

**THE NATIONAL UNIVERSITY OF LESOTHO**  
**FACULTY OF HUMANITIES**

**THE ROLE OF COMMUNICATION NETWORKS IN PROMOTING POTATO  
PRODUCTION AND MARKETING IN SEMONKONG, MASERU DISTRICT.**

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## DECLARATION

I, Ntlhonamo Khabisi Bokaako, do declare that to the best of my knowledge, this research paper is, in all honesty, originally initiated and done by me and has not been published for the requirement of Master of Humanities at the National University of Lesotho. Literature, data, and models done by other people or organisations and cited in the paper are all acknowledged accordingly and are included in the list of references. Finally, I, in addition, declare that I was authorised to undertake this research by the panel of the research committee of the National University of Lesotho.

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## LIST OF ACRONYMS

<b>AFDB</b>	African Development Bank
<b>AUC</b>	African Union Commission
<b>BOS</b>	Bureau of Statistics
<b>CBL</b>	Central Bank of Lesotho
<b>CIAT</b>	International Centre for Tropical Agriculture
<b>DCS</b>	Department of Crops Services
<b>FAO</b>	Food and Agriculture Organization
<b>GDP</b>	Gross Domestic Product
<b>GoL</b>	Government of Lesotho
<b>ICT</b>	Information Communication Technology
<b>IFAD</b>	International Fund for Agricultural Development
<b>IICD</b>	International Institute for Communication and Development
<b>ILO</b>	International Labour Organization
<b>LBoS</b>	Lesotho Bureau of Statistic
<b>LCA</b>	Lesotho Communications Authority
<b>LSP</b>	Lesotho Communications Policy
<b>LENAFU</b>	Lesotho National Farmers Union
<b>LENA</b>	Lesotho News Agency
<b>LVAC</b>	Lesotho Vulnerability Assessment Committee
<b>MDGs</b>	Millennium Development Goals
<b>NSDP</b>	National Strategic Development Plan
<b>NICs</b>	Newly Industrialized Countries
<b>PLA</b>	Potatoes Lesotho Association
<b>PEMS</b>	Paris Evangelical Missionary Society
<b>PRSP</b>	Poverty Reduction Strategy Papers
<b>RISDP</b>	Regional Indicative Strategic Development Plan
<b>SMU</b>	Seed Multiplication Unit
<b>SADC</b>	Southern African Development Community
<b>SPARS LES</b>	Strategic Plan for Agricultural and Rural Statistics in Lesotho

<b>SDGs</b>	Sustainable Development Goals
<b>SLA</b>	Sustainable Livelihoods Approach
<b>SLF</b>	Sustainable Livelihoods Framework
<b>TV</b>	Television
<b>UNESCO</b>	United Nations Educational, Scientific and Cultural Organization
<b>UNICEF</b>	United Nations Children's Fund
<b>UN</b>	United Nations
<b>WB</b>	World Bank
<b>WFP</b>	World Food Programme
<b>WHO</b>	World Health Organisation

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## ABSTRACT

Semonkong smallholder farmers' communication networks (telephone, television, radio, road, and internet) connect farmers to agricultural production and marketing in rural Lesotho. This study aimed to assess the role of communication networks in the production and marketing of potatoes among smallholder farmers in Semonkong, Lesotho. A mixed-method research design that combines quantitative and qualitative research methods is used. The study's research questions concentrated on the "how" and "what" of communication networks' effects on agricultural output. The research objectives include an examination of the role of communication networks in promoting agricultural production and marketing of farm produce, examination of how smallholder farmers access and use marketing technology in promoting farm produce in rural Lesotho, and to assessment of challenges that farmers face when attempting to access agriculture information in rural Lesotho.

The study's findings indicated that farmers with more expertise are far more likely to adopt agricultural practices that will boost their yield and enable them to participate in marketplaces. The research, therefore, suggests that the government of Lesotho increase its investment in the construction of Information Communication Technology (ICT) infrastructure. According to the literature, most farmers are hampered in accessing and disseminating agricultural information due to poor infrastructure, resulting in decreased potato yield and productivity. The results also show that extension staff provide the vast bulk of information delivery to farmers, accumulating educational skills, extension tools, and communication tools, farmers gain from communication networks. However, there are not enough extension agents working in the current environment to provide farmers with new technology. Information is been shared with many stakeholders involved in agricultural activities using information and communication technology (ICT) techniques.

It can be concluded that access to relevant information and knowledge is very important to improve agricultural performances and livelihoods in rural areas, especially in African countries. Agriculture-related innovations will change the way smallholder farmers practice, do business, and access advisory agricultural information. According to the reviewed literature, efforts to develop enabling policies that guide and support the use of ICT-related technologies must be strengthened.

# **CHAPTER ONE INTRODUCTION**

## **1.1 Introduction**

This chapter provides an overview of agricultural communication networks and farm produce throughout history. The specific goals were to investigate the contribution of communication networks to farm production and farm produce marketing, to assess how smallholder farmers in Semonkong, Maseru District access and use communication networks, and to assess the challenges that smallholder farmers face in terms of agricultural information.

## **1.2 Background to the study**

Communication network history proves that both developed, and Newly Industrialized Countries (NICs) can add value to development and economic growth (Hamelink, 2019). During the "first decade" of development, the 1960s, the objective expressed by Rostow's theory of economic growth stages was to make technology investments and foster economic growth. Agriculture, according to Dhahri and Omri (2020) is a key contributor to Gross Domestic Product (GDP) and jobs in developing countries. By giving users timely information, reducing transaction costs, and imparting useful knowledge to boost production, the networks have the potential to lower poverty and enhance livelihoods (Kenny, 2002). At the beginning of the twenty-first century, one of Africa's most important problems was poverty, which must be eradicated to achieve economic growth. Therefore, quick, and sustained growth is required for Africa (IbiAjayi, 2001).

In addition, the application of technology to agriculture, the most important sector in many African countries, offers opportunities for poverty reduction and economic advancement (Farrington et al., 2002). The importance of agricultural output, including agri-processing, is demonstrated by the region's population GDP, agricultural production portion of GDP, and agriculture's average contribution to total exports. According to Dutta and Bilbao-Osorio (2012), Africa will be the only continent that fails to meet the international community's Millennium Development Goals (MDGs) to end extreme poverty, famine, and diseases. Furthermore, African countries have had many difficulties including a lack of supportive infrastructure and very expensive service charges (Dutta and Bilbao-Osorio, 2012). As such, communication networks are essential for implementing initiatives meant to meet local information needs (May et al., 2007).

Adding to the history of communication networks, countries compete directly in an era of globalisation and rapid technological change. The importance of such countries is essentially defined by their ability to efficiently use information for structure, production, and marketing (Dzidonu, 2002). Global communication is now heavily reliant on communication networks. A network lattice was used to depict how the world is connected in the information age (Garnham and Mulgan, 1991). IbiAjayi (2001) argued that the key drivers of globalisation include both declining costs of communications and easy travel and communication. The world has become more global, with a global knowledge and information society encompassing all emerging regions. Thus, knowledge and information have evolved into critical components in the manufacture of goods and services (Malhan and Rao, 2007).

In terms of the widespread distribution of information and the benefits that it brings, technology has evolved greatly with the introduction of mobile phones and internet connections. The adoption of these technologies improves information flow among users by improving access to timely and trustworthy information and allowing entrepreneurs to carry out business operations more quickly (Thompson and Sonka, 1997). Based on the potential benefits, nations all over the world have sought to speed up the rate of technological diffusion (Nandi and Subramaniam, 2012). According to Ajayi (2002), the information and communication technology revolution has been the fundamental to globalisation. Neither developed nor developing nations can afford to miss out on the opportunities presented by the technologies.

Given the foregoing, the study's main argument centres around the impact of communication networks on farm produce, as well as that of marketing technological challenges on agricultural information sources (Mhlanga and Ndhlovu, 2020). As a result, the goal is to broaden and improve Lesotho's existing expertise in Information, Communication, and Technology (ICT). From the findings of the study, recommendations will be made to assist smallholder potato farmers, extension experts, and the Department of Agricultural policymakers in bridging knowledge gaps and connecting low-income farmers to profitable markets. This research would also benefit academics working in the fields related to the study. As a result, ICT has the potential to increase the flow of information among agricultural actors, as well as the transparency of agricultural exchange in rural areas (Apulu and Latham, 2011).

### **1.3 Statement of the problem**

Lesotho is faced with several challenges, which include Information Technology (IT), particularly in rural areas, which worsens and affects agricultural productivity and farm produce marketing. According to Mokotjo and Kalusopa (2010), Lesotho's agricultural productivity and its contribution to GDP have been dropping despite the government's considerable support for agriculture. Mojaki and Keregero (2019) indicate that farmers' needs for relevant learning materials and agricultural information are becoming widely acknowledged, yet they are not satisfied. This restricts the exchange of information, expertise, new technology adoption, and resources among system participants.

Furthermore, farming in Lesotho has several challenges. Lack of essential support services including road networks, communication infrastructure, and information-sharing platforms, among many other things, farmers are cut off from markets (Sadiq et al., 2020). Farmers' inability to market their products is one of the biggest restrictions to agricultural output. Product marketing necessitates infrastructure such as market information networks. Issues with communication networks can also contribute to decreased agricultural output (Mojaki and Keregero, 2019). According to Lesotho statistics, the worldwide poverty rate increased from 28.5 percent in 2019 to 31.2 percent in 2020. Like many African nations with low per capita incomes and economic limitations that prevent infrastructure investment, Lesotho has an underdeveloped infrastructure with inadequate service quality and coverage (Gillson and Strychacz, 2010).

### **1.4 Statement of the purpose**

This study aimed to assess the role of communication networks in the production and marketing of potatoes among smallholder farmers in Semonkong, Lesotho.

### **1.5 Specific research objectives**

The study thus set out to achieve the following objectives:

- To investigate the contribution of communication networks in promoting agricultural production and marketing of farm produce.
- To examine how smallholder farmers access and use marketing technology in promoting farm produce in rural Lesotho.
- To assess the challenges that affect farmers' access to agricultural information in rural Lesotho.

## **1.6 Specific research questions**

The study also aimed to answer the following specific questions:

- What is the contribution of communication networks in promoting agricultural production and marketing of farm produce?
- How do smallholder farmers access and use marketing technology in the promotion of farm produce?
- What are the challenges facing farmers in accessing Agriculture information?

## **1.7 Hypotheses**

- Communication networks contribute to the promotion of agricultural production and marketing of farm produce.
- Smallholder farmers access and use marketing technology to promote farm produce.
- Agricultural information sources pose challenges for smallholder farmers' farm produce.

## **1.8 Significance of the study**

In the literature, the researcher discovered no studies connected to the subject under study. It is thus worth researching the role of communication networks in agricultural production and marketing, and smallholders' access to the use of communication networks for policy development. The study would provide policymakers with relevant information on improving rural and promoting agriculture production and marketing. The study will also be likely useful in bridging the knowledge gap in communication networks, agricultural productivity, and farm produce marketing. Even if data about agricultural output and practices are available, most of many farmers, particularly those in distant places might not benefit from such information.

## **1.9 Assumptions of the study**

This study might provide future researchers, government, decision-makers, and service providers with information on communication networks to improve economic growth and rural livelihoods. With that, the respondents might not answer all the questions as honestly as possible in the interview guide. Apart from that, the assumption is that the respondents would likely become biased when answering the questions.

## **1.10 Delimitations of the Study**

The research is limited to one site in Semonkong, Maseru District. In addition, the different geographical areas might be another limiting factor. Because of time, money, and human resource constraints, the study could cover all the different locations. It was limited only to



Semonkong potato smallholder farmers and extensions. Because of time farmers union members, non-members, consumers, sellers/retailers, and shop owners who can produce and sell potatoes have been excluded. This research is limited to a few types of communication networks: mobile phone, WhatsApp, television, radio, road, and internet networks.

## **1.11 Defining key terms.**

### ***1.11.1 Communication networks***

According to Rogers (2013), a communication network is a relationship that develops between people in which the exchange of information and communication is described by a certain structure, which is established by groupings and their connections. Awan et al. (2017) define communication networks as the interactional patterns introduced by the exchange of information among communicators throughout time and space. For Prell (2012), the communication network is a collection of relationships comprised of a group of "actors" in which information is exchanged between the players in the relationship, which is assessed as relationship relations.

### ***1.11.2 Agricultural Information System***

An information system (IS), according to Bouchelouche et al. (2021), is a group of interconnected components that gather, process, store, and transmit information while also offering a feedback mechanism. An agricultural information system also generates, modifies, transfers, consolidates, receives, and feedback on agricultural data to help agricultural producers use such information (Rolling, 1988).

### ***1.11.3 Agricultural information***

Ndimbwa *et al.* (2019) view agricultural information as a channel for converting agricultural technologies and procedures into smallholder farmers via appropriate media to increase productivity and sustainability. Taking up the point, Kacharo (2007;27) see agricultural information as "*any information that can be utilized without the acquiring of a particular physical technology.*" Agriculture information, according to Adio et al. (2016;1456), is "*horticulture-related information*" that has been changed into crucial and helpful settings or structures for viable interactions in agribusiness or associated activities. Agricultural information according to Kursat (2010), is also characterized as a critical factor that communicates with other productive resources such as land, labour, capital, and strategy direction.

#### ***1.11.4 Production***

Lova Raju and Vijayaraghavan (2020) define production as the process of combining numerous material and immaterial inputs to make something for consumption (the output). It is the act of producing a worthwhile good or service that enhances the lives of others. Martey et al. (2014) further describe production as the process through which a corporation changes inputs into outputs.

#### ***1.11.5 Agricultural marketing***

According to Selvaraj and Ibrahim (2012), agricultural marketing is defined as the commercial functions required to transmit farm, horticultural, and other retail sales from a producer to a consumer. Agricultural marketing can alternatively be defined as the commercial functions involved in the movement of farm, horticultural, and other allied products from a producer to a consumer (Vadivelu and Kiran, 2013). Moreover, agricultural marketing is a procedure starting with the choice to create a marketable farm product. Founded on technical and financial factors, it incorporates all sides of the institutional and functional market structures of the system (Nasiru et al., 2012). Also based on technical and economic factors, agricultural marketing is a process that begins with the decision to create a saleable agricultural commodity and encompasses all parts of the market structure of the system, both functional and institutional (Otekunrin et al., 2019).

#### ***1.11.6 Smallholder farmers***

According to Gc and Hall (2020), smallholder farmers cultivate crops for both domestic consumption and the market while also making a living from their farms. Smallholder farmers are people who cultivate one or two farm products and one or more subsistence crops on small plots of land primarily with family labour (Sabo et al., 2017). Smallholder farmers also cultivate subsistence crops and sporadic commercial crops on tiny parcels of land under their control. With obsolete technology, basic production processes, poor earnings, and seasonal labour changes, such farmers rely on family labour (Kansanga et al., 2019).

#### ***1.11.7 Livelihood***

Ellis (2000) defined livelihood as more than just purchasing or creating a place to live, moving money around, and producing food to eat or trading in the marketplace. On the other hand, livelihood is defined by Islam and Ryan (2016) as the means and methods of making a living in the world. Included here are such resources as land, crops, seeds, labour, knowledge, animals, money, and social ties (Murray, 2001).

## **1.12 Study Organization**

This research study comprises 6 chapters. Chapter 1 presents an Introduction to the study, the Background to the study, the Statement of the problem, the Aim, Objectives, Significance of the study and Study organization.

Chapter 2 presents the conceptual and theoretical literature on the role of communication networks in the production and marketing of potatoes among smallholder farmers in Semonkong, Lesotho.

Chapter 3 presents and discusses the Lesotho literature the role of communication networks in the production and marketing.

Chapter 4 is the methodological approach used in undertaking this research.

Chapter 5 presents the collected data and its interpretation. Also discusses the findings in relation to the objectives of the study, the literature and theory and makes an analysis with regards to the aim of the study.

Chapter 6 presents the conclusions drawn from the findings and makes some recommendations.

**CHAPTER TWO**  
**THE ROLE OF COMMUNICATION NETWORKS IN PROMOTING**  
**AGRICULTURE IN DEVELOPING COUNTRIES: LITERATURE REVIEW**

**2.1 Introduction**

This chapter describes the theoretical and conceptual frameworks underpinning this study. Specifically, the use and gratification theory as well as the conceptual framework on innovation diffusion and sustainable livelihoods is considered. The chapter also examines the empirical literature on the role of communication networks in the introduction and widespread acceptance of potato production and marketing technology, as well as the impact that potato marketing technology farmers have in terms of accessibility and use. Finally, the chapter ends by considering the problems encountered by smallholder farmers with information sources.

**2.2 Theoretical structure**

In the 1940s, Katz et al. (1974) developed the Uses and Gratification Theory (UGT) as a framework for understanding why and how individuals use different types of media. Included were the requirements to be fulfilled and the satisfaction with utilising the media. Furthermore, according to UGT, information consumers actively seek out media providers to satisfy their information demands, as opposed to passively scanning through media. Users can select media providers that assist them in satisfying their desires for fulfillment, thus meeting their specific daily information needs (Katz et al., 1974). From the UGT perspective, information technologists acquire a greater understanding of the information needs of consumers to determine whether, how, and by what methods information should be generated and packaged to meet their demands (Masele, 2022).

Asemah (2011) claims that the theory stresses what people do with communication content rather than what it does to them. Instead of what the media do to individuals, it focuses on what people do with the media. The idea is used in this study because the media's coverage and message will influence whether smallholder farmers favour them. For knowledge of agriculture and modern agricultural technologies, farmers should rely only on the media. The theory, therefore, applies to this investigation.

### 2.3 Conceptual framework

This section uses diffusion innovation as a framework. The following narrative describes how the framework directs the research. It explains principles relevant to this study and how they are applied, considering the framework that informs the study.

Dissemination is a mechanism using people who become increasingly aware of innovation over time via specialised channels in a community (Rogers, 2003). The diffusion theory is linked to the critical theory which was developed by rural sociologists in the United States. The theory describes the process of change, such as the diffusion of innovations in society (Mardiana and Kembauw, 2021). Kembauw and Mardiana continue to state that the concept aims to anticipate the behaviour of people and communities adopting new ideas by considering their traits, social interactions, the time factor, and the characteristics of the innovation. The process of passing on new ideas to members of a community is referred to as diffusion. As Rice (2011:1) put it, diffusion is described as:

*“The method by which an innovation (a concept, good, technology, process, or service) spreads quickly, roughly in the same way, through mass and digital media as well as interpersonal and network communication, over time, through a community, with many different implications”.*

Scott and McGuire (2017) described diffusion as the method by which an innovation (a concept, good, technology, process, or service) spreads quickly, roughly in the same way, through mass and digital media as well as interpersonal and network communication, over time, through a community, with many different implications.

For Rogers (2003), "A technology is an instrumental action design that eliminates the potential for error in the causal connections involved in achieving a desired outcome."

Time enters the diffusion process in three ways. First, it incorporates innovation decision-making, which is a mental process that involves acquiring knowledge about innovation, creating an opinion about it, deciding whether to accept or oppose it and then adopting and validating the choice. In the five stages of the innovation-choice process, a smallholder farmer seeks information: knowledge, persuasion, decision, execution, and approval. Second, a farmer or other unit of implementation takes longer than other members of a community to absorb ideas. Wani and Ali (2015) define innovation as an object or an idea perceived as novel for a specific community or a group of people. Thus, the dissemination of innovations consists of four elements: innovation, the communication channels through which the novel idea is

communicated, time, and the social system. The usage of communication channels and how information is transmitted within a social system are influenced by the framing of agricultural communication as a tool for informing farmers about new technologies (Rogers, 2003).

