects are educating the same people). In the villages, if only one individual is educated enough to work with NGOs, then they are giving this person all responsibility, which will burden the community member. Therefore, most participants in this study suggested that it is really good to work cooperatively with government agencies and other NGOs. Their comments indicated that NGOs needed to collaborate, check and negotiate with one another, and be aware of what others were doing.

> "NGOs occasionally don't communicate with one another, so we are unaware of what other NGOs are up to. In order to be more effective, we need to check how many NGOs are working in this village and how many committees there are. We have to discuss what we can do together, form a more compact group, and coordinate among NGOs" – R10, male respondent.

However, some respondents acknowledged that it was challenging to collaborate with government representatives, particularly when government officials were unwilling to participate in project activities and showed unwelcome behavior towards non-government extension agents.

> "When I go to the Department of--, the head officer treats me like it is not worth communicating with me. The effort from the government side is kind of weak when it comes to cooperation with the project" -R13, female respondent.
>
> "Another thing was the pressure in communicating with the Department of--, and there are people, you know, we had to treat them in a special manner, like, they are superior to others" - R5, male respondent.

The answers acquired through interviews in this study are consistent with the former studies' conclusions. According to a former study on adoption rates, partnerships between

public, non-profit, and private groups that disseminate agricultural innovations to farmers result in high adoption rates of improved agricultural technologies. Therefore, in order to meet the needs of farming communities, extension programs must be jointly planned, implemented, and evaluated by all service providers working closely with farmers (Cho, 2013). Enhancing collaboration between extension and other connected organizations is essential because, without the participation of all related organizations, extension efforts do not produce the anticipated benefits (Baig et al., 2009). However, Ali et al. (1994) also reported that the biggest challenge in the majority of developing countries appears to be a lack of collaboration between extension and other groups working to improve agriculture.

5. CONCLUSION

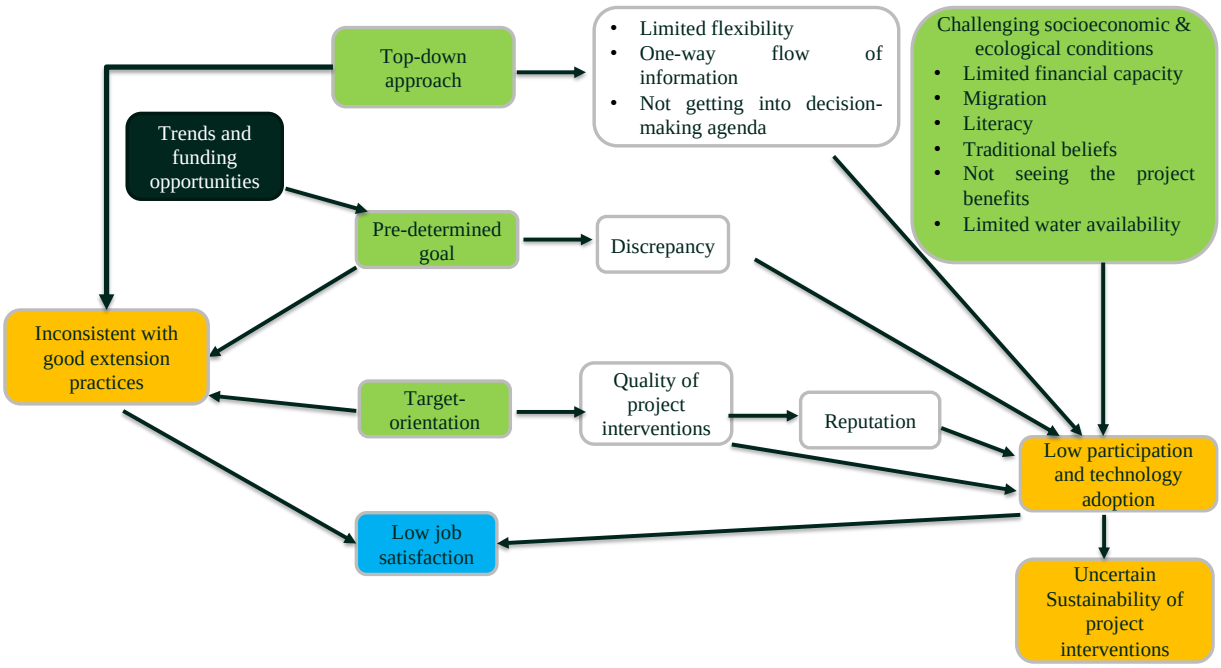

Figure 2: The correlation between the project approaches and the challenges faced by the extension agents

Figure 2 depicts the correlation between the project approach and the difficulties faced by the extension agents. According to the findings, top-down systems, pre-established goals, and a target-oriented mindset cause a number of struggles for extension workers. The respondents' descriptions of the study's results indicate that those management strategies are what keep extension agents from acting not as effectively as they had envisioned during the project implementation phase.

When the extension system is structured top-down, the management team pays little attention to the viewpoints of farmers and extension agents; their ideas or concerns are not getting into the decision-making meeting arena, and limited opportunity to change or modify the project interventions in response to situations they encountered.

Some respondents argued that NGOs had followed the trend too much lately because if the organization follows the trends, there is a great likelihood of receiving financial assistance. The drawback is that farmers no longer want to learn from the project because they receive the same information from several groups. The respondents also complained that due to predetermined goals, extension agents experience more difficulties when interacting with the project beneficiaries because the technology offered by the project differs from what farmers expected to learn from the extension worker.

The majority of extensionists explained during the interviews that the target-oriented system prevented the project personnel from concentrating on the quality of the project interventions. Also, rather than addressing local needs, they largely focused on accomplishing the project targets, which has a negative impact on people's perceptions and harms the organization's reputation. Hence, one of the changes the respondents hope to see is a stronger emphasis on the project interventions' quality because it affects how the general public views the organizations.

Challenges faced by extension agents are also influenced by elements outside of the extension system. There are a variety of sociological and ecological conditions that have a detrimental impact on farmers' interest in and desire to participate in project activities, as well as their decisions over whether or not to employ the enhanced agricultural technology.

Overall, the situations get worse for the extension agents if the project gives them little freedom to express their challenges to adapt the promoted technology or project strategy to the local environment; the way the projects operate prevents them from carrying out their duties in a manner that exemplifies what a good extension worker is. Consequently, they are not particularly happy with the project results and have low job satisfaction.

Everyone who participated in the discussion expressed their opinions about the project approach, and the majority of them were adamant that agricultural extension could only function more effectively if the extension system was set up flexibly and the project approach was realistically and sustainably framed to address the issues faced by the project's beneficiaries. The respondents also mentioned that it is crucial to remember that rural development is comparable, but the circumstances are different, and the development agencies cannot assume that just because a technique works somewhere, it will work somewhere else as well. Thus, development groups need to thoroughly consider the issue and the demands of the area, then carefully talk with locals to see if farmers can follow. The technology that NGOs support must be compatible with the demands of farmers and the project's intended audience. If NGOs don't thoroughly evaluate the regional context, farmers will adopt the technology for the duration of the project, and then they will abandon it after the project ends. In addition, the extension agents hoped that the organization would create a forum where all stakeholders, especially project staff and project beneficiaries, could express their views and contribute to making the necessary adjustments in light of the local situation.

The findings of this study connected to what Ibarra (2009) noted that there is no template for putting the best agricultural extension strategies into action, whether top-down or bottom-up; the effective extension system must be adaptable to make adjustments as per agroecosystem and farmer situations. In addition, for extension approaches to become effective and responsive to farmers' needs, a lot of listening, learning, and program adaptation is required. Allowing extension agents to take responsibility for their job and allowing them to build context-specific answers rather than following top-down requests and pre-defined demands is one of the most effective methods to boost their motivation (Bitzer, 2016).

5.1. Study limitations

Due to the political crisis in Myanmar, I had some difficulties gathering the data because I was unable to return home to conduct in-person interviews with respondents. I sought to conduct face-to-face interviews with participants using Zoom; however, due to internet connection problems, most interviews were conducted using Google voice calls, Facebook Messenger voice calls, and Viber voice calls. In addition, certain stakeholders in the non-government agricultural extension system, such as representatives from donor organizations and those who make decisions for the implementation agency, are underrepresented in this study. Despite efforts to interview representatives from those organizations, most non-government organizations cut their ties with government agencies, archived information about their work in Myanmar on their website, and some of them decided to leave the country and cease operations in Myanmar due to the political crisis. As a result, it was difficult to approach potential respondents for this study.

Another limitation is that all the secondary documents (such as checking the organization's website, project documents, and reports) were not gathered as intended; hence the outcomes of this study were totally based on interviews. These interviews were conducted only with extension agents because the study seeks to understand the perspectives of extension workers and the difficulties they encounter. Therefore, the challenges identified in this study do not necessarily reflect all areas of the agricultural extension system, which prevents generalizing the findings into broader aspects. This implies the significance of future research addressing the limitations of this work, which are discussed in the following section.

5.2. Recommendations for future research

This study offers a basic understanding of extension agents' challenges in the context of non-governmental organizations. One of the study's key conclusions was that the top-down, target-oriented, and pre-determined goal project management approaches are to blame for the beneficiaries' lack of interest in the project's activities, which creates challenges for extension agents throughout the actual project implementation process.

This study has some limitations; thus, more research is required to comprehend non-government agricultural extension fully. I only interviewed 17 participants from 5 Organizations due to difficulties in data gathering, which were mostly brought on by the political turmoil. Future research can add representation from farmers who worked with non-government organizations, senior management officials from non-government agencies, people from donor agencies, and government officers who collaborated with a non-government organization. Furthermore, future research should aim to get more in-depth replies about the non-government agricultural extension, and it is possible to study other topics relating to what actually occurs during project implementation from various perspectives, the decision-making process, and the relationship between the project methodology (whether top-down, bottom-up, or whatever) and the project's effectiveness.

Studies on the viewpoints of non-government extension agents and the difficulties they encountered in carrying out the programs are scarce. The effectiveness of extension programs run by NGOs, farmers' and extension agents' perspectives on the effectiveness of the services provided by the NGOs, and farmers' perspectives on changes they would like to see in the ways NGOs working for agricultural development can all be explored in more detail in future studies.

Also, this study can be repeated in various areas, such as the highland and delta regions of Myanmar. It would be interesting to find out what other circumstances extensionists in other regions of the nation, and even other countries, deal with. Future research in different contexts will make it possible to better understand agricultural extension, allowing project implementers, policymakers, and practitioners from government, non-government, & private organizations to create the extension strategies that will lead to the development of sustainable agricultural development.

REFERENCES

ADB, 2014. Myanmar Unlocking the Potential. Country Diagnostic Study. Asian Development Bank Economics and Research Department August 2014. Accessed on 15 August 2018 at. https://www.adb.org/sites/default/files/publication/42870/myanmar-unlocking-potential.pdf.

ADB, 2016. Climate risk and vulnerability assessment. In: Project Number 47152, May 2016. Asian Development Bank, Nay Pyi Taw 24, pp. Accessed on 29 November 2017 at. https://www.adb.org/sites/default/files/linked-documents/47152-002-sd-04. pdf.

Adesiji, G. B., Akinsorotan, A. O., & Omokore, D. F. (2010). Farmers' assessment of extension services in Ogun State, Nigeria. *Journal of Agricultural & Food Information*, *11*(2), 143-156.

Agholor, I. A., Monde, N., Obi, A., & Sunday, O. A. (2013). Quality of extension services: A case study of farmers in Amathole. *Journal of Agricultural Science*, *5*(2), 204-212.

Ahmad, M., Akram, M., Rauf, R., Khan, I. A., & Pervez, U. (2007). Interaction of extension worker with farmers and role of radio and television as sources of information in technology transfer: a case study of four villages of district Peshawar and Charsadda. *Sarhad Journal of Agriculture*, *23*(2), 515.

Alex, G. (2002). Rural extension and advisory services: New directions. *http://www. worldbank. org/wbi/sdruralpoverty/ag_extension1/Materials/additional/Rural_extension. pdf*.

Alexiades, M. N. (1996). Collecting ethnobotanical data: an introduction to basic concepts and techniques. *Advances in economic botany*, *10*, 53-94.

Ali, T., S. A. Khan., N. H. Malik., M. Ahmad and I. Saleem (1994). Investigation into some common factors which affect agricultural Research and Extension work in developing countries. Pakistan J. Agri. Sci., 31(3): 245-249.

Altalb, A. A. T., Filipek, T., & Skowron, P. (2015). The role of agricultural extension in the transfer and adoption of agricultural technologies. *Asian Journal of Agriculture and Food Sciences*, *3*(5).

Anandajayasekeram, P. (2008). *Concepts and practices in agricultural extension in developing countries: A source book*. ILRI (aka ILCA and ILRAD).

Anderson, J. R., and G. Feder (2004). Agricultural Extension: Good intentions and Hard Realities. The International Bank for Reconstruction and Development. The World Bank. The World Bank Research Observer. 19(1):41-60.

Anderson, J., & Van Crowder, L. (2000). The present and future of public sector extension in Africa: contracting out or contracting in. *Public Administration and Development: The International Journal of Management Research and Practice*, *20*(5), 373-384.

Antholt, C. H. (1994). Getting ready for the twenty-first century: Technical change and institutional modernization in agriculture.

Asio, V. B., Jahn, R., Perez, F. O., Navarrete, I. A., & Abit Jr, S. M. (2009). A review of soil degradation in the Philippines. *Annals of Tropical Research*, *31*(2), 69-94.

Atela, J., Tonui, C., & Glover, D. (2018). Farmers' agency and experiences of agricultural change in rural Kenya: Insights from exploratory fieldwork.

Babu, S. C., Joshi, P. K., Glendenning, C. J., Kwadwo, A. O., & Rasheed, S. V. (2013). The state of agricultural extension reforms in India: Strategic priorities and policy options. *Agricultural Economics Research Review*, *26*(347-2016-17086), 159-172.

Baig MB (1992) Technology transfer and agricultural extension in Asian countries. M.S. Thesis, Utah State University, Logan, USA.

Baig, M. B., & Aldosari, F. (2013). Agricultural extension in Asia: Constraints and options for improvement. *J. Ani Plant Sci*, *23*, 619-632.

Baig, M. B., & Straquadine, G. S. (2011). Sustainable agriculture ensures sustainable rural development: A reality or a myth. *Global food insecurity: rethinking agricultural and rural development paradigm and policy*, 21-32.

Baig, M. B., Al-Subaiee, F. S., & Straquadine, G. S. (2009). Role of agricultural extension in sustainable rural development in Pakistan. *Agricultural Management/Lucrari Stiintifice Seria I, Management Agricol*, *11*(1).

Baig, M. B., G. S. Straquadine., C. H. Antholt., W. S. Sleight and J. O. Derry (1999). Agricultural extension and technology transfer in Asian countries: A review of the key issues. Science Technology and Development. 18 (3):39-50.

Baloch, M. A., & Thapa, G. B. (2019). Review of the agricultural extension modes and services with the focus to Balochistan, Pakistan. *Journal of the Saudi Society of Agricultural Sciences*, *18*(2), 188-194.

Barriball, K. L., & While, A. (1994). Collecting data using a semi-structured interview: a discussion paper. *Journal of Advanced Nursing-Institutional Subscription*, *19*(2), 328-335.

Birner, R., Davis, K., Pender, J., Nkonya, E., Anandajayasekeram, P., Ekboir, J., ... & Cohen, M. (2009). From best practice to best fit: A framework for designing and analyzing pluralistic agricultural advisory services worldwide. *Journal of agricultural education and extension*, *15*(4), 341-355.

Birner, R., Davis, K., Pender, J., Nkonya, E., Anandajayasekeram, P., Ekboir, J., ... & Cohen, M. (2009). From best practice to best fit: A framework for designing and analyzing pluralistic agricultural advisory services worldwide. *Journal of agricultural education and extension*, *15*(4), 341-355.

Bitzer, V. (2016). Incentives for enhanced performance of agricultural extension systems. *Kit Sustainable Economic Development & Gender*, *6*, 1-8.

Bourke, B. (2014). Positionality: Reflecting on the research process. *The qualitative report*, *19*(33), 1-9.

Boyaci, M., & Yildiz, O. (2016). An overview of agricultural extension services in Turkey. *Bulgarian Journal of Agricultural Science*, *22*(1), 151-157.

Buadi, D. K., Anaman, K. A., & Kwarteng, J. A. (2013). Farmers' perceptions of the quality of extension services provided by non-governmental organisations in two municipalities in the Central Region of Ghana. *Agricultural Systems*, *120*, 20-26.

Campion, M. A., Pursell, E. D and Brown, B. K. (1988). Structured interviewing: Raising psychometric properties of the employment interview. Person Psychol., 41: 25-42.

Charmaz, K., & Mitchell, R. G. (2001). Grounded theory in ethnography. *Handbook of ethnography*, *160*, 174.