The diffusion of innovations, which is frequently the metric of interest, is the rate at which innovations are adopted within a group or population (Ross, 2012). The mechanism of information exchange, Rogers (1983) emphasised the significance of neighbour networks in the diffusion of innovations. Adopters of social systems fall into one of five categories: People who are innovative take risks and are the first to test out new ideas. Potato marketers make heavy use of the diffusion of innovations hypothesis to promote potato consumption.

Early adopters are those who are eager to explore new technologies and evaluate their usefulness in society. In such instances, potato marketers usually start with a small group of people who are interested in potato cultivation and marketing. These early adopters oversee spreading the news about the benefits of potatoes to a wider audience (Rogers, 1998). Ordinary people pave the way for applying innovation to society. After the early majority, the late majority is a subset of the whole population that incorporates innovation into their daily lives. Laggards are persons who are slower to accept new products and ideas than the rest of society (Wani and Ali, 2015). Rogers (1998) asserts that networks facilitate the flow of information and that the characteristics of networks, besides the functions played by opinion leaders at home, determine the probability that an idea will be accepted.

#### **2.4 Sustainable Livelihood Approaches**

According to Chambers and Conway (1992), a person's livelihood is their means of subsistence. Land, crops, seeds, labour, skills, animals, money, and social ties are examples of livelihoods (Murray, 2001). Ashley and Carney (1999) define "a livelihood comprises the capabilities, assets, and activities required for a means of subsistence." *The term "livelihood"* refers to the critical factors that influence the susceptibility or robustness of a person's or loved ones' strategies for survival (Allison and Ellis, 2001). Long-term livelihoods result from an ability to use a diverse range of economic resources, which are generally associated with the pursuit of prawn farming activities.

This study uses the sustainable livelihoods approach (SLA) to comprehend the long-term impact of communication networks on rural livelihoods. The SLA framework examines the key to the lifestyles of the poor as well as the connections between these factors (Carney, 2003). The definition of SLA according to Chambers and Conway (1992:16) is as follows:

*“A livelihood is made up of the abilities, assets (stores, claims, and access), and activities necessary to make a living; a livelihood is sustainable if it can withstand stress and shocks, recover from them, maintain, or increase its strengths and resources, and offer opportunities for a sustainable livelihood to the following generation. Additionally, both locally and globally, a sustainable livelihood provides net advantages to other livelihoods”.*

The study considers how people make a livelihood, particularly the poor, with the SLA investigating the dangers facing vulnerable people, as well as the tactics taken to achieve life goals such as higher household income. The framework demonstrates how having access to a variety of livelihood assets, paired with a variety of livelihood methods, can result in sustainable livelihoods in several situations. The Sustainable Livelihood Approach Mbatha et al., (2021) is essential for determining how much subsistence farming contributes to rural people's ability for self-support. Adoption of the SLA will benefit this study since it will help to clarify some of the variables and complexities involved in measuring the function of communication networks in agricultural production and rural community marketing. Government decision-makers, policymakers, and farmers are all potential users of agricultural information.

## **2.5. The role of communication technologies in promoting agriculture in developing countries**

For the distribution of formally obtained agricultural management information, communication networks are crucial (Kiptot et al., 2006). Kumar et al. (2015) further see communication networks as necessary for interaction and knowledge exchange among subsystem members. In this view, communication networks are critical for understanding interventions related to local information demands, and they become even more critical when dealing with issues involving raising awareness of the eventual shift and its implications for agriculture (Kumar et al., 2015). The adoption and distribution of innovations continue to be the foundation of the anticipated development in agriculture (Liu et al., 2020). Olowu (1998) pointed out that one requirement for sustainable agricultural production is the development and manufacture of appropriate technology.

### ***2.5.1 The Contribution of mobile networks in agricultural production and marketing in rural areas***

Firstly, mobile phones are used to transmit agricultural information, which has the potential to boost output by connecting farmers with appealing prospects (Asenso-Okyere and Mekonnen,

2012). As an effective medium for communicating information to many levels of society, mobile phones are rated as one of the best sources among farmers (May and Hearn, 2005). Mobile phones are also useful instruments for communicating information to people from all walks of life (Razaque and Sallah, 2013).

Furthermore, Mittal and Mehar (2012) also pointed out that mobile phones are utilized to convey information used in farming and marketing, as well as farmer demands. According to Aker and Mbiti (2010), mobile phones may also enable faster, more reliable, and consistent access to information, thereby influencing the present communication ecologies. For instance, mobile technology has been adopted more quickly than any other ICT in South Africa (Nwafor and Nwafor, 2020). About twenty-to-twenty-two million South Africans use smartphones today, making up around one-third of the nation's population (O'Dea, 2020).

Additionally, developing nations have increasingly been using mobile phones as tools for communication and information access (Gray et al., 2020). The World Bank (2016) reported that 60% of the people in Sub-Saharan African countries are currently accessing mobile phones as an ICT. Aker and Ksoll (2016) also claimed that farmers who have access to cell phones learn about the number of crops they are cultivating, leading to an increase in the number of cash crops produced from one to at least two. According to the most recent figures, 4.68 billion people worldwide were expected to own a mobile phone by 2018 (Aarons and Willis, 2022). Mobile phones are widely used as a medium of communication for accessing agricultural information (Rahman et al., 2020).

Secondly, for Sife et al. (2010), the fundamental benefit of phone use is that it gives farmers in remote areas access to improved markets and pricing for what they produce. Farmers use mobile phones to contact clients and buyers directly to sell their produce at reasonable prices (Atiso et al., 2021). Farmers can also market their wares using a mobile platform where potential buyers can contact them (Ifeoma and Mthitwa2015). Cell phones, enable farmers to rapidly get price information and are particularly valuable when deciding whether to sell products and animals (Aker and Mbiti, 2010).

Additionally, farmers may share information and exchange agricultural products from the local to the administrative levels thanks to mobile phones (Ogutu et al., 2014). Sife et al. (2010) continue to argue that mobile phones aid rural traders and farmers, saving time and money,



securing better markets and pricing, and promptly sharing business-related information. Farmers may easily access market prices across a large area using mobile phone connectivity, and they can compare pricing to make informed decisions (Rathod et al., 2016). Furthermore, as the number of phones on the market grows, smallholder farmers would break the feedback loop by transmitting information to markets rather than simply consuming the products (Balana and Oyeyemi, 2020).

According to Atiso et al. (2021), mobile phones are used to convey information on producers' demands, knowledge used for agriculture and marketing, and other forms of information. The capacity of rural farmers to use phones to locate improved marketplaces and prices for their products benefited them in addressing challenges and making crucial information available to the agricultural community, resulting in increased output and productivity and higher returns (Kameswari et al., 2011). Farmers can utilize their mobile phones to contact clients and purchasers directly to market their produce (Yu and Zhang, 2022). Kameswari et al. (2011) further pointed out that mobile phones solve problems and ease the dissemination of essential information to the farming community, hence enhancing output, productivity, and returns.

Thirdly, a mobile phone is a crucial communication tool that assists farmers in successfully networking (Panda et al., 2019). As a result, Africa is going through a mobile phone revolution, with the number of mobile phones rapidly increasing (World Bank, 2008). Mobile phones, for example, are being marketed as digital platforms capable of reaching many farmers in rural areas at the same time (Mansour, 2022). Mobile phones are commonly used as a potentially revolutionary technological platform in developing nations (Abdulai and Fraser, 2023). Mobile phones are also becoming more widely available, more affordable, and capable of running a diverse range of applications regularly (Rohini et al., 2022). In most people's daily lives around the world, mobile phone technology has become the most frequent form of communication according to (Rahman et al., 2020).

Finally, with cell phone technology, the low extension-to-farmer ratio can now be overcome, as can the rapid transfer of agricultural knowledge (Ibeawuchi et al., 2021). Deichmann et al. (2016) claim that offering extension services via cell phones is quickly rising to the top of the list of the most well-liked and dependable ways to notify smallholder farmers about pertinent information. For Razaque and Sallah (2013), using information and communication technology significantly increases the reach of agricultural extension.

### ***2.5.2 Challenges of mobile phone network***

According to Razaque and Sallah (2013), producers' use of mobile phones contributes to their illiteracy problem. Digital illiteracy is one of the biggest barriers to farmers' use of mobile devices (Khan et al., 2020). Additionally, Kabirigi et al. (2022) hinted that one of the biggest obstacles for rural farmers using smartphones is illiteracy. High dropout rates are a result of the farmers' lack of knowledge and experience (Magala et al., 2019). Using mobile applications can be challenging for rural residents due to language barriers and illiteracy (Matuha et al., 2016). Illiteracy is a barrier to farmers adopting mobile phones, (Mansour, 2022). For instance, most farmers in Ethiopia are illiterate, and lacking in English language reading skills (Ayim et al., 2022). Since most mobile phone settings are in English, farmers frequently struggle to read and comprehend mobile SMS and even find calling challenging (Alhassan and Shehu, 2019).

Farmers in underdeveloped nations experience constraints and obstacles while using mobile phones, such as high phone costs and concerns about network availability (Rahman et al., 2020). Lack of knowledge and competence, expensive cell phone charges, and network issues related to cell phone use (Razaque and Sallah, 2013). Similarly, mobile phones remain expensive for impoverished farmers, entrepreneurs, and/or business owners in many developing nations. Such high costs of smartphones have posed challenges for smallholder farmers (Sennuga et al., 2020; Kabirigi et al., 2022; Magala et al., 2019).

An inadequate network is a challenge to rural communities (Magala et al., 2019). The weak signal of the network service provider in the area is also challenging (Kenneth, 2010). Furthermore, Razaque and Sallah (2013) highlighted a scarcity of mobile phone signals, and infrastructure service delivery in various countries, thus causing difficulty in evaluating their social and economic repercussions. Lack of mobile network coverage, unstable electricity to charge mobile phones, and insufficient mobile phone awareness have also been reported (Magala et al., 2019). In some rural areas of Malawi, low network coverage has reduced access to mobile phones due to weak or non-existent mobile phone signals (Byers et al., 2011).

### ***2.5.3 The use of radio networks in agricultural production and marketing***

The radio is one of the most popular platforms for reaching rural populations across the continent (Sullivan, 2019). Bosch (2014) indicates that radio is a global and diverse mode of communication that can be used to help society; it is also used as a learning tool in development and literacy initiatives. According to Fombad and Jiyane (2019), the radio is the most crucial

means of communication for spreading information in African nations. As a key medium for spreading communication, the radio is used as the most efficient mode of interpersonal communication and a major source of news and entertainment for the general population (Sullivan, 2019; Das et al., 2021). Furthermore, radio has proved a trustworthy and significant source of news and entertainment that encourages local participation in the communication process (Bosch, 2014).

As Nwaerendu and Thompson (1987) posit, radio is used as a popular mode of communication in poor countries, where it is used to support programmes in education, health, literacy, nutrition, and agricultural skills. For example, radio is used as a popular mode of communication among Nigerian farmers (Opara, 2008). Radio networks are the most widely used agricultural communication and information-gathering tool among farmers, notably for crop selling (Chhachhar et al., 2014). Radio is also used to promote agricultural products (Manda and Chapota, 2015). Furthermore, Chhachhar et al. (2014) point out that one of the best forms of communication is the radio for disseminating knowledge in the fields of sociology, economics, culture, and agriculture.

In addition, farmers accept new agricultural technologies, through the radio also raises awareness of new ones and advances knowledge (Nirmala, 2018). Along with various newspapers that publish agricultural-related articles and publications, the radio is essentially used for obtaining agricultural information for farmers (Ogola, 2015). The radio is also used to deliver agricultural supplies to smallholder farmers (Amin et al., 2018). Radio, as indicated by Narine et al., (2019), is a crucial tool farmers use to employ gathering crucial agricultural information. Furthermore, the radio also promotes cultural, political, and economic empowerment, while also creating awareness, giving information and education, and strengthening communities (Nirmala, 2018).

For connecting rural farmers to agricultural information sources, radio is a well-known extension service technique (Funom, 2021). Radio also serves as an extension tool that enhances a communication strategy (Davis et al., 2018). According to Chapman et al. (2003), radio is also utilized as a tool for extension services that connect farmers to agricultural information sources and dramatically raise agricultural productivity and commercialization. In Parvizian et al.'s (2011) view, using the rural radio to engage with uneducated farmers and disseminating information on all areas of farming in a language would be a crucial extension tool. Many individuals can be reached through radio, especially in rural areas where most

families reside (Adamides and Stylianou, 2018). Sharma (2008) sees the radio as a dependable medium that can reach a huge audience and cover a wider geographical area. In this way, the radio also has the greatest geographical reach and audience (Hailu et al., 2018). Large audiences, young and old, especially those in isolated, underdeveloped, and underprivileged areas of emerging countries, can be reached by the radio (Alhassan and Shehu, 2019). Radio stations have a better chance of reaching more people at once since satellites and antennas enable transmission (Wahab et al., 2022). According to Crawford and Okigbo (2014), many development communicators view the radio as the only mass medium that reaches all social strata.

According to Alhassan and Shehu, (2019), the radio is crucial in providing farmers with market information so they can increase their market bargaining power, take advantage of market opportunities, and make wise marketing decisions. Farmers allocate production resources more effectively and use the information to decide on marketing their products through the radio (Asenso-Okyere and Mekonnen, 2012). Providing farmers with timely market information, the radio is significant for spreading market information in underdeveloped nations (Kae, 2019; Njelekela and Sanga, 2015).

An excellent medium for transmitting agricultural information, such as new developments and efficient methods, the radio can assist farmers in increasing production (Gentles et al., 2015). Radio is recognised as a method for promoting information dissemination to people. The radio wave information, according to Msangi, (2020), has the potential to contribute to the worldwide dissemination of news, information, and enlightenment. Farmers in Africa can swiftly and effectively acquire agricultural information through the radio, particularly participatory programming (Chapman et al., 2003). Radio broadcasts are effective and can be used to encourage farmers to actively participate in agricultural extension initiatives (Angwenyi, 2016).

Besides disseminating agricultural information, the radio rapidly disseminates development information to a large, geographically dispersed audience in domains such as agriculture policy promotion (Amin et al. 2018; Mhlaba and Yusuf, 2020). According to Alhassan and Shehu (2019), the radio is the most effective method of communicating with people and the key means of delivering entertainment and farming information to producers even in poor nations. Furthermore, Ayariga (2022) argues that the radio can spread important information about improved harvesting practices, soil conservation strategies, handling after harvesting, using improved seeds, and timing of planting.

#### ***2.5.4 Challenges of radio network***

Radio transmission and messaging are challenging since rural farmers sometimes lack literacy or never attended school (Wei and Claire, 2022). Nirmala (2018) asserts that low-cost radio access could be vital for reaching out to illiterate or barely literate farmers in rural areas. The radio should address issues such as illiteracy, ignorance, and limited information centres, including a shortage of extension agents (Bhavanishankar Naik and Bankapur, 2021).

The language barrier prevents smallholder farmers from fully adopting ICT to acquire agricultural information (Blumler and Katz, 1974). According to Wei and Claire (2022), the radio's language and speed were a challenge to the division's students, thus obstructing the programme.

As Familusi and Owoeye (2014) stated, poor signals restrict farmers from receiving information via the radio and other modes of transmission. Because of poor quality network and signal intensity, listeners cannot tune in and understand the information being delivered from the radio (Ribba, 2019). While the radio could reach many rural households, batteries, and energy are not always available, thus rendering coverage infeasible (Chhachhar et al., 2014). Other challenges include limited and irrelevant information coupled with weak television signal (Wei and Claire, 2022). In addition, with restricted radio network coverage, network speed is slow, despite using dedicated costly broadband lines (Wei and Claire, 2022).

#### ***2.5.5 Importance of road networks in improving agricultural production and marketing***

Agricultural products benefit from low prices due to the ease with which people and goods can move around because of excellent road transportation (Chukwu, 2019). According to Olorunfemi (2020), road transportation infrastructure provides adequate channels for the distribution and transit of agricultural commodity. A solid road network can improve agricultural distribution and offer new options for agricultural trade (Phuu, 2022). Agricultural products benefit from low prices due to the ease with which people and goods can move around because of excellent road transportation (Chukwu, 2019).

Rural communities are linked to market centres that sell agricultural and industrial products via the road network (Musonda, 2020). A road network expands agricultural trade markets and increases agricultural product distribution (Phuu, 2022). Musonda (2020), continues to indicate that a road network reduces the cost of transport, and improves farm product delivery, thus enhancing agricultural production and distribution. According to Crossley et al. (2009),

transportation is key to the agricultural industry. The road network is crucial for the selling of agricultural products (Wudad et al., 2021). Crossley et al. (2009) demonstrated further the movement of farm products to markets. A rural road network encourages an effective distribution of crops and farm inputs and the sale of finished goods to customers (Olorunfemi, 2020). Furthermore, Musonda (2020) contends that good infrastructure contributes to market expansion, and economies of scale, and improves factor market performance.

In addition, African road networks play a significant role in easing labour mobility for enterprises and creating a market for locally produced commodities (Nguimkeu and Okou, 2021). Rural transportation is crucial for farm produce evacuation and sale (Musonda, 2020). Furthermore, farmers can move their agricultural produce to markets. Transport sets up new economic areas, generates a market for produce from agriculture, and increases connectivity between geographical and commercial areas. Wudad et al. (2021) stated that farming communities rely on a transportation network for internal travel as well as connecting rural areas to marketplaces where they can sell agricultural products and obtain manufactured things.

According to Ejike (2021), it is impossible to overstate the significance of transportation in the distribution of agricultural products, commercial activities, and other activities that have an impact on people. Concurring, Musonda (2020) views the global road network as contributing to the smooth operation of all sectors. Rural roads in Sub-Saharan Africa (SSA) assist the effective distribution of central government programmes to rural populations, thus providing access to social, health, and educational resources (Ngezahayo et al., 2019).

### ***2.5.6 Challenges of the road networks***

Poor agricultural extension services and limited knowledge of modern farming methods and technology stem from inadequate road networks and communication services. As such, agricultural productivity invariably declines (Olorunfemi, 2020).

Losses of horticultural products have been recorded due to poor road networks and a lack of market knowledge (Wudad et al., 2021). As noted earlier, bad road conditions prevent vegetable commodities from reaching the market, hurting household livelihoods and income (Mhlanga and Ndhlovu, 2020). Farmers hardly reach their farms, transport fertilisers and even convey food to local markets due to the poor quality of rural roads. In the same vein, poor people cannot reach markets and services because of their substandard living conditions and a

lack of essential infrastructure like roads and transportation (Starkey and Hine, 2020; Wudad et al., 2021).

In addition, Olorunfemi (2020) argued that poor roads increase perishable product waste and deter many people from farming, with cumbersome transportation also impeding goods from reaching the market on time. Most farmers lack access to market information such as prices, marketing policies, and places where to find competent buyers and brokers. All these pose challenges for farmers in developing countries (Chhachhar and Memon, 2019).

Poor road accessibility and insufficient roads enhance transportation costs, limiting access to high-quality inputs and reducing product sales in local markets (Wudad et al., 2021). Poor road conditions force subsistence agricultural producers to pay high transportation expenses, which drive up input costs and restrict access to future markets, resulting in low productivity, poor education, and bad health, all of which impede economic growth (Ibrahim, 2020). Besides, inadequate infrastructure, a weak transportation system due to lousy roads, and high production costs are problematic. According to Chukwu (2019), agriculture loses appeal because of the high cost of travel and product movement caused by a lack of infrastructure. For agricultural producers and consumers, high transaction costs result from underdeveloped infrastructure and rural services (Angwenyi, 2016).