Chi, T. T. N., & Yamada, R. (2002). Factors affecting farmers' adoption of technologies in farming system: A case study in Omon district, Can Tho province, Mekong Delta. *Omonrice*, *10*, 94-100.

Cho, K. M. (2002, May). Training needs of agricultural extension agents in Myanmar. In *Proceedings of the 18th Annual Conference of Association for International Agricultural and Extension Education (AIAEE), Durban, South Africa* (pp. 72-80).

Cho, K. M. (2013). Background Paper No. 5, Current Situation and Future Opportunities in Agricultural Education, Research and Extension in Myanmar. *Michigan State University*.

Chowdhury, A. H., Hambly Odame, H., & Leeuwis, C. (2014). Transforming the roles of a public extension agency to strengthen innovation: Lessons from the National Agricultural Extension Project in Bangladesh. *The journal of agricultural education and extension*, *20*(1), 7-25.

Cornish, P.S., Birchall, C., Herridge, D.F., Denton, M.D., Guppy, C., 2018. Rainfall-related opportunities, risks and constraints to rainfed cropping in the Central Dry Zone of Myanmar, as defined by soil water balance modelling. Agric. Syst. 164, 47–57.

Creswell, J. W., & Miller, D. L. (2000). Determining validity in qualitative inquiry. *Theory into practice*, *39*(3), 124-130.

Davis, K. (2008). Intersectionality as buzzword: A sociology of science perspective on what makes a feminist theory successful. *Feminist theory*, *9*(1), 67-85.

Denzin, N. K. (1989). Interpretive interactionism. Newbury Park, CA: Sage.

Denzin, N. K. (2010). Moments, mixed methods, and paradigm dialogs. *Qualitative inquiry*, *16*(6), 419-427.

DENZIN, N. K. & LINCOLN, Y. S. (1998). Strategies of Qualitative Inquiry (Thousand Oaks, Sage).

Denzin, Norman K. 1978 The Research Act, 2d ed. New York: McGraw-Hill.

Dumanski, J., Gameda, S., & Pieri, C. J. (1998). *Indicators of land quality and sustainable land management: an annotated bibliography*. World Bank Publications.

Edwards, M., & Hulme, D. (1995). Beyond the magic bullet? Lessons and conclusions. *Non-governmental organizations—performance and accountability: Behind the magic bullet*, 219-228.

Elkind PD (1993) Correspondence between knowledge, attitudes, and behavior in farm health and safety practices. J Saf Res 24:171–179.

England, K. V. (1994). Getting personal: Reflexivity, positionality, and feminist research. *The professional geographer*, *46*(1), 80-89.

ESCAP, U. (2016). Assessment of stakeholder interventions for sustainable agriculture in Myanmar's dry zone: cast study.

Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American journal of theoretical and applied statistics*, *5*(1), 1-4.

FAO (2002). From Farmer Field School to Community Integrated Pest Management (IMP). Ten years of IMP training in Asia, Thailand.

FAO (2004). Business models that are inclusive of small farmers. Rome, Food and Agriculture Organization of the United Nations. Retrieved from http://www.fao.org/fileadmin/templates/est/AAACP/FAO_Business_models_for_Small_Far mers_2008_1_.pdf.

FAO, 2009. Climate. Agricultural Atlas of the Union of Myanmar. FAO Environment, Environmental Assessment and Management Unit (NRCE). FAO, Rome Accessed on 03.12.2017 at. http://dwms.fao.org/atlases/myanmar/downs/atlas/p031_rainfall_ map.pdf.

Foote, M. Q., & Gau Bartell, T. (2011). Pathways to equity in mathematics education: How life experiences impact researcher positionality. *Educational studies in mathematics*, *78*, 45-68.

Fossey, E., Harvey, C., McDermott, F., & Davidson, L. (2002). Understanding and evaluating qualitative research. *Australian & New Zealand journal of psychiatry*, *36*(6), 717-732.

Fowler, A. 1988. NGOs in Africa: Achieving comparative advantage in relief and micro-development. IDS Discussion Paper 249. Sussex: Institute of Development Studies.

Fylan, F. (2005). Semi-structured interviewing. In: Miles, J and Gilbert, P. (Eds), A handbook of research methods for clinical and health psychology. New York: Oxford University Press Inc.

Guerin, L. J., & Guerin, T. F. (1994). Constraints to the adoption of innovations in agricultural research and environmental management: a review. *Australian journal of experimental agriculture*, *34*(4), 549-571.

Haggblade, S., & Boughton, D. (2013). *A Strategic Agricultural Sector and Food Security Diagnostic for Myanmar* (No. 1096-2016-88414).

Hatry, H. P. (1996). *Measuring program outcomes: A practical approach*. United Way of America.

Herridge, D. F., Win, M. M., Nwe, K. M. M., Kyu, K. L., Win, S. S., Shwe, T., ... & Cornish, P. S. (2019). The cropping systems of the Central Dry Zone of Myanmar: Productivity constraints and possible solutions. *Agricultural Systems*, *169*, 31-40.

Hesse-Biber, S. N., & Leavy, P. (2017). In-depth interviewing. *The practice of qualitative research*, *3*, 138-139.

Hobbs, S. H. (1999) Ten tools for managing change in national agricultural research organizations, Research Management Guidelines No.5 (The Hague, the Netherlands: ISNAR).

Hoepfl, M. C. (1997). Choosing qualitative research: A primer for technology education researchers. *Volume 9 Issue 1 (fall 1997)*.

Holmes, A. G. D. (2020). Researcher Positionality - A Consideration of Its Influence and Place in Qualitative Research - A New Researcher Guide. *Shanlax International Journal of Education*, *8*(4), 1–10. https://doi.org/10.34293/education.v8i4.3232.

Hu, H. H., Kandampully, J., & Juwaheer, T. D. (2009). Relationships and impacts of service quality, perceived value, customer satisfaction, and image: an empirical study. *The service industries journal*, *29*(2), 111-125.).

Ibarra, M. B. (2009). An Analysis of Top-Down and Bottom-Up Extension Approaches of the School-on-the-Air (SOA) program in the Philippines.

Ingram, J. (2008). Agronomist–farmer knowledge encounters: an analysis of knowledge exchange in the context of best management practices in England. *Agriculture and Human Values*, *25*, 405-418.

IWMI, 2015. Improving water management in Myanmar's Dry Zone for food security, livelihoods and health. In: International Water Management Institute (IWMI), Colombo, Sri Lanka, 52 pp. Accessed on 15 December 2017 at. http://www.iwmi. cgiar.org/Publications/Other/Reports/PDF/improving-water-management-in- myanmars-dry-zone-for-food-security-livelihoods-and-health.pdf.

Kempel, C. S. (2013). Lessons learned from livelihoods interventions in the dry zone of Myanmar.

Kerft, S., Eckstein, D., Junghans, L., Kerestan, C. and Hagen, U. (2014), "Global climate risk index 2015, Who suffers most from extreme weather events? Weather-related loss events in 2013 and 1994 to 2013", Think Tank @ Research, Bonn and Berlin, German-watch.

Kiptot, E., & Franzel, S. (2015). Farmer-to-farmer extension: opportunities for enhancing performance of volunteer farmer trainers in Kenya. *Development in Practice*, *25*(4), 503-517.

Kirsten, J., Mapila, M., Okello, J. J., & De, S. (2013). *Managing agricultural commercialization for inclusive growth in Sub-Saharan Africa* (No. 206518). University of Pretoria, Department of Agricultural Economics, Extension and Rural Development.

LIFT, 2014. Household Survey 2013. LIFT Fund Management Office, Yangon, Myanmar. Accessed on 28 March 2018 at. https://www.lift-fund.org/sites/lift-fund.org/files/ publication/LIFT_HH_Survey_2013_0.pdf.

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. sage.

Löfgren, K. (2013, May 19). *Qualitative analysis of interview data: A step-by-step guide* [Video file]. Retrieved from (https://www.youtube.com/watch?v=DRL4PF2u9XA).

Malterud, K. (2001). Qualitative research: standards, challenges, and guidelines. *The lancet*, *358*(9280), 483-488.

Mansour, T. G. I., Abdelazez, M. A., & Eleshmawiy, K. H. (2022). Challenges and Constraints Facing the Agricultural Extension System in Egypt. *Journal of Agricultural Sciences–Sri Lanka*, *17*(2).

Masambuka-Kanchewa, F., Lamm, K., & Lamm, A. (2020). Beyond diffusion of improved technologies to promoting innovation creation and information sharing for increased agricultural productivity: A case study of Malawi and Kenya. *Journal of International Agricultural and Extension Education*, *27*(1), 79-92.

Masangano, C. M., Kambewa, D., Bosscher, N., & Fatch, P. (2017). Malawis experiences with the implementation of pluralistic, demand-driven and decentralised agricultural extension policy. *Journal of Agricultural Extension and Rural Development*, *9*(9), 185-195.

Masere, T. P. (2015). *An evaluation of the role of extension in adoption of new technology by small-scale resource-constrained farmers: a case of Lower Gweru Communal area, Zimbabwe* (Doctoral dissertation).

Massoud, M. F. (2022). The price of positionality: assessing the benefits and burdens of self-identification in research methods. *Journal of Law and Society*, *49*, S64-S86.

Mika, H. & Mudzamiri, N. (2012). The impact of Master Farmer Training on crop productivity of communal farmers in Gutu District. International Journal of Mathematical Archieve, (3)3: 849–854.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. sage.

MOALI, (2016). Myanmar Agriculture at a Glance 2016. Department of Planning. Ministry of Agriculture, Livestock and Irrigation (166 pp).

Moustakas, C. (1994). *Phenomenological research methods*. Sage publications.

Mugwisi, T., Ocholla, D. N., & Mostert, J. (2012). The information needs of agricultural researchers and extension workers in Zimbabwe. An overview of the findings. *lis. uzulu. ac. za/research/.../] site visited on*, *9*(5), 2017.

Mukute, M. (2013). Bridging and enriching top-down and participatory learning: The case of smallholder, organic conservation agriculture farmers in Zimbabwe. *Southern African Journal of Environmental Education*, 75-93.

Mundial, B. (1996). Performance Monitoring Indicators. A handbook for task managers.

Mushunje, A. (2005). Farm efficiency and land reform in Zimbabwe. *Unpublished PhD (thesis). Department of Agricultural Economics and Extension. University of Fort Hare*.

Naples, N. A. (1996). A feminist revisiting of the insider/outsider debate: The "outsider phenomenon" in rural Iowa. *Qualitative sociology*, *19*, 83-106.

Oakley, P., & Garforth, C. (1985). *Guide to extension training* (No. 11). Food & Agriculture Org.

Okwuokenye, G. F. (2018). Performance of the extension sub-unit of the Agricultural Development Programme in Delta South Agricultural Zone, Delta State, Nigeria. *Nigeria Agricultural Journal*, *49*(2), 276-283.

Oo, A. T., Van Huylenbroeck, G., & Speelman, S. (2017). Determining factors for the application of climate change adaptation strategies among farmers in Magwe District, dry zone region of Myanmar. *International Journal of Climate Change Strategies and Management*.

Patton, M. Q. (2002). Two decades of developments in qualitative inquiry: A personal, experiential perspective. *Qualitative social work*, *1*(3), 261-283.

Pazvakavambwa, S. C., & Hakutangwi, M. B. (2006). Agricultural extension. University of Zimbabwe (UZ) Publications.

Pond, B. S., Armenakis, A. A. & Green, S. B. (1984) The importance of employee expectations in organizational diagnosis, The Journal of Applied Behavioral Science, 20(2), pp. 167 – 180.

Purcell, D., & Anderson, J. R. (1997). *Agricultural extension and research: Achievements and problems in national systems*. World Bank Publications.

Ravi S, Breshears DD, Huxman TE, D'Odorico P. 2010. Land degradation in drylands: interactions among hydrologic–aeo- lian erosion and vegetation dynamics. Geomorphol. 116:236–245.

Rodriguez, J. M., Molnar, J. J., Fazio, R. A., Sydnor, E., & Lowe, M. J. (2009). Barriers to adoption of sustainable agriculture practices: Change agent perspectives. *Renewable agriculture and food systems*, *24*(1), 60-71.

Rogers, E. M. (1983). *Diffusion of Innovations*, 3rd edn., The Free Press, New York.

Rogers, E. M. (2003). Diffusion of Innovations (5th edition) Free Press, New York.

Rowe, W. E. (2014). Positionality. In D. Coghlan & M. Brydon-Miller (Eds.), *The Sage Encyclopedia of Action Research*. SAGE Publications Ltd. https://doi.org/http://dx.doi.org/10.4135/9781446294406.

Rubin, H. J., & Rubin, I. S. (2011). *Qualitative interviewing: The art of hearing data*. sage.

Sadati, S. A., Shaabanali Fami, H., Asadi, A., & Sadati, S. A. (2010). Farmer's attitude on sustainable agriculture and its determinants: A case study in Behbahan County of Iran. *Research Journal of Applied Sciences, Engineering and Technology*, *2*(5), 422-427.

Salami, A., Kamara, A. B., & Brixiova, Z. (2010). *Smallholder agriculture in East Africa: Trends, constraints and opportunities* (p. 52). Tunis, Tunisia: African Development Bank.

Saldaña, J. (2021). *The coding manual for qualitative researchers*. sage.

Sigman, A. and B. E. Swanson**,** 1993. Utilization of technology: the corner stone of agricultural development policy and pro- grammes, Agricultural Extension, A Reference Manual, 2nd Ed., *FAO*, Rome, Italy, pp: 227-231.

Subedi, B. (2006). Theorizing a 'halfie'researcher's identity in transnational fieldwork. *International Journal of Qualitative Studies in Education*, *19*(5), 573-593.

Sulo, T., Koech, P., Chumo, C., & Chepng'eno, W. (2012). Socioeconomic factors affecting the adoption of improved agricultural technologies among women in Marakwet County Kenya. *Journal of Emerging Trends in Economics and Management Sciences*, *3*(4), 312-317.

Sultana, F. (2007). Reflexivity, positionality and participatory ethics: Negotiating fieldwork dilemmas in international research. *ACME: An international journal for critical geographies*, *6*(3), 374-385.

Takenaka, S. (2006). Foreword. Enhancement of Extension Systems in Agriculture Publishedby the Asian Productivity Organization (APO) Report of the APO Seminar on Enhancement of Extension Systems in Agriculture. held in Pakistan, 15-20 December, 2003.

Tanui, J. K., Feng, W., Li, X., Wang, Y., & Kipsat, M. J. (2012). Socio-economic constraints to adoption of yield improving tea farming technologies: A study of small holder tea farmers affiliated to estates in Nandi Hills, Kenya. *African Journal of Agricultural Research*, *7*(16), 2560-2568.

Teerawichitchainan, B., & Low, T. Q. Y. (2021). The situation and well-being of custodial grandparents in Myanmar: Impacts of adult children's cross-border and internal migration. *Social Science & Medicine*, *277*, 113914.

Tey, Y. S., Li, E., Bruwer, J., Abdullah, A. M., Brindal, M., Radam, A., ... & Darham, S. (2014). The relative importance of factors influencing the adoption of sustainable agricultural practices: A factor approach for Malaysian vegetable farmers. *Sustainability science*, *9*, 17-29.

Thomas, D. R. (2006). A general inductive approach for analyzing qualitative evaluation data. *American journal of evaluation*, *27*(2), 237-246.

Tun, K.K.K., Shrestha, R.P., Datta, A.Q., 2015. Assessment of land degradation and its impact on crop production in the Dry Zone of Myanmar. Int. J. Sustain. Dev. World Ecol. 22, 533–544. https://doi.org/10.1080/13504509.2015.1091046.

United Nations Country Team (UNCT) (2011), "Achieving the millennium development goals in Myanmar, thematic analysis 2011", UNCT, Supported by the UNDG Asia Pacific (UNDG A-P), Bangkok.

United Nations Development Programme (UNDP) (2007), "UNDP and Ministry of National Planning and Economic Development- Integrated Household Living Conditions Survey in Myanmar", Poverty Profile, UNDP-Yangon, Myanmar.

United Nations Development Programme (UNDP), 1993. Human development report. Oxford: Oxford University Press.

Urama, K. C., & Ozor, N. (2010). Impacts of climate change on water resources in Africa: the role of adaptation. *African Technology Policy Studies Network*, *29*(1), 1-29.

Van den Ban, A. W., & Hawkins, H. S. (1996). Agricultural Extension. Blackwell Science LTD.
Van Dijk, M-P. 1994. The effectiveness of NGOs: Insights from Danish, British, and Dutch import studies. Schriften des Deutschen Ubersee-Instituts Hamburg. 28, pp. 27-42.

Vanclay, F. (2004). Social principles for agricultural extension to assist in the promotion of natural resource management. *Australian journal of experimental agriculture*, *44*(3), 213-222.