### ***2.5.7 The use of television networks in agriculture production and marketing***

According to Chhachhar et al. (2014), television plays an essential role in agricultural information dissemination. Furthermore, Chhachhar *et al.* (2014) argue that television provides farmers with current information through talks between agricultural specialists and disseminates scientific and agricultural knowledge. Television has been crucial for spreading agricultural information in India and Ethiopia (Ayim et al., 2022). Chhachhar also maintains that television is a useful medium for communicating with farmers to quickly disseminate agricultural knowledge.

Chhachhar et al. (2014) claimed that a suitable information communication technological instrument, such as television, which is a popular communication medium among farmers for using and sharing agricultural information may be used to impart knowledge about agriculture. For example, television serves as one of the most effective and widely used types of exchange since farmers can observe programmes and quickly learn new practices (Das et al., 2021). In addition, television offers farmers current information and conveys technological and

agricultural knowledge (Ayim et al., 2022). Television is an efficient means of communicating agricultural information to farmers (Chhachhar et al., 2014). Today, TV is an essential and effective information and communication tool, used for communicating agricultural information to farming communities. It is one of the most powerful communication channels, capable of transmitting information quickly and easily to a large audience across large geographical areas. The effective usage of television would also assist the area's smallholder farmers in obtaining various information that is crucial for agricultural production (Kumar et al., 2023).

Farmers easily obtain information by watching agriculture-related television programmes (Chhachhar et al., 2014). According to Sule et al. (2021), television is an effective tool for farmers to share agricultural knowledge. Television assists various stakeholders in giving information about various topics, while farmers also profit from this technology and gain agricultural knowledge (Chhachhar et al., 2014). Farmers, for example, prefer to watch television and find out weather and market information daily (Ayim et al., 2022). Chhachhar et al. (2014), argued, giving farmers the most recent information, other technologies are needed for agricultural knowledge obtained through television.

Television, which can efficiently spread knowledge about agriculture throughout farming communities, is one of the most significant and effective information and communication technologies now accessible (Ayim et al., 2022). As a suitable information and communication technology tool, television can transfer knowledge about agriculture (Chhachhar et al., 2014). Farmers may immediately view while learning about a variety of techniques and pesticides on television, one of the best and fastest-growing forms of communication (Kumar et al., 2023).

Agricultural technology awareness and knowledge among farmers have increased on television. Most of the population relies on the media for information on education, health, and agriculture, with television offering such programmes that pique the audience's attention (Rangayasami and Kannan, 2022). Rangayasami has also shown that farmers are now more knowledgeable about agricultural technologies.

Television creates programmes that stimulate the public's interest, and most of the populace relies on media sources for educational, health, and agricultural information (Rangayasami and Kannan, 2022). Because individuals may easily gain knowledge that improves their educational skills by viewing instructional programmes about wellness as well as agricultural growth, television is becoming increasingly popular among the general population. Farmers can learn



by watching agricultural-related television programmes (Kumar et al, 2023). The appropriate use of television might additionally assist the region's small-scale farmers in receiving important information for increasing agricultural productivity. Farmers' awareness and knowledge of agricultural processes have increased because of television (Ayim et al., 2022; Chhachhar et al., 2014).

#### ***2.5.8 Challenges of television networks***

Challenges with accessibility to television show the content of agriculturally relevant television shows as overlooking agricultural activities. In addition, farmers do not increase agricultural production to better their socioeconomic conditions if they are not given enough information about agricultural activities. Farmers nowadays face obstacles to modern technology, especially due to inadequate infrastructural development, poor information transmission using new technology, and little education about using new technologies (Alan et al., 2021; Chhachhar et al., 2014). Television and radio are two examples of communication channels that can be effective in distributing agricultural information to farmers in rural areas. As a result, rural television has been and will continue to be the most successful medium for rural communication and development (Chhachhar et al., 2014).

Farmers' education is inadequate in several nations, including India, Pakistan, Bangladesh, and Sri Lanka (Nazari and Hasbullah, 2005). For example, poor communication infrastructure has impeded access to modern farming information mediums. In addition, most mainstream media sources use languages unfamiliar to farmers, and illiteracy exacerbates the situation (Alan et al., 2021).

#### ***2.5.9 Importance of internet networks in promoting agricultural production and marketing***

Parvizian et al. (2011) argued that the Internet is crucial in the transfer of agricultural knowledge and the adoption of new technologies. A commonly used marketing technique that can assist any business in advertising its products. Furthermore, mobile ICT for marketing and selling to interact with potential clients can raise awareness of the items and services offered. Entrepreneurs can now conduct online meetings with shareholders and competitors from any location in the world thanks to mobile ICT (Parvizian et al., 2011). Furthermore, Parvizian et al. continue to indicate that Internet marketing and online shopping have developed into essential company interests and skills across all industrial use extends because of the Internet's transformation into the primary corporate playground and the most popular form of communication. This has led to the establishment of new standards and obligations for both

the supply and demand of the market. For anyone interested in learning more about agriculture and related subjects, the Internet is a great resource (Burke and Sewake, 2008).

The most crucial communication methods for farmers to learn about agriculture are the Internet, cell phones, radio, and television (Hansen and Bøgh, 2021). The Internet is crucial for distance learning and offers decreased communication costs through less expensive options such as emails, instant messaging, and social networking sites (Chhetri, 2016; Pankomera and van Greunen, 2019).

#### ***2.5.10 Challenges of internet networks***

Limited access to Internet-enabled devices due to the high costs involved in using the system (Magala et al., 2019). Thapa et al. (2020), indicate that the internet has weak data integration. Given that consumer data is used to collect agricultural data, using big data in agriculture is challenging. A further obstacle to fully using agricultural big data is secure data sharing across numerous stakeholders (Liu et al., 2020).

### **2.6 Marketing technology accessibility and use to smallholder farmers.**

To increase agricultural output, farmers need access to agricultural information (Adomi et al., 2003). Investment in food production has been critical to the industrial revolution since the green revolution (Inegbedion et al., 2020). Modern agriculture has become knowledge intensive. Increasing agricultural output and productivity requires access to adequate and accurate information (Madhavan, 2017). ICTs can be employed in virtually every aspect of agricultural production and farm management, and they can also revolutionise marketing, production, a most importantly the exchange of knowledge and information within the industry.

Ogotu et al. (2014) demonstrated that traders and farmers profit from market knowledge. Farmers in poor nations rarely receive information on market prices, traded quantities, and other marketing-related issues. Marketing demands enable farmers to organise their market items to reduce any excesses (Obidike, 2011). Included is information on product planning, current commodity pricing, a sales timetable, and information on more successful marketing methods. Furthermore, Information Communication Technology (ICT) assists the community by boosting market access through real-time market prices, weather forecasts, pest information, seed varieties, and planting procedures (Ogotu et al., 2014).

Production planning to fulfill demands and market prospects is the first step in agricultural product marketing (Oluwatayo et al., 2021). Availability of information on every aspect of

farming, processing, and selling is required for effective agricultural development, as it is essential for other economic sectors. Seen as the foundation for many African governments, agriculture is the primary source of economic growth in Sub-Saharan Africa (Oluwatayo et al., 2021). Market information is becoming increasingly significant for providing farmers with up-to-date agricultural information and allowing them to capitalise on opportunities intended to boost their income and well-being (Sehar, 2018).

With adequate facilities and incentives regarding agricultural productivity and marketing, smallholder farmers can increase the value of their produce (Dorward et al., 2003). The government has, however, mostly ignored agricultural output marketing despite its potential for agricultural development and industry. According to Khan et al. (2020), most of the agricultural products in the market were food crops, which supports his classification of the rural areas of the nation as serving as the immediate hinterlands to produce food crops for the country's urban markets and the distribution of manufactured goods from the urban core.

## **2.7 Communication network challenges that affect smallholder farmers.**

### ***2.7.1 Inadequate knowledge of rural farmers' agricultural information needs***

In rural farming communities in Sub-Saharan Africa (SSA), a lack of information and knowledge transmission might hinder agricultural production (Sife et al., 2010). Understanding the information requirements of rural farmers is essential if one were to offer internet-based information services. Farmers' information demands may be specialised and assist in using appropriate techniques and online information systems (Khan et al., 2021).

### ***2.7.2 Limited farmers' education level***

According to Lukungu (2022), rural people, the majority of whom are illiterate, require information to make informed decisions and participate actively in national development including agriculture. Musingafi et al. (2015) also argued that capacity-building is crucial for society's acceptance, adoption, and usage of ICTs. Illiteracy technical deficiency and a dearth of practical digital material have reportedly hindered the use of communication technology (Khan et al., 2021).

### ***2.7.3 Inadequate source income***

Smallholder productivity is crucial for raising income. As enhancing rural poor people's quality of life in many developing nations (McNamara, 2009). Agricultural development can raise

agricultural productivity and have a positive social and economic impact on communities (Angwenyi, 2016). Small-scale farmers who earn more money can provide for their families, send children to school, take care of their health, and invest in their fields. As a result, local economies are bolstered and stabilised (Ayim et al., 2022).

#### ***2.7.4. Poor information infrastructure***

Road networks, storage facilities, and marketing infrastructure are all examples of infrastructure. A farmer's ability to move inputs, produce, and knowledge is hampered by a lack of access to adequate infrastructure (Angwenyi, 2016). Most smallholder farmers struggle to transport and market their crops due to a lack of storage and processing facilities, resulting in high post-harvest losses (Ayim et al., 2022). As noted earlier, in places with weak road and transportation infrastructure, markets for agricultural inputs and outputs are frequently absent or delayed, making them unreliable for smallholder farmers (Atiso et al., 2021). Because of inconsistent production and supply capacity, lack of market expertise, and lack of negotiation power, businesses usually offer their products at lower profit margins. When selling products at the farm gate, smallholder farmers often make significantly less money (Atiso et al., 2021).

#### ***2.7.5 Low technology***

With low levels of technology and innovation, most smallholder farmers in Africa still employ outdated implements, leading to low yields (Asenso-Okyere and Mekonnen, 2012). Smallholder farmers still have a relatively low adoption rate for new technology, despite efforts by state policies and collaboration with foreign development partners to raise awareness and apply new technology. Technology has not been widely adopted, thus rendering smallholder farmers unproductive to meet the demands of the continental growing population (Sennuga et al., 2020).

#### ***2.7.6. Limited access to markets***

Markets typically fail smallholder farmers, most of whom are agricultural producers in many developing nations (Barrett et al., 2022). Smallholder farmers' incapacity to obtain information, amid knowledge inequality among farmers and purchasers, might result in agricultural market failure (Poulton et al., 2006). Smallholders face challenges of limited marketing information, collusion among middlemen, and a lack of transportation infrastructure (Barrett et al., 2022). Also lacking are the services and market-related abilities necessary to thrive in cut-throat

industries. The most affected could be the rural poor, with typically ineffective engagement with local authorities.

## **2.8 Conclusion**

The chapter has examined the importance of communication networks in agricultural production and marketing. Smallholders' access to and usage of agricultural marketing technology has also been explored. Specifically, the chapter has considered smallholder farmers' agriculture information sources together with related challenges.

## **CHAPTER THREE**

### **THE USE OF COMMUNICATION NETWORKS IN PROMOTING AGRICULTURAL PRODUCTION AND MARKETING IN LESOTHO**

#### **3.1 Introduction**

According to Mojaki and Keregero (2019 ), information, and communications technology (ICT) activities and products have been identified as key drivers of economic growth and development. A successful transition to a digital economy in Lesotho, as outlined in the National Strategic Development Plan (NSDP II), could provide opportunities for the populace of the nation, spur private sector growth, and job creation, and shift the provision of public services to the private sector. This chapter investigates Lesotho's communication networks, how they support agricultural production and farm produce sales, and the difficulties encountered by smallholder farmers when using agricultural information sources.

#### **3.2 The Background of Agriculture in Lesotho**

Farming is Lesotho's primary source of income, and it continues to be an important industry for food security and rural employment (NSDP II, 2019). The agricultural sector also contributes minimally to poverty reduction because it does not cover the food needs of households (Daemane and Muroyiwa, 2022). With a 49.7% poverty rate, almost half of the population is estimated to be living below the poverty line. Lesotho scored 32.4 on the Global Hunger Index, which indicates that the country is severely food insecure, according to the (World Bank, 2019). With Lesotho having two forms of farming: subsistence farming and semi-commercial farming, smallholder farmers are believed to be less productive as stated by the Lesotho Bureau of Statistics (LBOS, 2019). More than 70% of the rural households' practise subsistence agriculture (NSDP II). As Rantšo and Seboka (2019) observed, agriculture in Lesotho is primarily conducted by small-scale subsistence farmers on fragmented tiny plots of land that produce minimal yields. The agricultural sector also contributes minimally to poverty reduction because it does not cover the food needs of households. Farming in Lesotho is often a three-month monoculture of maize, wheat, or potatoes. Furthermore, as a result of changing climatic and agroecological conditions characterised by erratic rainfalls and frequent droughts, the agricultural sector, the primary source of revenue for the rural economy, with the majority of the poor employees, has remained stagnant since the early 1990s African Development Bank (AfDB, 2013).

Agriculture employs more than three-quarters of the country's population from 70% to 80%, most of whom live in rural areas, with traditional low-input and low-output-rain-fed wheat crops and significant livestock grazing (LBOS, 2019). Lesotho farmers, who rely mostly on rain-fed agriculture, require fast, comprehensive, and high-quality access to agricultural information (Mojaki and Keregero, 2019). The traditional way of disseminating agricultural knowledge has been agricultural extension workers visiting farmers to offer advisory services (Mojaki and Keregero, 2019). Major production losses come from the usage of animal-drawn implements by over 90% of the farmers for ploughing, planting, ridging, and harvesting. Irrigation and appropriate soil management involve two more productivity-enhancing techniques and technologies that are still in the early stages of development (LBOS 2019).

### ***3.2.1 The importance of potato production in Lesotho***

The importance of potato production is evident in different contexts in Lesotho. The crop generates economic value for local communities as well as for the entire nation because this sector employs both unemployed and self-employed people (Mphahama, 2011). Potatoes are a popular crop and an essential source of food in Lesotho. Potato planting, however, remains much lower than other essential crops like grain, wheat, sorghum, and pulses (Molahlehi et al., 2013). Potato cultivation is now carried out on a limited scale utilizing traditional farming practices (LBOS, 2019). However, there are emerging small-scale farmers working under the supervision of the Potato Lesotho Association (PLA) and the Lesotho National Farmers Union. The groups have strived to develop from subsistence to commercial farming with an emphasis on the potato crop (LENAFU, 2021). In a country where more than half of the population (58%) live in rural regions, with 70% of the households relying on subsistence crops and animal rearing, the agricultural sector remains essential for rural livelihoods (Akintunde and Oladele, 2019).

According to LENAFU (2021), the potato industry's growth was hampered by the inability of farmers to boost farm productivity, stabilise production, and negotiate processing access. LENAFU further indicated that crops are typically planted for food security by households rather than generating income. One of the high-value crops that can significantly boost the rural economy is the potato; it is a crop that can provide money. This is because the potato receives more pesticide and fungicide spraying than any other food crop worldwide. Thus, relying heavily on chemicals to sustain production has negative impacts on both the

environment and human health. Additionally, the cold temperatures are conducive to high yields and high-quality production (LENAFU 2021).

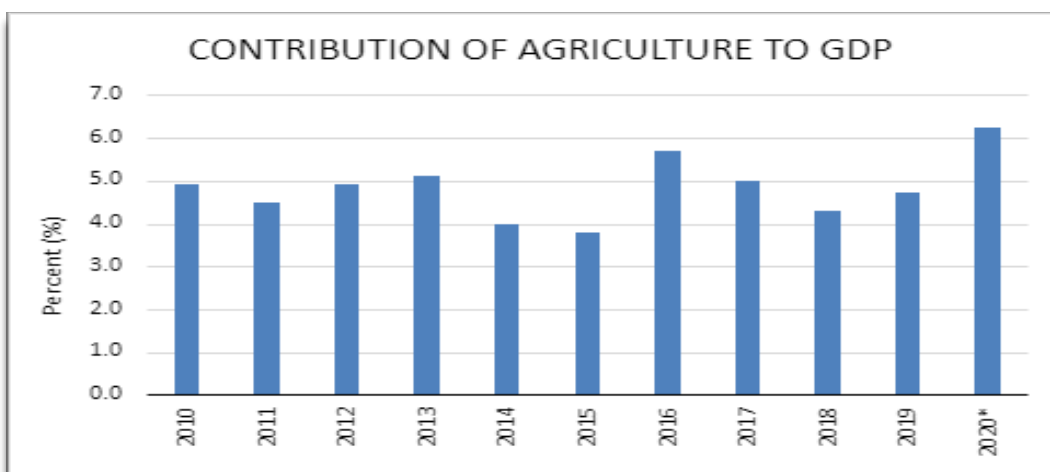
### 3.2.2 The contribution of agriculture to GDP

The NSDP II identified agriculture as one of the economic drivers through commercial agricultural entrepreneurship under the framework of climate-smart agricultural investment initiatives. Lesotho's economic growth has been inequitable, resulting in a high concentration of rural poverty, persistent inequality, and widespread unemployment (Cassim et al., 2016). The Lesotho Vision 2020 is the current framework for its economic growth.

*"Lesotho ought to be a secure democracy, a unified, affluent country that lives in harmony with its neighbours and with itself."*

According to Akintunde and Oladele (2019), the majority of the Basotho are farmers who make their living primarily by caring for animals and growing crops. Lesotho's most significant industry, accounting for 15.2% of the nation's GDP was agriculture. Lesotho's GDP contribution from agriculture, which, over the last decade, was at the rate of decline has remained stable from 5% to 6%. Considering the decline, agriculture continues to be the principal source of income for about 38% of the population and it accounts for 70% of the rural people's livelihoods, as reported by the World Food Programme and United Nations International Children's Emergency Fund (WFP and UNICEF, 2022).

**Figure 3.1: Contribution of Agriculture to Gross Domestic Product**



According to the national accounts estimates, the sector's contribution to GDP has been low in recent years, registering 4.9% in 2010 and 4.3% in 2018, with a slight improvement of 4.7% in 2019 and a further increase in 2020 of about 6.3%. Although the sector's contribution to GDP



increased slightly in 2020, to 6.3%, it significantly declined from around 20%, three decades ago (Lesotho Bureau of Statistics., 2021a).

Productivity in the industry remains relatively low, averaging less than 1,000 kg per hectare, much below the Southern African Development Community's (SADC) aim of at least 2,000 kg per hectare. Rural poverty has increased because of the recent drop in agricultural output and the sector's subsequent 5.2% drop in GDP contribution. Despite accounting for only 6% of the country's GDP, agriculture employs 80% of Lesotho's population (World Bank., 2018).

### ***3.2.3 Contribution of agriculture to food security in Lesotho***

Globally, food security is seen as a fundamental human right. However, underdeveloped countries such as Lesotho struggle to provide enough food security for their citizens (George, 2015). Furthermore, the NSDP II (2019) indicates that 78% of the rural population will continue to experience food insecurity over time. According to Citaristi (2022), Lesotho's food security situation worsened in 2022 as a result of three years of drought, the socioeconomic effects of COVID-19, the worldwide food crisis, excessive rainfall during the growing season that hampered production and lower revenue from livestock and related product sales. Agricultural production is the rural population's most important source of income, accounting for 70% of the households' income and food security. Considering the decrease in productivity, agriculture remains among the nation's most productive sectors for comprehensive sustainable growth in the economy, privately led job creation, income production, and food security to eradicate poverty (NSDP II).