Vaughan, E., Levine, E., 2015. The Dry Zone of Myanmar: A Strategic Resilience Assessment of Farming Communities. Mercy Corps, Oregon, USA Accessed 16 November 2017 at. https://www.mercycorps.org/sites/default/files/MercyCorps_ DryZoneStudyMyanmar_2015.pdf.

Walter, M. and A. A. Sarkar, 1996. The development of national agricultural extension policy in Bangladesh. *European Journal of Agricultural Education and Extension*, 3 (2): 85-96.

Work Bank Group. (n.d.). Climate change knowledge portal for development practitioners and policy makers. https://climateknowledgeportal.worldbank.org/country/myanmar/climate-data-historical#:~:text=Myanmar%20has%20a%20tropical%20to,October%20to%20mid%2D February.

World Bank Group (2016). Myanmar: analysis of farm production economics. Economic and Sector Work Report No. 100066-MM. World Bank Group, Yangon, Myanmar. Accessed on 26 November at http://documents.worldbank.org/curated/en/ 509581468181132091/pdf/100066-ESW-P144951-Box394886B-PUBLIC-MM-Farm-Production-Economics-online-version.pdf.

World Food Programme (WFP) (2013), "Food security focus in dry zone, regional integrated multi-hazard early warning system (RIMES)", 9th Monsoon Forum, Nay Pyi Taw.
\Worth, S. H. (2006). Agriflection: A learning model for agricultural extension in South Africa. *Journal of agricultural education and extension*, *12*(3), 179-193.

Yi, T. (2004), “Adaptation to climate change in Myanmar”, presented at workshop organized by UNECE (United Nations Economic Commission for Europe), available via DIALOG: www.unece.org/fileadmin/DAM/env/documents/2012/wat/workshops/Transboundary_adaptation_april/ presentations/6_Tin_Yi_Myanmar_Final_.pdf.

APPENDIX A: Interview guide for extension officer in English

[INTRODUCTION]

Hello!

My name is Kyu Kyu Thin, and I am a second-year graduate student at the Department of Community Sustainability, Michigan State University, USA.

Thank you so much for sharing your time for this interview. I am here to learn your perspectives, experiences, and challenges in NGO work.

If you are not comfortable answering some of my questions, please do not hesitate to let me know.

[READ THE CONSENT FORM]

[START THE INTERVIEW]

Personal Information

Date:

Name of the interviewee:

Gender:

Years - working as extension worker in NGOs:

Total years of experience:

Level of Education (Diploma, Bachelor, Master, PhD):

[Main Questions = Bold texts, Follow-up questions = Light texts, [..]= Explanations]

(1) Could you tell me about the nature of your work? To put it another way, what are your responsibilities as an extension officer in that project?

- Can you go for more details?
- How did you educate farmers?

(2) What factors do you think characterize a good extension worker?

(3) Do you think there is a difference between your job as an extension agent in principle and in practice?

- If the answer is yes [it's different], why? And what prevents you from practicing that certain approach [in practice] than in principle? What situations lead you to practice that certain approach [in practice] than in principle? Can you give me an example or more detailed information on that?
- If the answer is no [the same], why? And what aspects of your approaches in practice are consistent with what agricultural extension in principle. What situations lead you to follow that extension approach? Can you give me an example?

(4) Do you have any idea about the philosophy and process behind the decision of what agricultural practices to promote and use to alleviate farmers' problems?

- Where did they come from?
- Do you think they accurately reflect farmer needs? How so? How not?
- Do you think the strategies your project used were helpful for the farmers? How so? How not?

(5) What kind of pressures do you have to deal with at work?

- Who are you most accountable to?

[Pressure - if extension officers are more concerned about meeting the needs of the farmers or meeting the perceived needs of the donors or targeted-goals]

(6) How do you define the effectiveness of the extension program?

- What criteria do you use to determine whether an extension program is effective?

(7) For example, what if farmers approached you for guidance or assistance with something unrelated to the project goals? Have you ever been in a similar situation?

- What were your reactions to such situations?
- What were the responses of your project or your supervisor to such situations?

(8) What other difficulties did you frequently confront in effectively assisting farmers?

- How did you handle difficult situations? Can you give me an example?

(9) Have you ever had someone from the main office or your supervisor inquire about your thoughts on the project implementation process and the issues you faced in the field?

- And then, what were their responses after knowing your perspectives? Can you give me an example?

(10) Are you happy with the way your project benefits farmers? How so? How not?

(11) **What adjustments do you believe should be made to the way the extension system is set up to help farmers effectively in the future?**

APPENDIX B: Interview guide for project manager in English

[INTRODUCTION]

Hello!

My name is Kyu Kyu Thin, and I am a second-year graduate student at the Department of Community Sustainability, Michigan State University, USA.

Thank you so much for sharing your time for this interview. I am here to learn your perspectives, experiences, and challenges in NGO work.

If you are not comfortable answering some of my questions, please do not hesitate to let me know.

[READ THE CONSENT FORM]

[START THE INTERVIEW]

Personal Information

Date:

Name of the interviewee:

Gender:

Years - working as extension worker in NGOs:

Total years of experience:

Level of Education (Diploma, Bachelor, Master, PhD):

[Main Questions = Bold texts, Follow-up questions = Light texts, [..]= Explanations]

(1) What are your responsibilities as a project manager in that project?

- How did you handle the project as a whole? Could you please walk me through the steps?

(2) How did you decide what improved agricultural practices to promote?

- Who was involved in the decision-making process? Can you give me an example?

- What was the logic underlying the choice to promote certain practices?
- Did you believe they accurately reflect farmer needs? How so? How not?

(3) **What kind of pressures do you have to deal with at work?**

- Who are you most accountable to?

[Pressure - if project managers are more concerned about meeting the needs of the farmers or meeting the perceived needs of the donors or targeted-goals]

(4) What is your understanding of agricultural extension officers' responsibilities in that project?

- What factors do you use to determine whether or not someone is a good extension officer? Can you give me an example?

(5) Do you think there is a difference between extension agent's job in principle and in practice?

- If there are differences, what accounts for the variances? Can you give me an example?
- If there are resemblances, what aspects of the approaches applied in your project are consistent with what agricultural extension is supposed to be? Can you give me an example?

(6) What if extension agents came to you for help with something they had encountered in the field, for instance, when farmers asked for their support with issues that weren't directly related to project goals?

- Have you ever been in a situation like this?
- How did you react in such circumstances?

(7) What was the frequency of your meetings with field extension officers? When you and your team met, what issues did you discuss?

- What kind of input from field officers was critical for you?

(8) **Did you feel like you were able to attain the goals that your project intended to achieve? How so? How not?**

(9) How do you define the effectiveness of the project?

- What criteria do you use to determine whether the project is effective?

(10) What changes do you think the system should make in order to support farmers more successfully in the future?

APPENDIX C: Interview guide for extension officer in Burmese

စိုက်ပျိုးရေးပညာပေးအရာရှိများအတွက် အင်တာဗျူးမေးခွန်းများ

[နိဒါန်း]

မင်္ဂလာပါ!

ကျွန်မနာမည်က ကြူကြူသင်းဖြစ်ပြီး၊ ကျွန်မဟာ Community Sustainability ဌာန၊ Michigan State University ၊ USA မှာ ဒုတိယနှစ် ကျောင်းသူပါ။

ဒီအင်တာဗျူးအတွက် အချိန်ပေးမျှဝေပေးတဲ့အတွက် ကျေးဇူးအများကြီးတင်ပါတယ်။ အစ်ကို/အစ်မ ရဲ့ NGOs တွေမှာအလုပ်လုပ်တဲ့အခါမှာ အတွေ့အကြုံတွေ၊ အမြင်တွေ၊ စိန်ခေါ်မှုတွေကို ကျွန်မနဲ့ share ပေးဖို့တောင်းဆိုချင်ပါတယ်။

ကျွန်မမေးခွန်းအချို့ကို ဖြေဆိုရန် အဆင်မပြေပါက ကျွန်မကို အသိပေးရန် မတွန့်ဆုတ်ပါနှင့်။

[interview တွင်ပါဝင်ရန် သဘောတူညီကြောင်း သဘောတူညီချက်ပုံစံကိုဖတ်ပါသည်]

[အင်တာဗျူးကို စတင်ပါသည်]

ကိုယ်ရေးအချက်အလက်

ရက်စွဲ-

အင်တာဗျူးဖြေဆိုသူအမည်-

ကျား၊မ-

နှစ်များ - NGO များတွင် စိုက်ပျိုးရေးပညာပေးအရာရှိအဖြစ် လုပ်ကိုင်သည် အတွေ့အကြုံနှစ်များ-

စုစုပေါင်းအတွေ့အကြုံနှစ်များ-

ပညာရေးအဆင့် (ဒီပလိုမာ၊ ဘွဲ့၊ မဟာဘွဲ့၊ PhD)-

[ပင်မမေးခွန်းများ = Bold စာသားများ၊ နောက်ဆက်တွဲမေးခွန်းများ = Bold မဟုတ် စာသားများ၊ [..]= ရှင်းလင်းချက်များ]

(၁) အစ်ကို/အစ်မရဲ့ အလုပ်သဘောသဘာဝကို ပြောပြနိုင်မလား။ နောက်တစ်နည်းပြောရရင် ဒီပရောဂျက်မှာ စိုက်ပျိုးရေးပညာပေးအရာရှိတစ်ယောက်အနေနဲ့ အစ်ကို/အစ်မရဲ့တာဝန်ကဘာလဲ။

- အသေးစိတ်အချက်အလက်များကို ပြောပြနိုင်ပါသလား။

- project beneficiaries တွေကို ဘယ်လိုပညာပေးတာလဲ။

(၂) စိုက်ပျိုးရေးပညာပေးအရာရှိကောင်းတစ်ဦး၏ လက္ခဏာရပ်မှာ အဘယ်အချက်များဟု အစ်ကို/အစ်မ ထင်သနည်း။

(၃) စိုက်ပျိုးရေးပညာပေးအရာရှိအဖြစ် အစ်ကို/အစ်မ အလုပ်သည် မူအရနှင့် လက်တွေ့တွင် ကွာခြားချက်ရှိသည်ဟု သင်ထင်ပါသလား။

- အဖြေက ဟုတ်တယ်ဆိုရင် [ဒါက မတူဘူး] ဘာကြောင့်လဲ။ အဘယ်ကြောင့်နည်း။ မည်သည့်အခြေအနေများက **ကွာခြားချက်ဖြစ်**စေသနည်း။ အဲဒါနဲ့ ပတ်သက်ပြီး ဥပမာတစ်ခု ဒါမှမဟုတ် ပိုအသေးစိတ်အချက်အလက်ကို ပေးလို့ရမလား။

- အဖြေက မဟုတ်ဘူးဆိုရင် ဘာကြောင့်လဲ။ ပြီးတော့ ဘယ်လိုမျိုး **စိုက်ပျိုးရေးပညာပေးအရာရှိ** ရဲ့ **မူအရအခြေခံသဘောတရား**နဲ့ ကိုက်ညီလဲ။ အဲဒါနဲ့ ပတ်သက်ပြီး ဥပမာတစ်ခု ဒါမှမဟုတ် ပိုအသေးစိတ်အချက်အလက်ကို ပေးလို့ရမလား။

(၄) တောင်သူလယ်သမားများ၏ ပြဿနာများကို လျော့ပါးသက်သာစေရန် မည်သည့် စိုက်ပျိုးရေးအလေ့အကျင့်များကို မြှင့်တင်ရန်နှင့် အသုံးပြုရန် ဆုံးဖြတ်ချက်နောက်ကွယ်တွင် အတွေးအခေါ်နှင့် လုပ်ငန်းစဉ်များနှင့် ပတ်သက်၍ အစ်ကို/အစ်မ ဘယ်လိုစိတ်ကူးရှိပါသလဲ။

- သူတို့ဘယ်ကလာတာလဲ။

- တောင်သူတွေရဲ့ လိုအပ်ချက်ကို အတိအကျ ထင်ဟပ်နေသလား။ ဘယ်လိုနည်းဖြင့်

- ပရောဂျက်က အသုံးပြုတဲ့ နည်းဗျူဟာတွေက project beneficiaries တွေအတွက် အထောက်အကူဖြစ်မယ်လို့ **အစ်ကို/အစ်မ** ထင်လား။ ဘယ်လိုနည်းဖြင့်

(၅) လုပ်ငန်းခွင်မှာ ဘယ်လိုဖိအားမျိုးတွေ ကြုံရလဲ။

- အစ်ကို/အစ်မက ဘယ်သူ့အတွက် တာဝန်အရှိဆုံးလဲ။

[ဖိအား - တောင်သူလယ်သမားများ၏ လိုအပ်ချက်များကို ဖြည့်ဆည်းပေးရန် သို့မဟုတ် အလှူရှင်များ သို့မဟုတ် ရည်မှန်းထားသော လိုအပ်ချက်များကို ဖြည့်ဆည်းပေးခြင်းနှင့် ပတ်သက်၍ ပိုမိုစိုးရိမ်လာပါသလား]

(၆) တိုးချဲ့အစီအစဉ်၏ ထိရောက်မှုကို အစ်ကို/အစ်မ မည်ကဲ့သို့ သတ်မှတ်သနည်း။

- စိုက်ပျိုးရေးပညာပေးပရိဂရမ်တစ်ခု ထိရောက်မှုရှိမရှိ ဆုံးဖြတ်ရန် မည်သည့်စံနှုန်းများကို အစ်ကို/အစ်မအသုံးပြုသနည်း။

(၇) ဥပမာအားဖြင့်၊ လယ်သမားများသည် စီမံကိန်းပန်းတိုင်များနှင့် မသက်ဆိုင်သော တစ်စုံတစ်ရာအတွက် လမ်းညွှန်မှု သို့မဟုတ် အကူအညီများပေးရန် အစ်ကို/အစ်မထံချဉ်းကပ်ပါက မည်သို့နည်း။ အလားတူ အခြေအနေမျိုး ကြုံဖူးပါသလား။

- ဒီလိုအခြေအနေတွေကို ဘယ်လိုတုံ့ပြန်ခဲ့လဲ။

- အစ်ကို/အစ်မ ကြီးကြပ်ရေးမှူးက ထိုသို့သောအခြေအနေများအတွက် မည်သို့တုံ့ပြန်ခဲ့သနည်း။

(၈) တောင်သူလယ်သမားများကို ထိထိရောက်ရောက် ကူညီဆောင်ရွက်ပေးရာတွင် အခြားမည်သည့်အခက်အခဲများ ကြုံတွေ့ရတတ်သနည်း။

- ခက်ခဲတဲ့အခြေအနေတွေကို ဘယ်လိုကိုင်တွယ်ခဲ့လဲ။ ဥပမာတစ်ခုပေးလို့ရမလား။

(၉) ပင်မရုံးမှ တစ်စုံတစ်ဦး သို့မဟုတ် အစ်ကို/အစ်မ၏ ကြီးကြပ်ရေးမှူးသည် ပရောဂျက် အကောင်အထည်ဖော်မှု လုပ်ငန်းစဉ်နှင့် ပတ်သက်သည့် အစ်ကို/အစ်မ၏ အတွေးအမြင်များနှင့် နယ်ပယ်တွင် သင်ကြံုတွေ့နေရသည့် ပြဿနာများအကြောင်း မေးမြန်းဖူးပါသလား။

- ဒါဆို အစ်ကို/အစ်မရဲ့အမြင်တွေကို သိပြီးရင် သူတို့ရဲ့ တုံ့ပြန်မှုက ဘယ်လိုလဲ။ ဥပမာတစ်ခုပေးလို့ရမလား။

(၁၀) အစ်ကို/အစ်မရဲ့စီမံကိန်းက တောင်သူတွေကို အကျိုးပြုပုံနဲ့ ပတ်သက်ပြီး အစ်ကို/အစ်မ စိတ်ကျေနပ်ပါသလား။

(၁၁) တောင်သူလယ်သမားများကို အနာဂတ်တွင် ထိထိရောက်ရောက်ကူညီနိုင်ရန် တိုးချဲ့မှုစနစ်အား မည်သို့ပြုပြင်ပြောင်းလဲသင့်သည်ဟု အစ်ကို/အစ်မယုံကြည်သနည်း။

APPENDIX D: Interview guide for project manager in Burmese

ပရောဂျက်မန်နေဂျာအတွက် အင်တာဗျူးမေးခွန်းများ

[နိဒါန်း]

မင်္ဂလာပါ!