The NSDP II continues to list the promotion of sustainable commercial agriculture as one of the key actions for expanding crop diversity. The population's level of food insecurity is anticipated to increase further due to fewer opportunities for making a living, such as reduced job opportunities, money transfers, and animals' income, as well as increases in both food and other commodity prices, Lesotho Vulnerability Assessment Committee (LVAC, 2022). A total of 521,000 Basotho, or almost 25% of the population, are anticipated to be food-insecure; around 470,000 people in 2021 and 2022 about 320,000 in the rural regions, and 201,000 in the urban areas. Food insecurity was anticipated to affect poor and very poor households, and it was likely to slightly worsen during the lean season, that is from October 2022 to March 2023 (The Government of Lesotho, 2022).

### **3.3 Challenges facing agriculture in Lesotho.**

Farmers face knowledge imbalance because of poor agricultural information quality and dissemination (Mokotjo and Kalusopa, 2010). According to Ziervogel (2004), there is no information center where farmers can obtain all the information they require, including inputs, production technologies, pest and disease management, harvest and post-harvest handling, trade and markets, prices and agricultural standards (LBOS, 2019). Farmers are also losing money after harvesting due to a lack of proper automated lifting equipment, cleaning materials, and storage facilities. Farmers appear to be receiving insufficient assistance because of deficient information transfer mechanisms (Lesotho Communications Authority (LCA, 2017)). According to the Lesotho Bureau of Statistics (2019), farmers incur post-harvest losses due to a shortage of mechanised lifting equipment, cleaning supplies, and storage facilities.

For Mokotjo and Kalusopa (2010), extension staff cannot effectively share agricultural knowledge through human interaction. Extension officers are unable to keep up with modern-day agriculture demands due to a lack of refresher training and resources, such as up-to-date technologies such as smartphones and computer software that provide access to the most recent information (Mojaki and Keregero, 2019). Mokotjo and Kalusopa further argue that information quality and relevancy are major issues in agricultural extension. Furthermore, farmers know more than extension officers, which reduces their motivation to give extension services (Ziervogel, 2004). Mojaki and Keregero maintain that some farmers, for example, use high-tech, entirely automated greenhouses that extension workers have never seen in their professional work, restricting guiding in such situations.

Climate change, extreme weather, and global economic crises pose challenges to the agricultural sector (LBOS, 2019). Approximately 79% of Lesotho has climatic conditions causing agricultural production to deteriorate over the previous decade (Ziervogel, 2004). Variable meteorological conditions such as periodic droughts, rainfall levels and distribution, flash floods, strong winds, early/late frosts, and hailstorms, as well as poor soil conditions due to erosion, land degradation, and overgrazing, all contribute to low output (NSDP II). Agro-climatic challenges and a dearth of fertile land have hindered agricultural progress (LBOS, 2019).

Lesotho's lack of access to agricultural insurance and funding exacerbates the country's agricultural issues (Daemane and Muroyiwa, 2022). According to Balana and Oyeyemi (2020), supply-side issues including a dearth of financial products that cater to small-scale farmers'

needs and high loan processing costs are the main causes of credit constraints among smallholder farmers. The majority of banks in Lesotho do not provide agricultural finance (Rantšo and Seboka, 2019). As Rantšo and Seboka reported, one of the biggest developmental issues confronting the country's potential sector is that smallholder farmers lack access to agricultural financing.

Farmers confront market access restrictions because of poor production quality, low volumes, and erratic supply about market demand (NSDP II). Furthermore, there are fewer marketplaces to absorb things, lower product prices, many middlemen in the marketing system, and fewer effective marketing institutions (Mphahama, 2011). Mphahama, (2011) maintains that co-operatives are vital for protecting farmers' interests and rights over marketable products, as a poorly established means for producer coordination to increase bargaining power and a lack of market information system availability.

According to Mphahama (2011), poor transportation is a barrier to getting goods to market in Lesotho. Lesotho agriculture is also negatively impacted by a lack of supportive policies for value chain development, which is worsened by a shortage of processing and storage facilities, irrigation systems, and adequate road infrastructure.

Lesotho's food security situation is precarious, made worse by recurrent years of crop failures, poor earnings, and high food costs caused by drought. Drought caused by El Nino hit Lesotho hard in 2015/16, putting more than 60% of the rural population in danger of food insecurity. Persistent droughts have devastated agriculture and frequently led to food security for disadvantaged households and children (NSDP II). Climate change and expensive agricultural inputs have both contributed to a recent decline in agricultural productivity. Vulnerability Assessment Study (2022), there were 521,000 people in need of humanitarian assistance in 2022–2023, an increase from the previous years.

### **3.4 Agricultural production communication information in Lesotho.**

It is critical to remember that knowledge may be accessed through information centers and that farmers and information providers should work more closely together to coordinate and exchange information. (Mokotjo and Kalusopa, 2010). Farmers can use ICTs to increase their production capacity and obtain timely information from extension agents to maintain farming activities (Ajani, 2014). To help farmers meet their information demands and boost output, they should relate to the right information in the right format (Mojaki and Keregero, 2019). This would improve agricultural output in Lesotho.

Farmers must be self-sufficient decision-makers who fully understand agricultural issues and can respond to questions concerning agricultural productivity (Mokotjo, 2009). Mojaki and Keregero (2019) revealed that most Lesotho farmers lacked information about services available to them, nor did they know their right to any information service. Farmers' access to agricultural information is critical to their ability to increase productivity. Farmers must be aware of new inputs, production techniques, and cost-cutting measures in production and marketing (Mojaki and Keregero, 2019). As a result, the information dissemination channels available should be used to benefit all stakeholders (World Bank., 2019).

### ***3.4.1 Importance of mobile phone network in promoting agriculture production in Lesotho***

For one, Harry and Stanley (2022) view mobile phones as helpful to society in Lesotho, including the expansion of the information system in various communities. Telecommunications, particularly mobile phones, have the potential to address existing information asymmetry in a wide range of laggard industries, including agriculture (Mittal and Tripathi 2009). Farmers with temporary ICT mobile phones easily access the most recent knowledge regarding emerging agricultural technology, which can boost farm income by making the best use of all resources (Khan et al., 2020). Farmers can also use mobile devices to advertise their products and acquire price information. Additionally, it has reduced the time and expense of communicating while increasing discussions about farming activities (Akintunde and Oladele, 2019).

Secondly, mobile phones are widely regarded as a potentially game-changing technological platform for developing countries like Lesotho (Khan et al., 2020). Mobile phones can improve people's quality of life by lowering transaction and transportation costs, providing price information, and being used for banking and health care (Akintunde and Oladele, 2019). Furthermore, the LCA (2017) noted the usage of mobile phones on farms to assist rural farming communities in benefiting from commercial opportunities. Mobile phones are vital for growth because they benefit owners in mobility and security (Mapeshoane, 2020).

Finally, mobile phones improve communication for farmers, contributing to economic growth (NSDP II). Economic growth is driven by two interconnected factors: lower transactional costs and increased sales. Besides, mobile phones have increased productivity and marketing by co-

operative groups due to lower transportation costs, and thus being cost-effective (Vincent, 2013).

### ***3.4.2 Use of television in promoting agricultural production information in Lesotho***

Television may also provide farmers with agricultural knowledge. Television may swiftly reach an enormous number of individuals and play a vital role in garnering producers' interest in new ideas (Irfan et al., 2006). The creation of television, which has changed communication in all spheres of human existence, including agriculture, is one of the most scientific achievements (Das et al., 2021). Farmers boost agricultural output by sharing information about contemporary technology with a wider audience. In the area of agricultural information transmission, television can assist farmers in gaining access to the right technologies and learning how to use them successfully in their farming systems and practices (Das et al., 2021)

### ***3.4.3 Importance of the radio in promoting agricultural production information in Lesotho***

For starters, the radio is crucial for the growing public communication. It can reach a larger audience than the print media which covers both literate and illiterate users; to a certain degree, it can break the pattern of inactivity for consumers who are disadvantaged because of isolation and inaccessible written communication (LCA, 2017). Radio is a significant instrument for improving agriculture in rural areas. Radio is a powerful and effective medium in developing nations for disseminating agricultural information and knowledge (Mojaki and Keregero, 2019). Radio Lesotho provides affordable, sustainable, accessible, and dependable communication services while also acting as a provider and repository of technological know-how through research and development (R and D) and innovation coordination to accelerate economic growth and improve quality of life (Tehrani, 1999).

Secondly, the rural radio is employed as a potent instrument for bridging traditional and modern technology, offering low-cost information resources to individuals looking to enhance their standard of living while also bolstering current knowledge, entrepreneurialism, and cultural identity resources (Mokotjo and Kalusopa, 2010). Adoption of various ICT tools could improve information processing and dissemination management, resulting in more accurate and timely information dissemination than is currently the case. Furthermore, even though 85% of farmers in Lesotho are literate according to (Das et al., 2021).

#### ***3.4.4 Contribution of the internet to promoting agricultural production information in Lesotho***

Lesotho's Internet penetration has been slow due to low income, high costs, and small market size. Lesotho has the fewest links, with internet connectivity slightly lower than that of the Sub-Saharan African average (NSDP II). The internet, according to Chapman and Slaymakers (2002), is rapidly becoming a more affordable and faster means of obtaining agricultural information. The introduction of the computer has helped the automation of many agricultural organisations that provide a variety of services and products. With the introduction of e-mail and the internet which enhance access to information, major trends and developments are shaping modern agriculture.

With technology shaping people's lives all over the world, online services, purchases, and communicating with loved ones, can be conducted business via SMS instantly. Farmers can easily obtain current weather forecasts by using the internet and directly checking market information for various crops, increasing the popularity of information technology in agriculture (Harry and Stanley, 2022).

For farming to be successful, access to agricultural knowledge is vital (Mokotjo and Kalusopa, Evaluation of the agricultural information service (AIS) in Lesotho., 2010). Governments should guarantee all individuals access to information services. With ICT use and access in educational environments, farmers should access information to increase agricultural output (Adomi et al. 2003; Iriwieri, 2007). With essential information, illiterate rural communities could actively participate in national development initiatives, notably in agriculture, and make wise decisions.

Furthermore, the productivity and yield of horticultural crops have been variable. Most of Lesotho's consumers rely on small, unstable local informal markets with variable seasonal demands, which is the country's primary mode of marketing. As a result, there is a lack of marketing expertise, knowledge, and understanding of consumer preferences, such as flavour and packaging, with unreliable transportation of food to markets also complementing the challenges in Lesotho (World Health Organisation, 2009).

#### **3.5 Challenges facing farmers in accessing agricultural production information.**

One of the primary reasons for rural poverty is the fall in agricultural production (Rantlo, 2016). Small-scale horticulturists also have limited access to irrigation water and fertile soil. Lesotho's

access to technology is limited from planting to harvesting, cleaning, sorting, and packing. As noted earlier, the lack of production financing and market access has worsened the situation. Production in the Lesotho horticultural business is declining due to the high manufacturing costs, for example, seeds and pesticides (Mphahama, 2011). Furthermore, production limits are characterised by a lack of expertise and inadequate mechanisation. High post-harvest losses, poor husbandry, unstructured pricing methods, and a lack of standards limit profit margins (LENAFU, 2021).

Access to information to influence production decisions is a major limitation for Lesotho farmers (Mokotjo and Kalusopa, 2010). For Lesotho farmers to significantly raise their levels of productivity, both the public and non-state providers of agricultural extension services should improve farmers' knowledge to solve problems and seize opportunities (Ziervogel, 2004). According to Masia et al., (2021), crop yield and production have generally lagged the nation's potential. Many farmers are unaware of agricultural radio programmes, coupled with a lack of agricultural publications and legal information services. With such a dearth of knowledge about current agricultural and animal production, most farmers cannot access present subsidies (MAFSN, 2019; Akintunde, 2019).

### **3.6 Importance of communication networks in providing agricultural marketing information**

According to Ikejiofor and Ali (2014), improved roads enhance access to a larger market and reduce losses and delays when carrying agricultural products. Producers will earn more money if agricultural items are delivered to market on time, in good condition, and at a reasonable price. A road network is also likely to promote marketing activities because upgraded roads lead to new marketing trends (Government of Lesotho 2005). As mentioned above, mobile phones, television, and the radio are mostly employed to gather, share, and broadcast marketing and advertising information. In Semonkong, potatoes are a crop that is both commercially and environmentally feasible. The area's cool environment implies fewer planting risks, lowering the need for pesticides, with the soil requiring no fertilising.

Markets serve to coordinate human exchange or economic activities (Eaton and Meijerink, 2007). Market reforms in various emerging nations have come from the industrial and economic needs of horticultural markets (Gabre-Madhin, 2001). According to Mangisoni, (2006), smallholder farmers' marketing options are limited by a lack of collective action, high

transaction costs, high risks, and a lack of markets. Markets have generally been focused on improving their efficiency or increasing opportunities for farmers with lower income to participate in markets, the concept known as market access (Eaton and Meijerink, 2007).

The marketing e-market is an online marketplace founded in early 2020. The marketing e-market connects farmers, street vendors, retailers, and customers while also enabling online sales and delivery. An e-market is a food and agricultural produce, an e-commerce platform where farm produce and food commodities are sold. The platform also markets and advertises locally produced agricultural and food products in Lesotho (Mojaki and Keregero, 2019). The e-farmers mobile platform seeks to address farmers' needs and foster the productivity and performance of individual farmers, including members of the agro-value chain, through digital marketing, farmer profiling, and advisory services. Currently, one of the most rapidly evolving business payment methods is online transactions. Because some people prefer to shop online due to time constraints, delivery time is just as important as price (Laudon and Traver, 2013).

To increase their agricultural output, farmers should access agricultural information. They assert further that access to financing and financial information about farmers' real performance is necessary and is possible through cell phones (Mokotjo and Kalusopa, 2010). Mokotjo and Kalusopa (2010) continue to indicate that farmers' bargaining power has improved in recent years because of their access to immediate forms of marketing information alternatives.

### **3.7 Challenges facing farmers in accessing agricultural marketing information.**

In Oladele's (2011) view, a key barrier to agricultural advancement in developing countries is a lack of agricultural information. According to Mokotjo and Kalusopa (2010), government information resources in the agriculture sector in Lesotho were of high quality in terms of "relevance, adequateness and currency," but there are challenges for information receivers to access. According to Mokone, agricultural periodicals and radio programmes are not available in most farmer settlements, even though 85% of the farmers in Lesotho are literate. Lesaoana-Tshabalala, (2003) also discovered that the vast majority of Lesotho farmers were uninformed of the available data services and their legal right to use any information service.

Because of agroclimatic conditions, limited farm sizes, and a lack of technology, many farmers are engaged in subsistence cereal agriculture (NSDP II). As a result, more people are living in rural poverty, which accounts for 87% of all poverty (World Bank., 2020). Despite these



limitations, the country has a favourable climate, and if the crop is handled well, it might produce large yields (Bureau of Statistics 2008). Many ways exist where agricultural information interacts with and supports agricultural activity. Lack of investment from additional agricultural stakeholders like agro-allied businesses, the government, and non-governmental organisations; the area's high level of illiteracy as a result of the majority of farmers being illiterate; and the absence of adequate agricultural knowledge and information to enhance farmers' participation, cooperation, and collaboration (Mokotjo and Kalusopa, 2010).

Also noting farmers' limited information on market pricing, the report highlighted restricted various services required for profitable agricultural marketing (Masia et al., 2021). Such asymmetrical access has made farmers earn relatively low profits for agricultural commodity markets (Lesotho National Farmers Union, 2021). With such restricted information farmers face challenges regarding agricultural value, production technologies, pest and disease control, harvest and post-harvest handling, trade and markets, prices, and agricultural standards, coupled with the radio programmes that have been discontinued (Masia et al., 2021).

### **3.8 Conclusion**

This chapter has discussed the use of communication networks by farmers in the production and sale of farm products. The conclusion drawn from the literature is that farmers seem to have not used other platforms even, despite having various forms of communication technology at their disposal.

## **CHAPTER FOUR**

### **RESEARCH METHODOLOGY**

#### **4.1 Introduction**

Igwenagu (2016) defines methodology as a comprehensive, theoretical examination of the methodologies employed in a particular field of research. It is a theoretical analysis of the body of practices and beliefs connected to a particular area of knowledge. This chapter provided a comprehensive overview of the study's research methods. The chapter further described the research methodology, study population, research tools, data collection methods, data analysis data presentation, validity, and ethical issues.

#### **4.2 Research paradigm**

A "research paradigm" is defined as "a way of seeing the world that frames a research topic" and influences how researchers think about the topic (Hughes et al., 2011:35). Research paradigms are also defined as a collection of ideas about how to understand problems, how to interpret the world, and how to conduct research as a result (Rahi et al., 2019). The pragmatic paradigm was chosen as the appropriate usage paradigm for this study. Rather than emphasizing methodologies, Ishtiaq (2019) argued that pragmatism requires researchers to prioritize the study challenge and use all available approaches to understand the problem. In response to the research challenge, a mixed-method strategy combining qualitative and quantitative methodologies was used to produce high-quality and reliable results to address the research problem.

#### **4.3 Research methodology**

The methodology is defined as "the procedure followed in carrying out the investigation" (Antwi and Hamza, 2015: 218). A research plan known as a methodology integrates semantic and scientific principles into instructions that specify how research is to be carried out as well as the rules, regulations, and practices that apply to research (Nayak and Singh, 2021). The fundamental question in methodology is "How does one acquire knowledge?" (Guba and Lincoln, 1994:39). A research methodology is also a method for systematically solving a research problem. This is sometimes misunderstood as a science that studies how scientific research is conducted (Mackenzie and Knipe, 2006).

#### **4.4 Research approach**

The research approach/design specified how respondents were chosen, how data would be collected, and how data was analysed (Wagner and Maree, 2007). The researcher used this research design to ensure that the study objectives were achieved in data collection (Rajagopal, 2019). In this study, the data were collected through the use of questionnaires, and answers were recorded without being manipulated, followed by a summary providing answers to the questions posed in percentages, tables, and graphs. Then conclusions were drawn from the data collected from the study areas.

A mixed-method research design that combines quantitative and qualitative research methods was used. To provide a descriptive response, the study's research questions concentrated on the "how" and "what" of communication networks' effects on agricultural output. On the other hand, quantitative data were employed to give more in-depth information based on numerical data (Dawadi et al., 2021). Quantitative research is defined as the numerical representation and manipulation of observations to describe and interpret the process through which information is reflected (Mohajan, 2020 ). This study is quantitative in nature, but it also employed some aspects of qualitative research.

As Islam and Aldaihani (2022) observed, qualitative research is a research method used to investigate human behaviour, cultural patterns, community perceptions, and past experiences. Creswell and Plano Clark (2018) argued that qualitative research focuses on meanings and concepts at a contextual level, which is appropriate for the study to understand individual situations as well as their experiences and perceptions of their social reality. The purpose of this study was to examine farmers' opinions of the communication networks smallholder farmers use to receive agricultural information about agricultural production and selling, the impact of the information, and the difficulties encountered.

#### **4.5 Population and sampling**

A population is the whole collection of subjects that fulfills a particular description, encompassing the entire group of individuals the researcher finds interesting and for whom the research findings can be summarised (Barnard et al., 1999). The individuals, events, or things that the researcher wished to analyse constitute the research population, or a target population (Nayak and Singh, 2021). The study's population was composed of farmers from Semonkong, Maseru. The sixty-one target farmers were interviewed from the following villages: Ha Moahloli (10), Ha Tsekana (10), Tšenekeng (11), Likoeng (10), Ha Rasefale (10), and Ha

Tsionyana (10). The distance from Maseru to Semonkong is 113-kilometer travel of about 1 hour and 45 minutes.

Ross et al. (2012) define sampling as the process of choosing a subset of cases from a larger pool of potential cases. Research, according to Haque, (2010), should entail adaptable, trustworthy, logical, and helpful knowledge. Seventy farmers were chosen as part of the sample and interviewed using snowball and purposeful sampling techniques. Using the snowball sampling technique, the first sample of the participants were asked to name other participants who probably possessed similar traits (Matthews and Ross, 2010).

When difficult to identify individuals of the desired population, Pace (2021) employed a non-probability sample design technique. The purposive (judgmental) sampling technique was adopted because it allowed the researcher to choose instances that were most likely to generate data that would answer the study's questions and help to achieve the research objectives. It served as the framework for brief, in-depth investigations that used qualitative data-gathering methodologies to study and comprehend the respondents' experiences and perspectives (Ross, 2012). This sampling technique saved time and resources because it included only relevant respondents who were aware of the research phenomenon under study.

#### **4.6 Research instruments and data collection procedures**

A research instrument is a piece of equipment that has been scientifically created to collect, quantify, and analyse data on research interests and alignment (Mohajan, 2020 ). To collect the data for this study, specific research instruments were used. To begin with, a sample of potato producers completed a questionnaire form. Second, for extensions, an open-ended interview guide was used to collect data during the interviews. Questionnaires, timetables, interviews, and readily available records are examples of data collection instruments (Orodho, 2003). Furthermore, Oben (2021) defines a research instrument as a scientifically organised and methodical tool for collecting, measuring, and interpreting data related to study goals and alignment.

##### ***4.6.1 Questionnaire for the potato farmers***

Primary data were collected through guided face-to-face in-depth interviews and observation. An interview is a methodological approach in which intensive interviews are conducted with individuals to generate the respondents' perspectives on a specific phenomenon (Boyce and Neale, 2006). Semi-structured interviews with open-ended and closed questions were used to

collect the primary data. In addition, the secondary data were also gathered through document analysis for the study. This method was used to evaluate study information from both published and unpublished sources.

An interview is defined as a process of asking people to obtain both qualitative and quantitative data (Taherdoost, 2021). Face-to-face interviews allow the researcher to better understand the respondents' needs, provide direction, and develop a connection with them so that they can provide accurate and truthful information (Ross et al., 2012). Interviews were also used to assess the environment, using visual aids, and interpreting the respondents' nonverbal cues to comprehend their points of view. The researcher also was able to listen, take notes, and observe significant facts.

#### ***4.6.2 Interview guide for extension***

The interviews were semi-structured so that respondents were not distracted from the subject matter while also allowing them to express their opinions. Another reason for using semi-structured interviews in this study is that some of the respondents had low literacy levels, requiring the researcher's guidance throughout the interview. This is consistent with the claim that semi-structured interviews are required when respondents' literacy is low, making it difficult for respondents to read the questions and fully answer them. A two-way conversation in which the researcher asks questions to gather data or information about the respondents' ideas, views, beliefs, opinions, and behaviour (Wagner and Maree, 2007). The researcher used a semi-structured interview guide, with specific questions prepared to guide the interview towards meeting the research objectives.

#### **4.7 Data presentation procedures**

Data presentation entails using various graphical representations to graphically convey the link among multiple sets of data to make decisions based on them (Salha, 2021). Then raw data collected from the field was organized, classified, interpreted and conclusions were made through using tables and graphs to present the results of the data analysis. The data gathered from the respondents (frequency and percentages) were compiled using descriptive statistics and analysed using the Statistical Package for Social Science (SPSS) Version 21. Descriptive statistics (frequency and percentages) were used to summarise the data from the respondents.

#### **4.8 Validity and reliability**

Validity describes the accuracy and dependability of methods, data, and study findings. Reliability, on the other hand, refers to an instrument's ability to produce the same result when used repeatedly to measure the same thing. The word "instruments" can be used to describe a wide range of things, such as tools, scales, or inquiries you make of individuals (Nayak and Singh, 2021). This study evaluated how accurately a research instrument measures what it is meant to measure and what is meant by the validity of the tool. The interview guide was employed in this study, and its validity was evaluated using content validity, a logical analysis technique that requires rigorous and critical examination of items in the research instruments. To determine the dependability of the study equipment, a pre-test was carried out.

#### **4.9 Ethical considerations**

What is meant by research ethics is the propriety of the researcher's conduct towards the subjects or participants of the study (Gray et al., 2020). As a result, the researcher kept in mind that the study was being conducted in the Basotho community, which has its own set of cultural norms and values, for which they should be respected. To obtain respondents' consent to participate in the study, certain procedures should be followed. Before data collection, the researcher contacted the chiefs, heads of communities, and "peace communities." In this manner, chiefs and community leaders could plan the availability of farmers on the designated data collection days. This was done to show respect for the village chieftainship.

Additionally, Denscombe (2008) added that informed consent, confidentiality, and anonymity should be considered during a research study. Hence the researcher will maintain the necessary confidentiality of the information about the respondents, by never using the names of the respondents. The names of the informants are kept confidential, while the researcher only requested consent to use certain titles and their pictures where necessary.

Certain ethical concerns were applied to the research. To ensure that all participants were at ease, the researcher created a pleasant working environment. The participants were approached in writing to obtain their permission to be interviewed. They were given signed consent forms and briefing letters to participate in the study. The participants were also required to sign the debriefing and withdrawal documents at the same time, indicating their right to withdraw at any time. Both letters assured the participants that their participation in the study would be entirely voluntary and that they would be free to withdraw at any time and for any reason, without facing any undesirable consequences.

#### **4.10 Conclusion**

The chapter gave a summary of the approach. The chapter also offered a thorough explanation of the tools used to direct data collection and communication network design for use and access in rural communities in the Semonkong, Maseru area. The conclusion drawn from the studied literature is that categories and variables are used to determine the adoption of communication networks in rural communities. There was sufficient coverage of the study population, sample frame, and sampling methods. Semi-structured interviews and questionnaires were used to obtain the data.

## CHAPTER FIVE

### THE USE OF COMMUNICATION NETWORKS IN POTATO PRODUCTION AND MARKETING IN SEMONKONG

#### 5.1 Introduction

In this chapter, data gathered from the target potato growers in Semonkong, Maseru district, are analysed and explained. There are four sections in this chapter. The demographic information on the informants is presented in the first section of the chapter. The second section discusses the land use and agricultural output of potato producers. The third half of the chapter examines marketing information. The final section discusses the informational issues facing potato producers. In this regard, data about the study objectives are summarised and presented using frequency distribution tables, pie charts, and bar charts.

#### 5.2 The Demographic characteristics of potato farmers

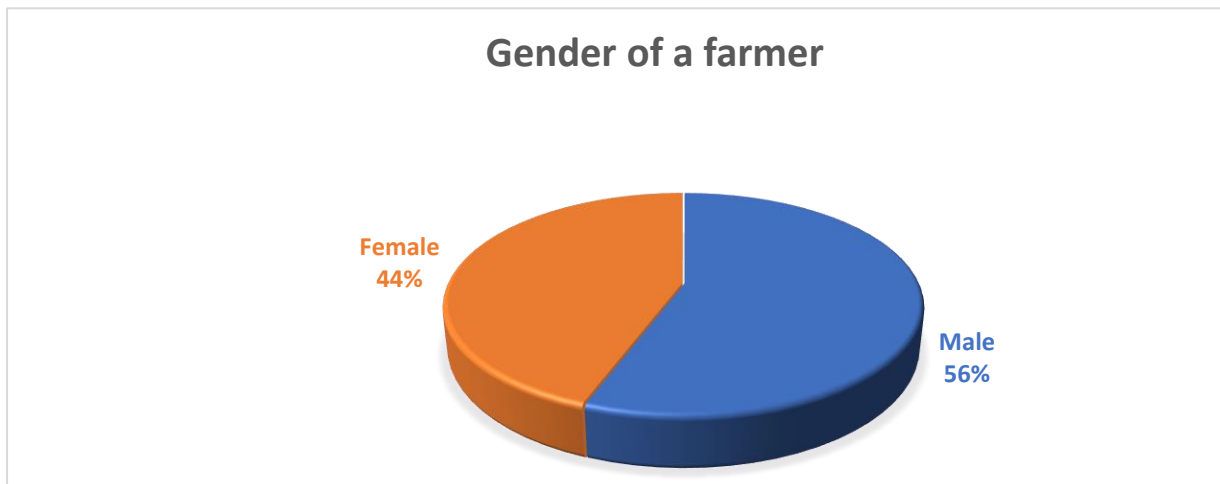
This section presents farmer demographic information. Included are such social elements as gender, age, level of education, household members, and villages where fields are located.

##### 5.2.1 *Gender of the potato farmers*

The active participation of men and women in agricultural development in other African countries including Lesotho cannot be ignored. However, women are involved in farming activities in many parts of Africa, while male ones have migrated to towns for employment opportunities. Despite this, many male farmers are contributing to farming activities. Farmers involved in agriculture use different communication technologies for the production and marketing of the produce. The following Figure 5.22 presents the gender of potato farmers in Semonkong.



**Figure 5.1: Gender of the potato farmers in Semonkong, May 2023**



**Source: Field data**

The research findings reveal that the majority (56%) of potato farmers are male. These results suggest that unlike in some African countries where farming is dominated by females, men are actively involved in potato production. Several factors contribute to the large number of males in farming. For instance, many Basotho males often work in South African mines as migrant labourers. However, they have been laid off from South African mines beginning in the 1990s. According to Rantšo, (2014), most retrenched migrant laborers invest their packages in both agricultural and non-agricultural activities to start their businesses.

It can also be noted that females still make up a substantial number, constituting 44 % of potato farmers in the study area. Despite a good number of women involved in potato production in the study area, research from some developing nations shows that women occupy the ancillary activities such as selling and are considered helpers on the farms (Alabi et al., 2019).

Although males are found in large numbers in potato farming in Semonkong, it cannot be concluded that they use communication technologies more than females. This is because technology adoption is not always determined by gender. However, males have a better chance of using modern technologies in farming compared to females. This is because they command control of financial resources in the household that are used to purchase such technologies.

### ***5.2.2 Age distribution of the potato farmers***

Age plays an important part in agricultural development. For instance, young people are more active compared to the elderly ones. However, research shows that youth are less participate in agriculture in Africa. In terms of technological innovations, youth are more likely to adopt

modern technologies compared to the elderly. Table 5.1 presents the age of potato farmers in Semonkong.

**Table 5.1: Age distribution of the potato farmers in Semonkong, May 2023**

Age Distribution	Frequency	Percentages
15-20 years	1	2
21-25 years	4	7
26-30 years	2	3
31-35 years	3	5
36-45 years	18	29
46-50 years	22	36
51 years and above	11	18
<b>Total</b>	<b>61</b>	<b>100</b>

**Source: Field data**

The findings indicate that the majority of potato farmers (36%) are aged 46-50 years. At this age are adults who are responsible for maintaining their households. Although persons in this age group are still employable, many of them have not found work in the formal sector. As a result, farmers turned to potato cultivation for income. Older farmers might have greater resources and expertise, enabling them to make wise technical decisions. On the one hand, young farmers might be more knowledgeable about cutting-edge practices and more receptive to the risks involved in farming. In this situation, it is necessary to assist and encourage young people who desire to work in agriculture. This is supported by the finding that young farmers recognized social media as a high-exposure, low-cost marketing tool for the sale of agricultural products (Vasumathi and Arun, 2021).

Potato farming employs the smallest number of young people. For example, the statistics show that 15% of farmers are found in the 21 to 35 age group. Lesotho's young unemployment rate remained practically steady in 2022, at roughly 26.66 percent (LBOS, 2022). This is because youth unemployment has increased in recent years due to a lack of job opportunities in the formal sector (Rantšo and Seboka, 2019). Nevertheless, many young people do not consider farming to be a reliable source of income. However, young people can adopt new technologies in farming compared to adults and the elderly. Therefore, their active involvement in farming could be important.

### 5.2.3 Education level of the potato farmers

Also important is education as it helped in justifying respondents' information-seeking behaviour, information sources, and channels. Abubakar et al. (2023) emphasise the knowledge and education for technology's acceptability, farming, and gathering of relevant data. When smallholder farmers gain knowledge, they can accept and/or spread a concept (Albizua et al., 2020). The education attained by the potato farmers in Semonkong is shown in Table 5.2 below.

**Table 5.2 Education level of potato farmers in Semonkong, May 2023**

Education Level	Frequency	Percentages
No Education	9	15
Primary	18	30
Secondary	12	20
College	9	15
University	13	21
<b>Total</b>	<b>61</b>	<b>100</b>

**Source: Field data**

According to data in Table 5.2 above, 50% of potato growers in the study area have low levels of education (primary and secondary). UNICEF (2021) indicates that about 92% of citizens in Lesotho are literate. Despite the country's high literacy rate, it is not always effective in the adoption of the best farming practices mostly through reading. As a result, it is difficult for farmers to obtain information from sources such as books, newsletters, and any other written materials. This is because most of the information is written in English, which most farmers do not understand. Despite farmers' lack of formal knowledge of farming practices, most of them began farming at a tender age (Seko and Jongrungrot, 2022).

The findings also show that 36% of farmers have tertiary education. In Lesotho, it is not common for graduates to be involved in farming. Most of them work in government and the commercial sector in white-collar occupations. Knowledge is one of the five stages in the individual adoption process Rogers (2003). A probability of using agricultural information technologies exists for more educated farmers. A well-educated farmer is more likely to use current agricultural technologies than a less educated or illiterate farmer.

Additionally, it has been noted that education is crucial to the majority of farm enterprises because it aids individuals in decisions regarding the product's price and marketing. Farmers

go through several steps before adopting an improved agricultural technology, including awareness, interest, trial, evaluation, and acceptance (Seko and Jongrungrot, 2022). Farmers who are educated are shown to be early innovators and rapid learners. Education encourages farmers to accept new technologies, thus increasing agricultural productivity and efficiency (Abdulai and Huffman, 2005). (Alene and Manyong 2007).

#### **5.2.4 Household size**

Household size influences agricultural operations mainly in subsistence farming (Lelimo et al, 2021). Household members collaborate on farms to produce crops for the maintenance of the household. Usually, in many African households, many family members labour together on the family farms to speed up the task. The household members further consume the produce of their labour. In this study, it is important to look at the household size of farmers to determine the availability of labour used on the family farms. In this light, the results showing the household size of potato farmers are presented in Table 5.3.

**Table 5.3: The potato farmer households’ size in Semonkong, May 2023**

<b>Household size of the farmer</b>	<b>Frequency</b>	<b>Percentages</b>
0-1	5	8
2-4	12	20
5-9	24	39
10-14	13	21
15 and above	7	12
<b>Total</b>	<b>61</b>	<b>100</b>

**Source: Field data**

The data indicate that (39%) of the farmers, which is the highest number in the data, have a household size of 5– 9 members. In this way, many farmers in the study area have large households that contribute to agricultural development. These households are considered too large when considering the average household size which is 3.7 members (LBOS, 2016). The large household size has the advantage of providing unpaid labour on the farms. According to Mdoda (2023), the usual household size is six individuals. This number of people played a significant role in providing family labour, especially if household members were of working age. This is intended to increase the availability of labour on family farms.

### **5. 3 Contribution of communication networks in promoting potato production**

### 5. 3.1 Experience in farming activities of the potato farmers

Experience in farming is an important variable since the success of a farmer depends on the farmer's practical experience in farming (Abdulai and Fraser, 2023). Thus, worth considering in this study is the experience of potato farmers for several reasons as shown in Table 5. 4 below.

**Table 5.4: Farming experience in Semonkong, May 2023**

<b>Farming Experience</b>	<b>Frequency</b>	<b>Percentages</b>
Under 5 years	3	5
5 - 10 years	8	13
10 - 15 years	17	28
16 – 20 years	19	31
Above 20 years	14	23
<b>Total</b>	<b>61</b>	<b>100</b>

**Source: Field data**

Table 5.4 data indicate that 31% of the farmers have between 16 and 20 years of experience in farming. Such experience could help them to manage the farm, proving what is best for their farming. This shows that farmers in the study area have the necessary tools to produce and sell their goods. Farming experience could enhance a farmer's farming success and potentially good livelihood. Additionally, farmers with more farming experience employ agricultural techniques that will boost their productivity and enable them to participate in markets much more quickly. These findings cohere with that of Rahm and Huffman (1984), who observed that adoption efficiency rises with experience.

Further noted from the above table is that only 5% of the farmers have five years or less in potato farming. However, it cannot be concluded that farmers with little time in farming produce low-quality potatoes than those who have been in farming for a long time. This is because many factors contribute to the production of quality crops, some of which use appropriate technologies, yielding improved inputs.

### 5. 3. 2 Benefits to start potato farming.

Farming is essential for eradicating poverty, creating jobs, and ensuring food and nutrition security and raw materials for industries, thus leading to economic development for the inhabitants. On this basis, agriculture can contribute to the Gross National Product, and Gross National Product, thereby boosting the government income and foreign currency. The results showing motivation for participating in potato production are shown in Table 5.5 below.

**Table 5.5: Benefits for potato farming in Semonkong, May 2023**

<b>Reasons Motivated Potato Farmers</b>	<b>Frequency</b>	<b>Percentages</b>
Provide sources of income	10	16
Create employment	24	39
Market and consumption	8	13
To ensure Food Security	19	31
<b>Total</b>	<b>61</b>	<b>100</b>

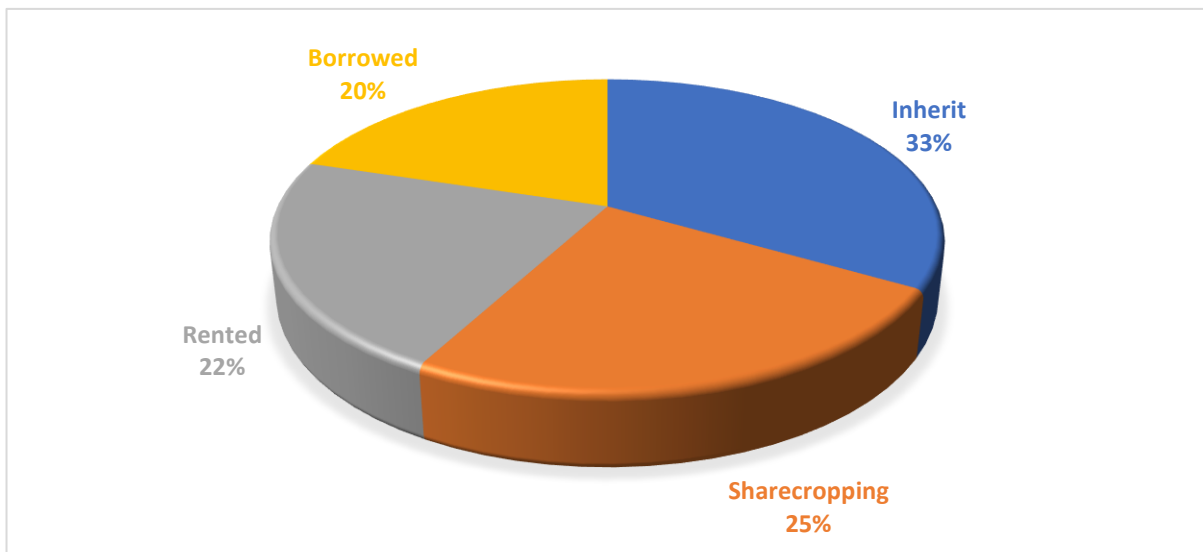
**Source: Field data**

The results of the study show that 39% of the farmers participated in potato production to create employment. As mentioned earlier, a potato is one of the high-value crops, significantly contributing to the rural economy as an income-generating crop. The population's level of food insecurity is anticipated to increase. Because of limited job opportunities, money transfers, and animals' income, as well as increasing both food and other commodity prices, crops are typically planted to secure the food security of households rather than to generate income (LENAFU, 2021; Lesotho Vulnerability Assessment Committee (LVAC), 2022). Agricultural production is the rural population's most important source of income, accounting for 70% of the household income and food security (WFP and UNICEF, 2022). Agriculture not only provides food for humans, but it also contributes to the nation's overall economic well-being. Many countries continue to rely on agriculture for jobs and national income, even in the modern era of science and technology. This research indicates that most farmers have not been motivated by processing food; instead, they have been motivated by providing food and generating income.