ကျွန်မနာမည်က ကြူကြူသင်းဖြစ်ပြီး၊ ကျွန်မဟာ Community Sustainability ဌာန၊ Michigan State University ၊ USA မှာ ဒုတိယနှစ် ကျောင်းသူပါ။

ဒီအင်တာဗျူးအတွက် အချိန်ပေးမျှဝေပေးတဲ့အတွက် ကျေးဇူးအများကြီးတင်ပါတယ်။ အစ်ကို/အစ်မ ရဲ့ NGOs တွေမှာအလုပ်လုပ်တဲ့အခါမှာ အတွေ့အကြုံတွေ၊ အမြင်တွေ၊ စိန်ခေါ်မှုတွေကို ကျွန်မနဲ့ share ပေးဖို့တောင်းဆိုချင်ပါတယ်။

ကျွန်မမေးခွန်းအချို့ကို ဖြေဆိုရန် အဆင်မပြေပါက ကျွန်မကို အသိပေးရန် မတွန့်ဆုတ်ပါနှင့်။

[interview တွင်ပါဝင်ရန် သဘောတူညီကြောင်း သဘောတူညီချက်ပုံစံကိုဖတ်ပါသည်]

[အင်တာဗျူးကို စတင်ပါသည်]

ကိုယ်ရေးအချက်အလက်

ရက်စွဲ-

အင်တာဗျူးဖြေဆိုသူအမည်-

ကျား၊မ-

နှစ်များ - NGO များတွင် စိုက်ပျိုးရေးပညာပေးအရာရှိအဖြစ် လုပ်ကိုင်သည် အတွေ့အကြုံနှစ်များ-

စုစုပေါင်းအတွေ့အကြုံနှစ်များ-

ပညာရေးအဆင့် (ဒီပလိုမာ၊ ဘွဲ့၊ မဟာဘွဲ့၊ PhD)-

[ပင်မမေးခွန်းများ = Bold စာသားများ၊ နောက်ဆက်တွဲမေးခွန်းများ = Bold မဟုတ် စာသားများ၊ [..]= ရှင်းလင်းချက်များ]

(၁) အဲဒီပရောဂျက်မှာ ပရောဂျက်မန်နေဂျာတစ်ယောက်အနေနဲ့ အစ်ကို/အစ်မရဲ့တာဝန်ကဘာလဲ။

- ပရောဂျက်တစ်ခုလုံးကို ဘယ်လိုကိုင်တွယ်ခဲ့လဲ။ ကျေးဇူးပြုပြီး အသေးစိတ် ရှင်းပြပေးလို့ရမလား

(၂) စိုက်ပျိုးရေးအလေ့အကျင့်များ တိုးတက်ကောင်းမွန်လာစေရန် အစ်ကို/အစ်မ ရဲ့မည်ကဲ့သို့ ဆုံးဖြတ်ခဲ့သနည်း။

- ဆုံးဖြတ်ချက်ချတဲ့ လုပ်ငန်းစဉ်မှာ ဘယ်သူတွေ ပါဝင်ခဲ့လဲ။ ဥပမာတစ်ခုပေးလို့ရမလား။

- စိုက်ပျိုးရေးအလေ့အကျင့်များကို ရွေးချယ်မှုမှာ ဘယ်လိုအချက်ကို အခြေခံပြီး စဉ်းစားလဲ။

- တောင်သူတွေရဲ့လိုအပ်ချက်ကို အတိအကျထင်ဟပ်တယ်လို့ သင်ယုံကြည်ပါသလား။

(၃) လုပ်ငန်းခွင်မှာ အစ်ကို/အစ်မ ဘယ်လိုဖိအားမျိုးတွေ ကြုံနေရလဲ။

- မင်းက ဘယ်သူ့အတွက် တာဝန်အရှိဆုံးလဲ။

[ဖိအား - ပရောဂျက်မန်နေဂျာများသည် တောင်သူများ၏ လိုအပ်ချက်များကို ဖြည့်ဆည်းပေးခြင်း သို့မဟုတ် အလှူရှင်များ၏ သိမြင်နားလည်မှု လိုအပ်ချက်များကို ဖြည့်ဆည်းပေးခြင်း သို့မဟုတ် ရည်မှန်းထားသော ပန်းတိုင်များကို ဖြည့်ဆည်းပေးခြင်းနှင့် ပတ်သက်၍ ပိုမိုစိုးရိမ်လာပါသလား

(၄) ထိုစီမံကိန်းတွင် စိုက်ပျိုးရေးပညာပေးအရာရှိများ၏ တာဝန်များကို အစ်ကို/အစ်မ မည်သို့ နားလည်သနည်း။

- တစ်စုံတစ်ယောက်သည် စိုက်ပျိုးရေးပညာပေးအရာရှိကောင်းဟုတ်၊ မဟုတ် ဆုံးဖြတ်ရန် မည်သည့်အချက်များကို အသုံးပြုသနည်း။ ဥပမာတစ်ခုပေးလို့ရမလား။

(၅) စိုက်ပျိုးရေးပညာပေးအရာရှိများ၏အလုပ်သည် မူအရနှင့် လက်တွေ့တွင် ကွာခြားချက်ရှိသည်ဟု အစ်ကို/အစ်မ ထင်ပါသလား။

- ကွဲလွဲမှုများရှိပါက မည်သို့ ကွဲလွဲမှု ရှိပါသနည်း။ ဥပမာတစ်ခုပေးလို့ရမလား။

- တူညီမှုများရှိပါက၊ သင့်ပရောဂျက်တွင် ကျင့်သုံးသည့် ချဉ်းကပ်ပုံများ သည် မည်သည့် စိုက်ပျိုးရေးပညာပေးဖြစ်သင့်သည် နှင့် ကိုက်ညီနေပါ သနည်း။ ဥပမာတစ်ခုပေးလို့ရမလား။

(၆) ဥပမာအားဖြင့် လယ်သမားများသည် စီမံကိန်းပန်းတိုင်များနှင့် တိုက်ရိုက်မသက်ဆိုင်သော ပြဿနာများနှင့် ၎င်းတို့၏ ပံ့ပိုးကူညီမှုကို တောင်းခံသောအခါတွင် စိုက်ပျိုးရေးပညာပေးအရာရှိများသည် အစ်ကို/အစ်မ ထံလာပြီး အကူအညီတောင်းပါက မည်သို့နည်း။

- ဒီလိုအခြေအနေမျိုး ကြုံဖူးလား။

- ဒီလိုအခြေအနေမျိုးမှာ ဘယ်လိုတုံ့ပြန်ခဲ့လဲ။

(၇) စိုက်ပျိုးရေးပညာပေးအရာရှိများနှင့် တွေ့ဆုံမှု အကြိမ်ရေက ဘယ်လောက်လဲ။ အစ်ကို/အစ်မ နဲ့ အဖွဲ့တွေ့တဲ့အခါ ဘာတွေ ဆွေးနွေးခဲ့လဲ။

- ကွင်းဆင်းအရာရှိများထံမှ မည်သို့သော သဘောထားမှတ်ချက်မျိုးသည် အစ်ကို/အစ်မ အတွက် အရေးကြီးသနည်း။

(၈) မင်းရဲ့ပရောဂျက်က ရည်ရွယ်ထားတဲ့ ပန်းတိုင်ကို အရောက်လှမ်းနိုင်ပြီလို့ ခံစားရလား။

- ဘယ်လိုနည်းဖြင့် အရောက်လှမ်းနိုင်ပြီလို့ ခံစားရလဲ

- ဘယ်လိုနည်းဖြင့် အရောက်လှမ်းနိုင်ပြီလို့ မခံစားရဘူးလဲ

(၉) ပရောဂျက်ရဲ့ထိရောက်မှုကို ဘယ်လိုသတ်မှတ်သလဲ။

- ပရောဂျက်သည် ထိရောက်မှုရှိမရှိ ဆုံးဖြတ်ရန် မည်သည့်စံနှုန်းများကို အစ်ကို/အစ်မ

အသုံးပြုသနည်း။

(၁၀) တောင်သူလယ်သမားများကို အနာဂတ်တွင် ပိုမိုအောင်မြင်စွာ ပံ့ပိုးပေးနိုင်ရန် စနစ်သည်

မည်သို့သော အပြောင်းအလဲများ ပြုလုပ်သင့်သည်ဟု အစ်ကို/အစ်မ ထင်ပါသနည်း။

APPENDIX E: Codebook

Table 2: Codebook

What are the experiences and perspectives of non-government extensionists who engage in different projects in the central dry zone of Myanmar?			
Code	**Definition**	**Rules**	**Examples**
Extension approach	This refers to the approaches used by extension workers to educate, convince, solve the problems of farmers and introduce new agricultural techniques and ideas to them to incorporate them into their farming practices.	Any text that describes how the participants utilize extension approaches in the project.	During training, we explain to farmers as if there were someone who already knew about what we were about to say, and then the farmer who already knows was asked to explain & share with other farmers. When their explanations (farmer-to-farmer) got a little off track, I tried to interrupt the conversation and kept them on the right track. - R1
Good extension agent (GEA)	This refers to the characteristics of the good extension agents described by the participants.	Apply when participants mention what characteristics are included in their criteria when they consider the extension officers as good extension agents.	A GEA should first have good listening skills. A GEA must be able to comprehend the requirements and challenges of the farmer. Sometimes, there is something we want to deliver and what the farmers want to know is different, like a buffer zone, then we have to adjust it. – R19
Project approach	How the implementers run the project, how the actors in the system (extension agents, senior staff, donors, farmers, officers from DOA- department of agriculture) communicate with each other, and how the management officers administer the project.	Any text that indicates how the implementers manage the project.	