### ***5. 3. 3 Ownership of land used for potato production.***

The land is a vital resource for the economic development of a country. This is because land is required for the country's agricultural activities. Land could foster investment and may be used as collateral to obtain advances (Mapeshoane, 2020). Since rural households own land as one of their tangible assets, they can engage in various activities for livelihood. The data show ownership of potato farming in Figure 5.2 below.

**Figure 5.2: Ownership of potato farmers' land in Semonkong, May 2023**



**Source: Field data**

The most common type of land ownership is customary in several African nations. Communal land ownership, which is the practice of passing down land ownership through the generations, has been used for many years in many countries including Lesotho (Rantšo and Seboka, 2019). According to the findings in Figure 5.2 above, 33% of the farmers claim to have inherited land from their relatives. Given that men own 70% of the land in Lesotho, land inheritance is crucial for women (Paradza, 2021). A major means of property transfer in Sub-Saharan Africa is inheritance, or the handing down of a person's accumulated wealth through the generations (Kumar and Quisumbig, 2012).

The land is either owned by farmers or rented to them by other farmers who are no longer growing crops and are abandoning the land. Therefore, Figure 4.2 indicates that 22% of the farmers rent land used for producing potatoes. Except for a few people who have borrowed land, many farmers do not borrow any land; instead, they rent it from landowners who cannot afford to grow crops. In most cases, there is no formal agreement between the two parties (World Bank, 2019).

### ***5. 3.4 Size of land farmers planted potatoes on hectares***

Land is a critical resource that can significantly transform the livelihoods of rural dwellers in developing countries. The size of land in hectares is one of the house assets owned by the respondents, which includes both productive and non-productive assets held by potato farmers. The size of land for the farmers in Semonkong is presented in Table 5. 6 below.

**Table 5.6: Size of land farmers plant potatoes on hectares (ha) in Semonkong, May 2023**

Size of land in hectares	Frequency	Percentages
0.1 - 0.9 ha	38	57
1.0 - 1.9 ha	15	26
2.0 – 2.9ha	6	10
3.0 – 3.9ha	4	7
<b>Total</b>	<b>61</b>	<b>100</b>

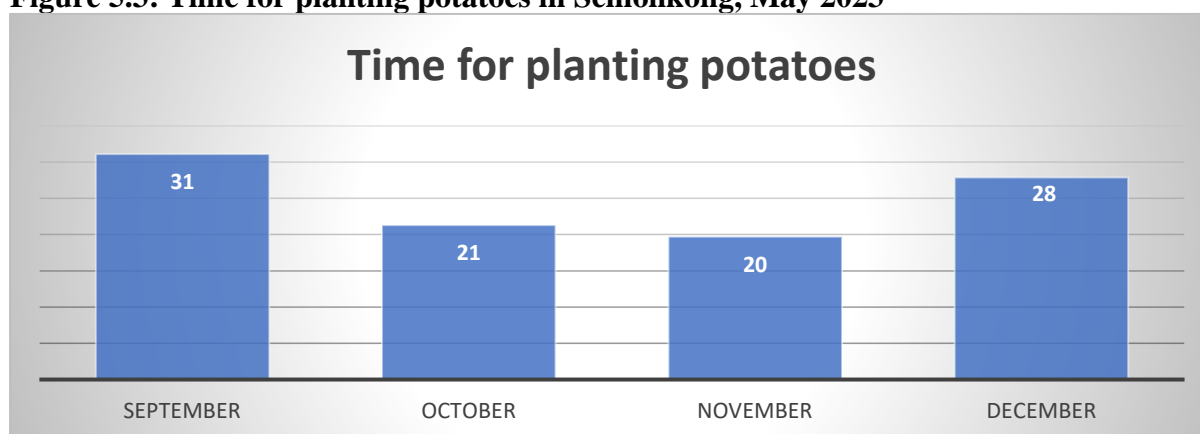
**Source: Field data**

The results of the study also show that fields visited for potato-producing locations have the average farm size for most growers roughly at 0.1 - 0.9 ha, accounting for 57%. Lesotho’s arable land is estimated at 9%, and the average farm size in Lesotho is approximately 1.3 hectares. Research shows that around 80% of the population relies on subsistence farming, with over 70% of them residing in rural areas where agriculture is their main source of income. Although only 10% of the nation's land area is arable, the agricultural industry contributes more than 17% of the GDP (LBOS, 2019). However, land degradation and encroachment have caused major concerns for food security and national development (NSDP II).

### **5. 3.5 Time for planting potatoes**

Potato farming is rapidly growing in developing countries, where its ease of cultivation and nutritional benefits have made it a valuable crop for food security and income for millions of farmers. The potential of the crop to benefit in high-altitude environments is higher in the lowlands. Figure 5.3 shows the planting time of potatoes in the study area.

**Figure 5.3: Time for planting potatoes in Semonkong, May 2023**



**Source: Field data**

The research findings in Figure 5.3 above reveal that 31% of the farmers planted potatoes in September. Lesotho's hot summers and chilly winters only allow for one producing season to be practised over the entire nation. Although there are chances of a late frost up to the beginning



of October, potatoes are cultivated as a summer crop, and planting can commence at any time between mid-September and December. However, planting typically cannot begin until October because there are typically no summer rains until then.

Smallholder farmers are among the most susceptible populations to climate change. However, efforts to promote farmer adaptation are hampered by the paucity of data on how they are experiencing and responding to climate change. For years, farming has been falling due to soil erosion, poor land-use practices, and declining soil fertility. Lesotho's chilly environment reduced the need for harmful agrochemicals in crops, particularly potatoes (LENAFU, 2021). Farmers are in danger as a result of climate change because they are hesitant to plough for fear of drought or flash floods that wash away seeds or growing crops. According to Dorward et al. (2003), such risks reduce the productivity of rural economies.

### 5. 3.6 Potato bags produced from the previous and current season

Potato is an important commodity crop in Africa, contributing to food security and improving livelihoods. Planting, ridging, and harvesting are all done by hand, sometimes with the help of draught animals (Lindsay et al., 2022). As a seasonal crop, potato farming is mainly rain-fed in most parts of Africa. Despite growing in lowlands, the crop works best in high-altitude regions. As such, the study shows potatoes produced throughout the agricultural year and previous seasons as depicted in Table 5. 7 below.

**Table 5.7: The number of potatoes produced in 25kg bags in Semonkong, May 2023**

Potatoes produced	Previous harvest		Current harvest	
	Frequency	Percentage	Frequency	Percentage
41-50 bags	6	10	0	0
51 and above	55	90	61	100
<b>Total</b>	<b>61</b>	<b>100</b>	<b>61</b>	<b>100</b>

**Source: Field data**

Looking at Table 5. 7 above, 90% of the farmers produced more than 51 bags of 25kg of potatoes during the previous harvest (2022 harvesting season). According to (Mothibeli et al., 2023), Lesotho may produce up to 37 tons of grain per hectare. Potatoes are the fourth-largest food crop in the world by production. One of the most productive food crops is the potato, which has a shorter crop cycle of approximately 120 days than significant cereal crops like maize and yields more dry matter (food) per hectare than cereals or any other cultivated plant (FAOSTAT, 2019). The climatic conditions prevailing in Lesotho, especially in the foothills

and highlands are quite suitable for seed potatoes, thereby having the potential to produce the crop. The results show that 100% of farmers produced more than 51 bags of 25 kg of potatoes during the 2023 farming season.

### 5.3.7 Use of and Access to Communication Networks for Agricultural Production

#### Information

The rating of the accessibility and usefulness of communication channels for agricultural production information by potato producers is critical. Information is vital to agricultural development and productivity, providing effective communication for farmers, agricultural scientists, and extension workers (Islam and Aldaihani, 2022). Table 5.8 shows how obtaining information from communication networks can assist farmers in increasing agricultural production.

**Table 5.8: Access and use of communication networks for agricultural information in Semonkong, May 2023**

Availability of communication networks	Frequency	Percentage	The usefulness of communication networks	Frequency	Percentage
Easily accessible	23	59	Very Useful	25	41
Accessible	36	38	Useful	35	57
Not easily accessible	2	3	Not Useful	1	2
<b>Total</b>	<b>61</b>	<b>100</b>	<b>Total</b>	<b>61</b>	<b>100</b>

**Source: Field data**

From the results in Table 5.8 above, it is evident that 59% of the potato farmers access communication networks. The ICT in rural areas enhances agricultural information flows, which enables timely access to vital information, thus improving agricultural practices and rural livelihood (Atiso et al., 2021). This study suggests that farmers should easily access agricultural information with mobile phones through WhatsApp, though not affording smartphones with internet access and social networking apps such as Facebook and Instagram.

Table 5.8 also showed that the majority of farmers (57%) believe that communication networks promote learning about production and provide access to production information. Having access to a mobile phone can improve quality of life by reducing costs associated with transactions and transportation, providing price information, or being used for banking and medical care. All agricultural stakeholders had access to information through a variety of media

channels, including websites, digital newspapers, and social media, according to (Khan et al., 2021). Communication networks have also been used to promote community development, innovation, and other programs that rely heavily on self-help and community participation.

### ***5.3.8 Type of agricultural production information used by potato farmers.***

The data show that some communication networks help the potato farmer to access agricultural production information, for instance, seed information, and pest and disease information. Potato farmers use various communication methods to access agricultural information. This was confirmed by farmer 42 who said: *“I am getting seed information because the Ministry of Agriculture, Food Security, and Nutrition provides subsidy and time when its available extension informs us”*. ICT mobile phone applications are the most used ICT applications by farmers to communicate agricultural information because they are easy to use, provide economic benefits, and improve users' social status (Kumar et al., 2023). Concurrently, Msangi (2020) discovered that the media are a source of much knowledge, which could be correctly structured to boost farm productivity.

This was also stated by Potato Farmer 29, who stated: *“I receive agricultural information on fertilizer and seed since it is easy to send the message through WhatsApp”*. The farmer uses the radio to get pest and disease information (Ango et al, 2013). In this case, farmer 15 stated that: *“I use radio and mobile phone to get seed information since we have an agricultural programme to give us information every week.”* This was confirmed by farmer 19 who said: *“I use seed and fertilizer information is also easy to access through radio programme”*. Agricultural information is essential for boosting small-scale agricultural production, resulting in rural livelihoods, food security, and national growth (Mtega, 2021). These research findings suggest that potato farmers in Semonkong use communication networks such as mobile phones WhatsApp and the radio for information on agricultural production, such as seed, pest, and disease information. Farmers also obtain information about the best farming practices from the Potato Lesotho Association (PLA).

## **5. 4 Use and access of marketing technologies in promoting farm produce**

### ***5.4.1 Quantity of potatoes sold in the agricultural season.***

The potato agro-food industry is crucial for the economy, thus enabling the population to access food and a high standard of living. When farmers market their products optimum market

channels for the farm business's profitability are desirable (Molahlehi et al., 2013). The data show the number of bags sold by farmers in Table 5.9 below.

**Table 5.9: Quantity of potatoes sold in agriculture in Semonkong, May 2023**

Quantity of potatoes	The previous harvest marketed		Current harvest marketed	
	Frequency	Percentage	Frequency	Percentage
41-50 bags	5	8	0	0
51 and above	56	92	61	100
<b>Total</b>	<b>61</b>	<b>100</b>	<b>61</b>	<b>100</b>

**Source: Field data**

The research findings in Table 5.9 above reveal that the majority (92%) of the farmers sold over 51 bags of potatoes in the farming season of 2022. In the current farming year 2023, 100% of the farmers sold more than 51 bags of 25kg of potatoes. Street vendors and market sellers feature global urban economies, providing access to a diverse range of affordable goods and services in public locations (Lutaladio *et al.*, 2009 cited in Kohar et al., 2023). It could be concluded that diminishing arable land due to land degradation and encroachment has constrained the future of potato production in Lesotho. As the NSDP II observed, the declining land quality and land encroachment remain critical threats to food security and the general development of the nation.

#### **5.4.2 Place for selling potatoes.**

Marketing information about various institutions, including federal and local governments, co-operatives, funders, international organisations, and NGOs can be gathered, analysed, and disseminated across different nations. Participatory markets are important (Otekunrin et al., 2019). Table 5. 10 below illustrates the place where potato farmers sell their produce.

**Table 5. 10 Location where potatoes are sold Semonkong, May 2023**

Location for market	Frequency	Percentages
Farmgate	7	11
Street vendors	21	34
Retail shops	17	28
Supermarkets	6	10
Market Centre	10	16
<b>Total</b>	<b>61</b>	<b>100</b>

**Source: Field data**

According to the research findings in Table 5.10, most farmers (34%) sell potatoes to street sellers. Street vendors have low entry barriers, inexpensive startup costs, and flexible hours, making it simple and handy. Many people turn to street hawking because they are unable to find employment in the official economy. Accessing the market Otekunrin et al., (2019), enables farmers to specialise in commodities which gives them a competitive advantage, enabling them to enjoy a broad consumption package while also reaping the benefits of trade. As a crucial element of market involvement in addition, markets are referred to as the circumstances for increasing agriculture-based economic growth and raising rural incomes over the long term, particularly for rural poor farming households (Otekunrin et al., 2019).

These results imply that growing agricultural output and commercialising activities so that farming can be treated as a company require access to markets. Access to markets is crucial. Using accessible transportation, a smallholder farmer can physically convey the produce to the market or sell it to a buyer at the farm gate (Otekunrin et al., 2019).

#### ***5.4.3 Use of communication networks to market potatoes***

Many farmers use communication networks to market potatoes. For instance, Farmer 15 said, “I use a *mobile phone to sell potatoes through WhatsApp groups of members of the Potato Lesotho Association (PLA)*”. Similar findings were obtained by Mtega (2012), where most farmers used cell phones besides the radio to communicate agricultural information. The data also revealed that farmers use both mobile phones and radio to market their potatoes. As Farmer 23 reported, “*I use both mobile phone and radio to market my produce to the market with the help of extension officer*”. The results show the significance of the media in decision-making processes, and policymakers could use the freshly expanded community-level radio stations to educate and advocate the adoption of innovative agricultural technologies. The conclusion could be that potato farmers, assisted by extension officers as reliable sources, use mobile phones and the radio to market their produce.

#### ***5.4.4 Access to marketing information through communication technology***

The data from the field shows that agricultural marketing information is accessed by farmers through communication networks. In this case, Farmer 34 explained, “*I access the information about the market from the extension officers in the Department of Marketing so that we know the market before production*”. Many farmers used marketing information through mobile phones and the radio. However, extension workers are fewer than is required to pass on

improved technology to farmers. Market knowledge is a public good since it can be used by many people interchangeably without lowering its supply (Magesa et al., 2020). For smallholder farmers to make wise production and marketing decisions, they should have access to timely and accurate market information.

Pricing information was also raised by farmers. For example, Farmer 40 indicated that: “*The weekly potato prices are distributed to us by an officer in the Department of Marketing using the WhatsApp group*”. According to the International Institute for Communication and Development (2004), pricing data is an important agricultural piece of knowledge that can help farmers find a trustworthy market for their products, earn more money, and raise their standard of living. However, as already mentioned, if access to power in rural regions was increased, television's influence on facilitating access to knowledge and information may be strengthened.

These findings suggest that agricultural marketing information can also be shared using appropriate information communication technologies, such as television, which is a popular communication medium among farmers. Agricultural information is critical for enhancing farming operations since it constantly delivers new farming techniques and market information. It is, therefore important to determine the advantages of leveraging communication networks to convey marketing material among potato farmers through information technology.

#### ***5.4.5 Benefits of communication networks to source marketing information***

The data show that farmers benefit through communication networks by acquiring educational skills, extension tools, and communication tools. Farmer 42 indicated that: “*I use a mobile phone with WhatsApp to communicate with other farmers*”, thus confirming (Gray et al., 2020) observation. In addition, Farmer 45 indicated: “*I use a mobile phone and radio to communicate with the extension*”. The Internet, cell phones, radio, and television are the most essential communication tools for farmers to learn about agriculture (Hansen and Bøgh, 2021).

### **5.5 Challenges for accessing agriculture information.**

Many constraints limit the farmers’ use of agricultural information to access farm-related information. This section presents the challenges faced by farmers in accessing agricultural information technologies.

### **5.5.1 High information and communication technology (ICT) Cost**

The data revealed that farming is one agricultural activity that is exposed to many challenges. Farmer 24 said: “*High ICT cost is the challenge that hinders me from accessing information*”. As a result, the usage of ICT in farming is not exceptional as there are challenges associated with it. It is against this background that this part looks at challenges facing potato farmers in accessing agricultural information in Semonkong, Maseru District. From this finding, it can be suggested that the high cost of ICT limits the farmers’ access to production information.

### **5.5.2 Lack of infrastructure**

Lack of infrastructure affects farmers’ access to agricultural information. In this respect, Farmer 24 said: “*The lack of infrastructure, access to electrification, and poor roads are other factors that hinder limited access to agricultural information*”. According to LCA (2017), one of the reasons for the country's low level of ICT usage is that half of Lesotho's homes have no electricity, in which case, farmers have difficulty charging their cell phones, and having them switched off almost all the time; otherwise, charging phones at kiosks has restricted farmers from receiving information on time (Kumar et al, 2023).

### **5.5.3 Poor access roads**

Extension officers were asked about their challenges in disseminating production information to potato farmers. Extension 10 said: “*Poor Road is one source that hinders limited access to agricultural information*”. Lesotho from using ICT tools to their full potential. This section examines the obstacles that the extension faces in conveying productivity information to farmers in Semonkong, Maseru. Most extension officers claimed to have been hampered by a lack of access to roadways from disseminating information. Extension 7 further said: “*limited source of power hinders limited access to agricultural information*”. All agricultural extension and farmer programmes confront considerable problems. For (Aizaki et al., 2010), guaranteeing cost-effective outreach, providing solutions targeted to individual farmer requirements, and cultivating a farmer-friendly image has been problematic, despite having agriculture as Lesotho's primary source of revenue and employment (Seko and Jongrungrot,2022).

### **5.5.4 Climate change**

Crop output can be impacted by climate change in a variety of complex ways. High temperatures might result in reduced yields because of accelerated growth rates and increased

respiration, depending on the crop and the temperature regime. Farmer 37 stated: “*Climate change is a problem for us in the highlands, it has changed the time we use to plant*”. Rantšo and Seboka (2019) alluded that due to climate change, agricultural production has been dropping in recent years. Furthermore, Farmer 17 reported: “*Climate change is a problem for us in the high lands, giving us problems for changing agriculture calendar*”. Balasundram et al. (2023) affirmed that climate change and its effects on crop production and food security are major sources of concern for people around the world. In Balasundram et al.’s view, climate change can have a substantial impact on crop productivity by changing the time of planting and harvesting and altering crop growing conditions.

#### **5.5.5 Poor access to marketing information**

The research could present communication network difficulties in emerging countries. Reporting, Farmer 43 mentioned: “*I don’t get information on the marketing of potatoes, so to price is difficult*”. Smallholder farmers' incapacity to obtain information, combined with the ubiquitous issue regarding knowledge inequality among farmers and purchasers, might result in agricultural market failure (Poulton et al., 2006). Although ICTs have the potential to improve people's lives in many facets of human development, several constraints, particularly in third-world countries, may limit their timely deployment. Besides, smallholders face challenges such as insufficient market access, a lack of market information, collusion among middlemen, and a lack of transportation infrastructure (Sennuga et al., 2020).

#### **5.6 Relevance of the theory to the study findings**

The diffusion of innovation theory was used as the research framework and investigation. Rogers (2003) classifies members of a social system based on how rapidly an individual learns new ideas in comparison to other members of the system. The adopter spectrum is divided into five categories: innovators, who introduce the innovations; early adopters, who are the first to implement them; early majority, a large number of individuals who quickly adopt the innovations; late majority, who adopt them later; and laggards, who lag behind the rest. According to the findings of this study, farmers in Semonkong are laggards in embracing alternative communication networks, such as the usage of Facebook, Tik TikTalk. and Instagram to share information. Although there are early adopters when it comes to mobile phone use because they use the WhatsApp application to spread information, the Lesotho Potato Association is also used as an allusion to the theory.



## **5.7 Conclusion**

It can be concluded that access to relevant information and knowledge is very important to improve agricultural performances and livelihoods in rural areas, especially in African countries. Agriculture-related innovations will change the way smallholder farmers practise, do business, and access advisory agricultural information. Efforts to develop enabling policies that guide and support the use of ICT-related technologies for agriculture are reportedly weak. The study demonstrates that some incorporate innovation decision-making, which is a mental process that comprises learning about innovation, forming an opinion about it, deciding whether to embrace or oppose it and finally, adopting and validating the choice. We also recognise that communally owned farm food can help individuals to overcome problems.

## **CHAPTER SIX**

### **CONCLUSIONS AND RECOMMENDATIONS**

#### **6.1 Introduction**

This chapter presents the study findings, conclusions, and ways of improving communication networks in accessing agricultural information. The specific aim and objectives of the study were to evaluate the role of communication networks in potato production and sale among smallholder farmers in Semonkong, Maseru, Lesotho. The difficulties encountered by potato farmers when acquiring agricultural information were also considered in the study.

#### **6.2 Summary and discussions of the main findings**

The study's goal was to assess the importance of communication networks on potato production and sale among smallholder farmers in Semonkong, Maseru, Lesotho. The mixed-methods technique was used to help answer the research questions and objectives of the study. The research objectives included the following: examining the role of communication networks in promoting agricultural production and marketing of farm produce; examining how smallholder farmers access and use marketing technology in promoting farm produce in rural Lesotho; and assessing challenges facing the farmers in accessing agricultural information in rural Lesotho.

This implies that the farmers in the study area have adequate resources to produce and market their products. Farming experience improves a farmer's farming skills and increases the chances of a farmer's successful living. Farmers could be encouraged to plant potatoes to ensure food security. Because of the high productivity per unit area for expanding market demand, potato farmers have the potential for food security. As reported in this study, the farmers with more farming experience would more likely embrace agricultural techniques to boost their productivity and participate in marketplaces. Furthermore, because young farmers are quick adopters of technology, they should be encouraged to practice farming. In terms of the programme's value to farmers, the study concludes that it helped them to increase their output. They received relevant information on agricultural inputs for more production. The initiative also taught farmers to plan their planting seasons. Additionally, it provided remedies for pest-related issues and informed them about new farming techniques.

One of the study's objectives was to discover the role of communication networks in improving agricultural production. The study revealed the farmers in Semonkong as cultivating potatoes on three fields inherited from their families. Another plot of land has been used through renting

from farmers who are unable to plant. Semonkong soils are exceptionally productive and require little fertilising. Potato producers use inorganic fertilisers to increase the soil nutrients, thus directly affecting plant growth and improving potato yields. Although improved farming inputs are valuable since they helped to revitalise the farming sector. Also noted from the findings is that the typical farm size for most growers is between 0.1 and 0.9 ha. Potato growers reported to have obtained their seeds from the South African co-operatives. Seed potatoes (generation two or three) were purchased from seed producers in South Africa. Farmers planted potatoes in September, during which rainfall patterns, which normally begin in October, influence the agricultural season. Even though the freezing and isolated highland regions are regarded to hold ecological promise for potato production and supply, particularly seed potato cultivation, the lowlands and foothills are more suited for ware/table potato production, and highlands farmers benefit more, and will conclude in April. Therefore, 90% of the farms produced more than 51 bags of 25kg of potatoes during the previous harvest. However, 61% of such farmers grow potatoes for the market.

The study further looked at the contribution of communication networks in promoting the agricultural production of potato farmers. Communication channels are vital in providing information to farmers. To promote agriculture in the country, different communication methods, including traditional and creative media, have been deployed. Farmers agreed that they needed information on disease and pest management, planting techniques, and soil improvement, all of which were deemed critical to their farming production and, hence their livelihoods. Communication networks have also been used to promote community development, innovation, and other programs that rely heavily on self-help and community participation.

Farmers, on the other hand, are unable to obtain agricultural information because they are unaware of the available platforms and are unable to pay subscription fees, which are considered the biggest obstacle to mobile phone usage in agriculture. Communication networks can help one learn about production. Moreover, using ICTs to improve information flow and connect people within rural areas has shown that the illiteracy of farming communities may no longer be an excuse to deny communities extension systems.

The farmers were found to have access to agricultural information to improve their agricultural production. They further contend that farmers should have access to market information for their actual performance as well as selling the place of selling. Furthermore, the findings

stressed that access to and using appropriate information services by all members of society should be done by extension services.

One of the objectives of the study was to farmers access and use marketing information. The study findings show that research findings show that some marketing in agriculture is vital not only for increasing production and consumption but also for accelerating the country's economy. The crop can also be produced organically and sorted for international markets. The cool conditions are also ideal for good quality and high-yield production. Only 8% of the respondents produce from 40 to 50 bags of potato bags of 25kg each. However, smallholder farmers face stiff competition from experienced and well-informed commercial farmers in attempting to provide their products to official markets. The majority of potato farmers in this study current year, the majority of the farmers have produced more than 51 bags of 25kg of potatoes. The marketing of agricultural produce depends heavily on the availability of transportation. Improving the rural roads and transport services is essential to ensure price reduction for agricultural inputs and improvement of market access for agricultural produce.

These findings suggest that market access is critical for increasing agricultural output and commercialising activities so that farming can be viewed as a business. Farmers' market access is a critical component of market participation. A smallholder farmer can acquire market access by selling to a buyer at the farm gate or physically transporting the product to the market using available transportation. According to the study's findings, the biggest percentage of farmers (14%), gain from communication networks through learning educational skills, extension tools, and communication tools. Tools of information and communication technology (ICT) have been used to transmit information to various parties involved in agricultural activities. From these results, it can be concluded that potato farmers use the radio and cell phones as trustworthy sources to market their produce with the help of extension officers.

### **6.3 Challenges facing farmers in accessing agricultural information.**

In terms of the issues confronting potato farmers, the use of ICT in farming is not unique, as there are challenges associated with it. In this light, this part investigated the challenges facing potato producers in gaining access to agricultural information in Semonkong. The farmers' experiences in accessing information sources and services affected productivity. The farmers had difficulty with ICT usage, coupled with a lack of rural electrification and limited access to highways in their villages. This poll also shows that there is a lack of infrastructure for farmers to charge their cell phones, causing them to leave them unattended most of the time.

The survey also identified problems with the extension's efforts in teaching the farmers about their production in Semonkong, Maseru. Officers of extension took into account obstacles preventing access to production data. Most extension officials claimed that a lack of roads and an absence of electrification were key obstacles. Extension programmes should ensure cost-effective outreach, create solutions that are specific to the needs of each farmer, and promote a farmer-friendly image. Following a downturn in agricultural production, people moved from rural to urban areas for lucrative employment. Despite declining yields, some farmers carry on cultivating.

The results show that the extension staff provide much information to farmers, accounting for the largest percentage. By accumulating educational skills, extension tools, and communication tools, 14% of the farmers gain from communication networks. However, there have been few extension agents working in the current environment to provide farmers with new technology. However, information has been shared with many stakeholders involved in agricultural activities using information and communication technology (ICT) techniques.

#### **6.4 Conclusion**

This study investigated the role of communication networks in promoting agricultural production and marketing. Based on the data collected and analysed in Chapter Five, several conclusions can be made. The use of ICT tools necessitates the provision of suitable ICT infrastructure, adequate ICT skills, adequate and cheap connectivity, and an appropriate ICT policy. However, the study found that most of the ICTs and ICT infrastructure in rural areas have poor capacity and consumption. As a result, buyers do not twist market information to their advantage to exploit farmers when they use information acquired through ICTs as a platform for bargaining with purchasers for their agricultural produce. Farmers benefit from greater selling prices, which leads to improved productivity. More than 60% of the respondents rated existing agricultural marketing information obtained via ICTs as accessible indicating that farmers in rural regions require agricultural marketing information to boost agricultural productivity.

#### **6.5 Recommendations**

The study has identified some key areas that should be improved to amplify communication networks in promoting agricultural production and marketing. The study, therefore, has the following recommendations: strengthening youth participation in modern agriculture, using modern agriculture, and improving ICT adoption and utilisation.

### ***6.5. 1 Use of ICT modern technology in agriculture***

To reduce the high cost of ICT, the Lesotho Government collaborates with another technology partner to encourage the usage of a communication network in disseminating agricultural production and marketing information. Furthermore, this will probably improve farmers' knowledge and skills, allowing them to make better use of existing communication networks. Farmers should be trained and motivated to use their communication network's digital capabilities to access agricultural information.

### ***6.5. 2 Improved ICT infrastructure***

The poor road accessibility insufficient road-enhanced transport, poor information transmission, and inadequate infrastructure development. There is a need to improve infrastructural development in rural areas. This study recommends the Government of Lesotho to enhance ICT infrastructural development. Literature notes many farmers as having limited access to agricultural information due to limited infrastructure, hence decreasing potato production and productivity.

### ***6.5. 3 Strengthening youth participation in modern agriculture.***

While young people consider farming to be unreliable for income generation, they can adopt new technologies in farming compared to adults. Young farmers might be more knowledgeable about cutting-edge practices, and more receptive to the risks involved in farming. In this situation, it is necessary to assist and encourage young people to work in agriculture. The Ministry of Gender, Sports, and Recreational Services should promote contemporary agriculture on behalf of the Lesotho government. Young people are more inclined towards adopting new farming techniques than adults. Their active involvement in farming will likely improve shortly.

### ***6.5. 4 Improved ICT adoption and utilisation***

Poor quality of agricultural information dissemination leads to preferential information access for farmers. With no information hub for farmers required information, it is imperative to have an information platform for agriculture. On this basis, this study recommends cutting-edge platforms for young people working in agriculture. It is also possible to create social media platforms for young people to engage, exchange knowledge, ask questions, and learn about new agricultural technologies.

## REFERENCES

- Aarons, H., & Willis, E. (2022). *The Sociological Quest: An introduction to the study of social life*. Taylor & Francis
- Abdulai, A., & Huffman, W. E. (2005). The diffusion of new agricultural technologies: The case of crossbred-cow technology in Tanzania. *American Journal of Agricultural Economics*, 87(3), 645-659.
- Abdulai, A. R., Kc, K. B., & Fraser, E. (2023). What factors influence the likelihood of rural farmer participation in digital agricultural services? experience from smallholder digitalization in Northern Ghana. *Outlook on Agriculture*, 52(1), 57-66.
- Abubakar, A. A., Jazim, F., Al-Mamary, Y. H., Abdulrab, M., Abdalraheem, S. G., Siddiqui, M. A., ... & Alquhaif, A. (2023). Factors influencing students' intention to use learning management system at Saudi Universities: A structural equation modeling approach. *Human Systems Management*, (Preprint), 1-14.
- Adamides, G., & Stylianou, A. (2018). Evaluation of the radio as an agricultural information source in rural areas. *Journal of Agricultural & Food Information*, 19(4), 362-376.
- Adomi, E. E., Ogbomo, M. O., & Inoni, O. E. (2003). Gender factor in crop farmers' access to agricultural information in rural areas of Delta State, Nigeria. *Library Review*, 52(8), 388-393.
- Adio, E. O., Abu, Y., Yusuf, S. K., & Nansoh, S. (2016). Use of agricultural information sources and services by farmers to improve productivity in Kwara State. *Library Philosophy and Practice*, 1456, 1â.
- AfDB, A. D. (2013). *Kingdom of Lesotho: Country strategy paper 2013-2017*.
- Ajani, E. N. (2014). Promoting the use of information and communication technologies (ICTs) for agricultural transformation in Sub-Saharan Africa: Policy implications. *Journal of Agricultural & Food Information*, 15(1), 42-53.
- Ajayi, S. (2001). What Africa needs to do to benefit from globalization. *Finance & Development*, 38(4), 6-6.
- Ajayi, G. O. (2002). Information and communication technologies in Africa. *International Centre for Theoretical Physics (ICTP)*, 1-15.
- Ajayi, S. O., Ogunode, N. J., & Ayoko, V. O. (2023). Challenges facing e-learning in basic education in Nigeria and the way forward. *Ta'lim va Rivojlanish Tahlili Onlayn Ilmiy Jurnali*, 3(5), 17-28.
- Aker, J. C., & Ksoll, C. (2016). Can mobile phones improve agricultural outcomes? Evidence from a randomized experiment in Niger. *Food Policy*, 60, 44-51.
- Aker, J. C., & Mbiti, I. M. (2010). Mobile phones and economic development in Africa. *Journal of Economic Perspectives*, 24(3), 207-232.

- Akintunde, M. A. O., & Oladele, O. I. (2019). Use of information communication technologies among agricultural extension officers in Lesotho. *Journal of Agricultural Extension*, 23(3), 50-65. <http://journal.aesonnigeria.org>.
- Alabi, O. O., Shoyombo, A. J., Ajala, A. O., & Ogunjimi, S. I. (2019). Animal agriculture: A viable tool for rural women empowerment and redemption from poverty. *International Journal of Civil Engineering and Technology*, 10(2), 2365-2373.
- Alan, R., Hassan, M. S., Bolong, J., Osman, M. N., Lepun, P., & Kamarudin, S. (2021). Descriptive Analysis: Television uses among communities in rural areas, Sarawak. *International Journal of Academic Research in Business and Social Sciences*, 11(11), 1258-1272.
- Albizua, A., Bennett, E., Pascual, U., & Larocque, G. (2020). The role of the social network structure on the spread of intensive agriculture: An example from Navarre, Spain. *Regional Environmental Change*, 20, 1-16.
- Alhassan, M., & Shehu, A. (2019). Community radio in promoting agriculture: A Study of Agric Panorama Programme on ABU FM Radio. *KIU Journal of Humanities*, 3(4), 57-62.
- Allison, E. H., & Ellis, F. (2001). The livelihoods approach and management of small-scale fisheries. *Marine Policy*, 25(5), 377-388.
- Amin, M. B., Issa, F. O., & Abba, M. M. (2018). Assessment of the use of radio for agricultural technology dissemination among farmers in Lere Local Government Area of Kaduna State, Nigeria. *Nigerian Journal of Agricultural Extension*, 19(3), 3.
- Angwenyi, I. B. (2016). *The Influence of Television in Promoting Agribusiness to the Youth in Kenya: A Case Study of Hhamba Shape Up on Citizen Television* (Doctoral Dissertation), University of Nairobi.
- Antwi, S.K. & Hamza, K. (2015). Qualitative and Quantitative Research Paradigms in Business Research: A Philosophical Reflection. *European Journal of Business and Management*, vol.7, no.3, pp217-225
- Apulu, I., & Latham, A. (2011). Drivers for information and communication technology adoption: A case study of Nigerian small and medium-sized enterprises. *International Journal of Business and Management*, 6(5), 51.
- Asemah, E. S. (2011). Public relations strategies and the implementation of the Millennium Development Goals in Nigeria. *Journal of Research in National Development*, 9(2), 163-172.
- Asenso-Okyere, K., & Mekonnen, D. A. (2012). The importance of ICTs in the provision of information for improving agricultural productivity and rural incomes in Africa. *African Human Development Report. UNDP Sponsored Research Series*.
- Ashley, C., & Carney, D. (1999). *Sustainable livelihoods: Lessons from early experience* (Vol. 7, No. 1). London: Department for International Development.
- Atiso, K., Folitse, B. Y., & Manteaw, S. A. (2021). Mobile Telephony and Agriculture Information Communication in Ghana: The Ho West district under review. *Library Philosophy and Practice*, 0\_1-28.



- Awan, A. A., Hamidouche, K., Hashmi, J. M., & Panda, D. K. (2017, January). S-Caffe: Co-designing mpi runtimes and caffe for scalable deep learning on modern GPU clusters. *In Proceedings of the 22nd ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming* (pp. 193-205).
- Ayariga, A. S. (2022). *Influence of Koob-Ne-Guliuk radio programme on livestock farming in the Bawku West district of Ghana* (Doctoral dissertation) University of Development Studies.
- Ayim, C., Kassahun, A., Addison, C., & Tekinerdogan, B. (2022). Adoption of ICT innovations in the agriculture sector in Africa: A review of the literature. *Agriculture & Food Security, 11*(1), 1-16.
- Balana, B., & Oyeyemi, M. (2020). *Credit constraints and agricultural technology adoption: Evidence from Nigeria* (Vol. 64). Intl Food Policy Res Inst.
- Balasundram, S. K., Shamshiri, R. R., Sridhara, S., & Rizan, N. (2023). The Role of Digital Agriculture in Mitigating Climate Change and Ensuring Food Security: An Overview. *Sustainability, 15*(6), 5325.
- Barrett, C. B., Reardon, T., Swinnen, J., & Zilberman, D. (2022). Agri-food value chain revolutions in low-and middle-income countries. *Journal of Economic Literature, 60*(4), 1316-1377.
- Besley, T., & Ghatak, M. (2007). Reforming public service delivery. *Journal of African Economies, 16*(suppl\_1), 127-156.
- Bhavanishankar Naik, B., & Bankapur, V. M. (2021). usage of communication channels for information dissemination by farmers of Belgavi district: *A Study, 7*(4), (254-264).
- Blumler, J. G., & Katz, E. (1974). *The Uses of Mass Communications: Current Perspectives on Gratifications Research*. Sage Annual Reviews of Communication Research Volume III.
- Bosch, T. (2014). Community radio. *The Handbook of Development Communication and Social Change, 426-438*.
- Bouchelouche, K., Ghomari, A. R., & Zemmouchi-Ghomari, L. (2021). Open Government Data (OGD) publication as Linked Open Data (LOD): A Survey. *International Journal of Computer and Information Technology 10*(1), (2279-0764).
- Boyce, C., & Neale, P. (2006). Conducting in-depth interviews: A guide for designing and conducting in-depth interviews for evaluation input. Pathfinder International Tool Series- Monitoring and Evaluation-2. Retrieve from [http://www.pathfind.org/site/DocServer/m\\_e\\_tool\\_series\\_in-depth\\_interviews.pdf?docID=6301](http://www.pathfind.org/site/DocServer/m_e_tool_series_in-depth_interviews.pdf?docID=6301)
- Byers, T. H. (2011). *Technology ventures from idea to enterprise*. Penn Plaza, New York, United States of America: McGraw-Hill Education
- Carney, L. T. (2003). 17 Restoration Techniques for *Nereocystis Luetkeana* (Mertens) Postels Et Ruprecht (Bull Kelp). *Journal of Phycology, 39*, 7-7.
- Cassim, A., Lilenstein, K., Oosthuizen, M., & Steenkamp, F. (2016). *Informality and inclusive growth in Sub-Saharan Africa*. Institute of Development Studies.