Table 2 (cont'd)

What are the experiences and perspectives of non-government extensionists who engage in different projects in the central dry zone of Myanmar?			
Code	**Definition**	**Rules**	**Examples**
Top-down approach	The top-down approach lacks a two-way information flow, fails to customize messages for each location and technology transfer without a framework for extension agents and farmer feedback, and ignores the complexities of real-world situations and farmers' needs.	Apply when the participant mentions the management team gave little heed to the viewpoints of farmers and extension agents. Any text that indicates how ideas or concerns of them are not getting into the decision-making meeting arena.	The way the project operates was a bit bureaucratic, like "if I asked you to do things like that, you have to do it." The employees did not really know how to reach the target; what is the logical framework? The supervisor just said like, "do this, do that, go there, and provide training. - R5
Bottom-up approach	The essential criteria of the bottom-up approach are to find out the problems of farmers first before presenting solutions; farmers are key players in this and make sure to have a responsive & flexible information flow system among actors.	Any text that describes how the organization figured out the challenges faced by farmers and the answers to those challenges has an impact on how they structure the organization's future work plan and goals.	
Adaptive approach	The project strategy is adaptable enough to make adjustments per agro-ecosystem and farmer situations, responsive to farmers' needs.	Apply when participant mentions the team modifying the project's methods to farmers' needs, getting their feedback, and making the necessary improvements will make it simpler for the farmers to embrace the technology.	

Table 2 (cont'd)

What challenges do non-government extension workers face in resourcefully and meaningfully helping farmers?			
Code	**Definition**	**Rules**	**Examples**
Challenges	Any difficulties encountered by the extension workers during the actual implementation process	Apply when the participant mentions the challenges while working on the project. Apply when difficult to categorize the identified challenges under the subcodes.	When I go to the Department of--, the head officer treats me like it is not worth communicating with me. The effort from the government side is kind of weak when it comes to cooperation with the project. - R13
Challenges caused by Top-down approach	The top-down approach makes it difficult for farmers and extension agents to participate in planning and decision-making. There is no room for flexibility, and the system is set up with rigid rules that are difficult to modify.	Any text indicates how ideas, concerns, or voices of all actors (especially farmers, extension workers) are not getting into the decision-making meeting arena and then how the top-down approach created a challenging situation for extension agents.	The teaching method is not right as it makes farmers not think outside the box. I even mentioned that challenge to the technical advisor, but they say we cannot change anything and have to go according to the project model, so yeah. - R 5
Meeting topics and responses	This refers to what topics are discussed during the team meeting.	Any text describes topics discussed during the team meeting and how follow-up actions are formed among participants.	In weekly team meetings, we mainly talked about the jobs I was responsible for. They did not ask anything about farmer feedback; they just asked how many trainings were completed, how were the conditions of dealing with the project partners, and the activities to be done in the future. I think it is rare that we talked about extension agents' difficulties. – R5

Table 2 (cont'd)

What challenges do non-government extension workers face in resourcefully and meaningfully helping farmers?			
Code	**Definition**	**Rules**	**Examples**
Challenges caused by pre-determined goals	"A pre-determined goal" strategy emphasizes adopting specific agricultural technology and achieving a particular result created and chosen through earlier negotiations among donor organizations, implementation partners, technical experts, and policymakers.	Any text that indicates how pre-determined goals created a challenging situation for extension agents.	If the extension workers are trying to deliver topics opposite to farmers' interests, then farmers might not be interested in the topics and don't want to listen to you and not even think of adopting the promoted technologies in their farms. And as a consequence, they don't trust that extension worker and don't have much desire to get information from them. – R5
Philosophy behind decision-making	The process of how different local and international NGOs, including project implementers (senior project officials and extension educators), decide which agricultural practices to promote	Any text indicates the process (process = who is involved, how they decide, based on what) of the decision-making.	As for the project like "climate-smart agriculture project", I think the donor agencies noticed that the farmers are suffering from the adverse effects of climate change, so like they need technologies to overcome those impacts, and then they decide where and how to implement; I guess that is the process of decision-making. – R11
Data Discrepancy	The discrepancy between the information or scenario described in the proposal and the circumstances that the implementer encounters while carrying out the project	Apply when the data discrepancy problems created a challenging situation for extension agents.	The main challenge is a gap between beneficiaries' needs and the plans wanted to implement, writing the proposal based on outdated data which no longer reflect the actual situations, which is also why farmers are not interested in the training provided by the project or adopt the promoted technology. If that happens, it is not as effective as it costs. I have been having this issue up until now. – R1

Table 2 (cont'd)

What challenges do non-government extension workers face in resourcefully and meaningfully helping farmers?			
Code	**Definition**	**Rules**	**Examples**
Trends and Funding opportunities	This refers to the influence (positively and negatively) of funding opportunities and trends on the process of developing a proposal's story and implementing a project after receiving the funding.	Apply when the participant talks about the influence of funding opportunities and trends on developing a proposal's story, and the extension agents regarded this as a challenge for them.	Lately, NGOs have followed the trend too much. For example, in the dry zone, around 2015-2016, every project in Myanmar was implemented only in the dry zone, focusing on malnutrition. - R19
Challenges caused by Target-oriented approach	The approach is primarily focused on achieving project goals (such as the number of villages covered and the number of beneficiaries reached) rather than paying attention to the quality of the interventions that are implemented by the project.	Any text that indicates how excessively focusing on achieving a target-oriented approach created a challenging situation for extension agents.	Frankly speaking, when we have to prioritize the budget and target, we cannot focus on the rests and some parts are not qualified at all, and it has become pressure. – R10
Incentives and its Unexpected/Undesired outcomes	An unintended, unanticipated, or unwanted result of actions initially meant to generate positive outcomes.	Apply to the statement by participants that - providing an incentive to farmers sometimes generates undesired outcomes.	Some villagers are just establishing the farms because they are given by the project free of charge, so they do not really care. The farms become unproductive as a result. So, when farmers do not pay attention and get nothing, it becomes the pressure for us. - R19
Job Satisfaction	The impression expressed by the participants regarding the accomplishments and work they or the project have made for the community.	Apply to the statement made by participants that they are satisfied or unsatisfied working on the project.	When I worked on that project, I was unsatisfied with the results. The project tried to give and do good for farmers, but I felt nothing was left after the project. After working on that project, I no longer want to work at an NGO. - R19.

Table 2 (cont'd)

What challenges do non-government extension workers face in resourcefully and meaningfully helping farmers?			
Code	**Definition**	**Rules**	**Examples**
Climate	This refers to the influence of climate on production capacity, especially rain's availability.	Apply when participant states heavy reliance on rain makes for a challenging cropping environment for farmers and development agencies attempting to promote certain agricultural practices effectively.	I felt the most pressure on that project because I was in charge of the demonstration section; we had to rely on the rain for everything. – R11
Factors influencing farmer's interest on promoted technologies (negative way)	Factors that negatively influence farmers' decisions regarding whether to apply the promoted technologies on their farms and their interest & willingness to participate in project activities.	Factors that negatively influence farmers' decisions regarding whether to apply the promoted technology.	Farmers' main interest is yield, there is no direct effect on yield increase after using the promoted technology for one year, so the farmer does not want to accept it. And while the majority of farmers pay attention to me when we try to educate them, they are not really engaged in doing it and still do not accept it. - R14
What changes might extensionists like to see in how the system works?			
Expectations	The views of participants on future changes they would want to see in the extension system, as well as suggestions for making it function more effectively.	Any text that describes how and what kinds of changes participants would like to see in the future extension system.	I think the project should add the farmers' needs to the project log frame and always update it. Even if an existing activity is intended to be implemented, we have to think carefully, like "Is it okay to do this?" We have to discuss this with local communities; otherwise, if what farmers want is different from what we want to give them, it is not good for all. - R3