- Chambers, R., & Conway, G. (1992). *Sustainable rural livelihoods: practical concepts for the 21st century*. Institute of Development Studies (UK).
- Chapman, R., & Slaymaker, T. (2002). ICTs and rural development: a review of the literature, current. *London: Overseas Development Institute*.
- Chapman, R., Blench, R., Kranjac-Berisavljevic, G., & Zakariah, A. B. T. (2003). Rural radio in agricultural extension: The example of vernacular radio programmes on soil and water conservation in N. Ghana. *AgREN Network Paper*, 127(2), 456-489.
- Chhachhar, A. R., & Memon, B. (2019). Challenges in the usage of mobile phones regarding agricultural and marketing information among farmers in Sindh, Pakistan. *Indian Journal of Science and Technology*, 12(6), 1-9.
- Chhachhar, A. R., Qureshi, B., Khushk, G. M., & Ahmed, S. (2014). Impact of information and communication technologies in agriculture development. *Journal of Basic and Applied Scientific Research*, 4(1), 281-288.
- Chukwu, A. U. (2019). Globalization, urbanization, and food security challenges in Africa. *International Journal of Humanitatis Theoreticus*, 2(1), 82-96.
- Citaristi, I. (2022). World Food Programme—WFP. In *The Europa Directory of International Organizations 2022* (pp. 302-306). Routledge.
- Crawford, E. C., & Okigbo, C. C. (2014). Strategic communication campaigns. *Strategic urban health communication*, 11-23.
- Creswell, J. W., & Clark, V. L. P. (2017). *Designing and conducting mixed methods research*. Sage publications.
- Crossley, M. (2009). Rethinking context in comparative education. In *International Handbook of Comparative Education* (pp. 1173-1187). Dordrecht: Springer Netherlands.
- Crush, J. (Ed.). (2016). *The state of poverty and food insecurity in Maseru, Lesotho* (No. 21). Southern African Migration Programme.
- Daemane, T., & Muroyiwa, B. (2022). Factors influencing credit access for rural small-scale farmers in Lesotho: Evidence from maize farmers in Masianokeng. *World Journal of Advanced Research and Reviews*, 15(1), 757-768.
- Das, S., Ahmed, K. U., & Awal, M. A. (2021). The role of radio and television in the dissemination of agricultural technologies among farmers of Bangladesh. *Bangladesh Journal of Agriculture*, 55-64.
- Das, S. K., Hossain, M. M., Das, P. S., & Kabiraj, M. S. Use of radio by the farmers in receiving agricultural information.
- Davis, K., Dolly, D., Lamm, A. J., & Lamm, K. W. (2018). The future of extension: A network emergence perspective from the case of the Global Forum for Rural Advisory Services. *Journal of International Agricultural and Extension Education*, 25(4), 40-51.
- Dawadi, S., Shrestha, S., & Giri, R. A. (2021). Mixed-methods research: A discussion on its types, challenges, and criticisms. *Journal of Practical Studies in Education*, 2(2), 25-36.

- Deichmann, U., Goyal, A., & Mishra, D. (2016). Will digital technologies transform agriculture in developing countries? *Agricultural Economics*, 47(S1), 21-33.
- Denscombe, M. (2008). Communities of practice: A research paradigm for the mixed methods approach. *Journal of mixed methods research*, 2(3), 270-283.
- Dhahri, S., & Omri, A. (2020). Does foreign capital matter for the host country's agricultural production? Evidence from developing countries. *Review of World Economics*, 156, 153-181.
- Dorward, A., Poole, N., Morrison, J., Kydd, J., & Urey, I. (2003). Markets, institutions, and technology: Missing links in livelihoods analysis. *Development Policy Review*, 21(3), 319-332.
- Dutta & Bilbao-Osorio, B. (2012). *Living in a Hyperconnected World. The Global Information Technology Report 2012*: New York: World Bank.
- Dzidonu, C. (2002). A blueprint for developing national ICT policy in Africa. *African Technology Policy Studies Network*, 1-35.
- Eaton, D. & G. Meijerink. 2007. Markets, institutional change, and the new agenda for agriculture. Markets, Chains and Sustainable Development Strategy and Policy Paper, no.6. Stitching DLO: Wageningen. Available at: <http://www.boci.wur.nl/UK/Publications/>
- Ejike, I. K. (2021). Television advertisement and marketing performance of insurance companies: a study of insurance companies in Port Harcourt, River's state. *Emerald International Journal of Scientific and Contemporary Studies*, 1(1), 51-74.
- Ellis, F. (2000). *Rural livelihoods and diversity in developing countries*. Oxford University Press.
- FAOSTAT Statistical Database (2019). *Food and Agriculture Organization of the United Nations [FAO]*. 2019. Retrieved from <http://www.fao.org/faostat/en/>
- Farrington, J., Christoplos, I., Kidd, A. D., & Beckman, M. (2002). Can extension contribute to rural poverty reduction? Synthesis of a six-country study. *Agricultural Research and Extension Network Paper*, 123.
- Familusi, E. B., & Owoeye, P. O. (2014). An assessment of the use of radio and other means of information dissemination among the residents of Ado-Ekiti, Nigeria. *Library Philosophy & Practice*.
- Fombad, M. C., & Jiyane, G. V. (2019). The role of community radios in information dissemination to rural women in South Africa. *Journal of Librarianship and Information Science*, 51(1), 47-58.
- Funom, B. C. (2021). Sources and channels of agricultural information used by soybean farmers in Niger State, Nigeria. *Journal of Agripreneurship and Sustainable Development*, 4(2), 201-213.
- Gabre-Madhin, E. Z. (2001). *Market institutions, transaction costs, and social capital in the Ethiopian grain market* (Vol. 124). Intl Food Policy Res Inst.
- Garnham, N., & Mulgan, G. (1991). Broadband and the barriers to convergence in the European Community. *Telecommunications Policy*, 15(3), 182-194.
- Gc, R. K., & Hall, R. P. (2020). The commercialization of smallholder farming—A case study from the rural western middle hills of Nepal. *Agriculture*, 10(5), 143.

- Gebremeskel, S. (2017). *Practices and Challenges of Using ICT in Agro-processing Firms: The Case of Ethio Agri-CEFT Plc* (Doctoral dissertation), St. Mary's University.
- Gentles, S. J., Charles, C., Ploeg, J., & McKibbin, K. A. (2015). Sampling in qualitative research: Insights from an overview of the methods literature. *The qualitative report*, 20(11), 1772-1789.
- George, M. J. (2015). The status of the food industry and associated socio-economic implications in Lesotho: Challenges and opportunities. *Journal of Science Policy & Governance*.
- Gershom, A., Kambere, E., & Kaitesi, D. (2022). The relationship between feeder road network and agricultural production in Kiruhuradistrict Southwestern Uganda.
- Government of Lesotho. (2001). *Lesotho Vision 2020*. Maseru: GOL.
- Gillson, I., & Strychacz, N. (2010). Addressing the trade challenges facing landlocked LCDs: The experience of Lesotho. *Africa Trade Policy Note*, (8).
- Gillwald, A., Mothobi, O., & Deen-Swarray, M. (2017). The State of ICT in Lesotho (2016).
- Graham, S., & Marvin, S. (2002). *Telecommunications and the city: Electronic spaces, urban places*. Routledge.
- Gray, L. M., Wong-Wylie, G., Rempel, G. R., & Cook, K. (2020). Expanding qualitative research interviewing strategies: Zoom video communications. *The Qualitative Report*, 25(5), 1292-1301.
- Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In N. K. Denzin & Y. S. Lincoln (eds.), *Handbook of qualitative research* (pp. 105-117). London: Sage.
- Hamelink, C. J. (2019). The politics of global communication. *Global communication: a multicultural perspective*, 72.
- Hailu, G., Pittchar, J. O., Khan, Z. R., & Ochatum, N. (2018). Perceived preference of radio as an agricultural information source among smallholder farmers in Uganda. *International Journal of Agricultural Extension*, 5(3), 119-130.\
- Hansen, E. B., & Bøgh, S. (2021). Artificial intelligence and internet of things in small and medium-sized enterprises: A survey. *Journal of Manufacturing Systems*, 58, 362-372.
- Haque, M. (2010). Sampling methods in social research. *Global Research Methodology*, 8(5), 1-6.
- Harry, A. T., & Stanley, O. (2022). Role of mobile phone use in enhancing agricultural productivity of farmers in Etche Local Government Area, Rivers State. *International Journal of Agriculture and Earth Science*, 8(1), 1-19.
- Ibeawuchi, B. O., Adisa, P. T., Gbede, O. I., Bilisuma, K. W., Derara, S. F., & Aminu, H. A. (2021). Review of the use of video in agricultural extension to increase the adoption of agricultural innovation. *Journal of Community & Communication Research*, 6(2), 110-118.
- IbiAjayi, S. (2001). What Africa needs to do to benefit from globalization. *Finance and Development*, 38.
- Ibrahim, A. (2020). Effects of energy consumption, economic growth and population growth on carbon dioxide emissions: a dynamic approach for African economies (1990-2011).

- Ifeoma, O. D., & Mthitwa, H. T. (2015, May). An analysis of the impact of the use of mobile communication technologies by farmers in Zimbabwe. A case study of Esoko and Eco Farmer's platforms. In *Proceedings of SIG GlobDev Pre-ECIS Workshop*. Munster, Germany: SIG GlobDev.
- Igwenagu, C. (2016). *Fundamentals of research methodology and data collection*. LAP Lambert Academic Publishing.
- Inegbedion, H., Inegbedion, E. E., Osifo, S. J., Eze, S. C., Ayeni, A., & Akintimehin, O. (2020). Exposure to and usage of e-banking channels: Implications for bank customers' awareness and attitude to e-banking in Nigeria. *Journal of Science and Technology Policy Management, 11*(2), 133-148.
- Inoni, O., & Omotor, E. (2009). Effects of road infrastructure on agricultural output and income of rural households in Delta State, Nigeria. *Agricultural Tropicalet Subtropical, 42*(2), 90-97.
- Ishtiaq, M. (2019). Book review Creswell, JW (2014). Research design: qualitative, quantitative, and mixed methods approach. Thousand Oaks, ca: sage. *English Language Teaching, 12*(5), 40.
- Islam, M. A., & Aldaihani, F. M. F. (2022). Justification for adopting qualitative research method, research approaches, sampling strategy, sample size, interview method, saturation, and data analysis. *Journal of International Business and Management, 5*(1), 01-11.
- Johnston, P. B., Shapiro, J. N., Shatz, H. J., Bahney, B., Jung, D. F., Ryan, P. K., & Wallace, J. (2016). *Foundations of the Islamic State: management, money, and terror in Iraq, 2005-2010*. Rand Corporation.
- Kabirigi, M., Sekabira, H., Sun, Z., & Hermans, F. (2022). The use of mobile phones and the heterogeneity of banana farmers in Rwanda. *Environment, Development and Sustainability, 25*(6), 5315-5335.
- Kacharo, D. K. (2007). Agricultural information networks of farm women and role of agricultural extension: The case of Dale Woreda, southern nations, nationalities, and peoples' region. *Unpublished Thesis of M.Sc., Haramaya University, Haramaya, 27*.
- Kaee, A. C. (2019). *An Assessment of Inooro Fm's Mugambo Wa Murimi Programme on the Uptake of Information on Soil Fertility Management Technologies Among Smallholder Farmers in Kandara Sub- County, Murang'a County* (Doctoral dissertation), University of Nairobi.
- Kameswari, V. L., Kishore, D., & Gupta, V. (2011). ICTs for agricultural extension: a study in the Indian Himalayan region. *The Electronic Journal of Information Systems in Developing Countries, 48*(1), 1-12.
- Kansanga, M., P. Andersen, D. Kpienbaareh, S. Mason-Renton, K. Atuoye, Y. Sano, R. Antabe, and I. Luginaah. "Traditional agriculture in transition: Examining the impacts of agricultural modernization on smallholder farming in Ghana under the new Green Revolution." *International Journal of Sustainable Development & World Ecology 26*, no. 1 (2019): 11-24.
- Kenny, C. (2002). Information and communication technologies for direct poverty alleviation: costs and benefits. *Development Policy Review, (2)*, 141-157.

- Khan, M., & Won, Y. J. (2020). Transnationalization of TV serials: A comparative study of the exportation of Korean and Turkish TV serials. *European Journal of Social Sciences*, 59(2), 193-208.
- Kenny, C. (2002). Information and communication technologies for direct poverty alleviation: costs and benefits. *Development Policy Review*, 20(2), 141-157.
- Khan, N. A., Gao, Q., Ali, S., Shahbaz, B., Khan, P., & Abid, M. (2020). Analyzing ICT-enabled agricultural advisory services in Pakistan: evidence from a marginalized region of Punjab province. *Electronic Commerce Research*, 1-23.
- Khan, N., Ray, R. L., Sargani, G. R., Ihtisham, M., Khayyam, M., & Ismail, S. (2021). Current progress and prospects of agriculture technology: Gateway to sustainable agriculture. *Sustainability*, 13(9), 4883
- Kiptot, E., Franzel, S., Hebinck, P., & Richards, P. (2006). Sharing seed and knowledge: farmer to farmer dissemination of agroforestry technologies in western Kenya. *Agroforestry Systems*, 68, 167-179.
- Kohar, D., Gupta, A., Siwakoti, P. P., Gouli, S., Shrestha, P., & Sah, R. (2023). Effect of zinc and boron on the performance of rainy season local potato variety “Sete”(Solanum tuberosum L.) at Rukumkot, Rukum East, Nepal. *Archives of Agriculture and Environmental Science*, 8(2), 157-161.
- Kumar, K. R., Nain, M. S., Singh, R., & Bana, R. S. (2015). Analysis of farmers’ communication network and factors of knowledge regarding agro-meteorological parameters. *Indian Journal of Agricultural Sciences*, 85(12), 1592-6.
- Kumar, R., Kumar, S., & Chahal, P. (2023). Information and Communication Technologies (ICT) implementation. *Indian Journal of Agricultural Sciences*, 93(1), 119-121.
- Kursat, M. (2010). The Taxonomic Revision of Artemisia L. (*Asteraceae*) Genus Growing in Turkey. *Ph.D. Thesis, Firat*.
- Laudon & Traver, C. G. (2013). *E-commerce (pp. 1-912)*. Boston, MA: Pearson.
- Leal Filho, W., Tripathi, S. K., Andrade Guerra, J. B. S. O. D., Giné-Garriga, R., Orlovic Lovren, V., & Willats, J. (2019). Using the sustainable development goals towards a better understanding of sustainability challenges. *International Journal of Sustainable Development & World Ecology*, 26(2), 179-190.
- Lejakane, L. (1997). The Role of the News Agency in Development (Support) Communication: A Case Study of Lesotho. *Unpublished Ph.D. thesis, Department of Culture, Communication and Media Studies, University of Natal*.
- Lelimo, S., Tingum, E. N., Nchake, M., & Mohlori-Sepamo, K. (2021). Determinants of food security among rural households participating in the non-farm sector in Lesotho. *International Journal of Agricultural Policy and Research*, pp. 3-5.
- Lesaoana-Tshabalala, B. V. 2003. Agricultural information needs and resources available to agriculturalists and farmers in a developing country with special reference to Lesotho. MA thesis. Pretoria: University of Pretoria, Information Studies Department. Available at:

<http://etd. au.ac.za/theses/available/etd03242004-125946/restricted/ThabalaThesesFinal.pdf>. Accessed 2 April 2007.

- Lesotho Bureau of Statistics. (2019). 2018-2019\_agricultural\_production\_survey\_crops 27 (Maseru, Lesotho: Bureau of Statistics). Lesotho Bureau of Statistics. (2021a). Kingdom of Lesotho agricultural production survey crops 25 (Maseru, Lesotho: Bureau of Statistics).
- Lesotho Communication Authority (2017). The state of ICT in Lesotho, commissioned by the Lesotho Communications Authority and the International Telecommunication Union. completed in March 2017.
- Lesotho National Farmers Union. (2021). *The Potato Food Systems' Stakeholder Platform*.
- Lesotho Vulnerability Assessment Committee. (2018). Vulnerability assessment and analysis report. Maseru, Lesotho, 1–77
- LVAC, 2021. Lesotho Vulnerability and Analysis Report, Maseru: Kingdom of Lesotho.
- LVAC, 2022. Lesotho Vulnerability Assessment Report, Maseru: Kingdom of Lesotho. <https://www.bos.gov.ls/default.htm> [accessed on 15/05/2022]
- Lindsay, R., Mngonyama, S., Molahlehi, P., Ngwadla, X. E., & Ramonnye, G. J. (2022). A pilot study of thoron concentration in an underground thorium mine. *Health Physics*, 123(4), 315-321.
- Liu, Y., Ma, X., Shu, L., Hancke, G. P., & Abu-Mahfouz, A. M. (2020). From Industry 4.0 to Agriculture 4.0: Current status, enabling technologies, and research challenges. *IEEE Transactions on Industrial Informatics*, 17(6), 4322-4334.
- Lova Raju, K., & Vijayaraghavan, V. (2020). IoT technologies in an agricultural environment: A survey. *Wireless Personal Communications*, 113, 2415-2446.
- Lukungu, C. (2022). *Assessment of the effectiveness of communication channels disseminating fall armyworms information in maize production: a case of Kakamega county, Kenya* (doctoral dissertation), University of Nairobi.
- Mackenzie, N. & Knipe, S. (2006). Research dilemmas: paradigms, methods, and methodology. *Issues in Educational Research*, 16(2), 193–205.
- Madhavan, S. R. U. T. H. Y. (2017). Agriculture Information Needs of Farmers: An Overview. *International Journal of Science and Research (IJASR)*, 7(6), 209-216.
- Magala, D. B., Najjingo Mangheni, M., & Miiro, R. F. (2019). Actor social networks as knowledge sharing mechanisms in multi-stakeholder processes: A case of coffee innovation platforms of Uganda. *The Journal of Agricultural Education and Extension*, 25(4), 323-336.
- Magesa, M. M., Michael, K., & Ko, J. (2020). Access and use of agricultural market information by smallholder farmers: Measuring informational capabilities. *The Electronic Journal of Information Systems in Developing Countries*, 86(6), e12134.
- Malhan, I. V., & Rao, S. (2007, August). Impact of globalization and emerging information communication technologies on agricultural knowledge transfer to small farmers in India. In *World Library and Information Congress: 73rd IFLA General Conference and Council* (pp. 19-23).

- Manda, L. Z., & Chapota, R. (2015). Integrating radio and e-media in national agricultural policy: the case of agricultural extension and advisory services in Malawi. *Journal of Development and Communication Studies*, 4(1), 49-61.
- Mansour, T. (2022). Factors affecting mobile phone usage by farmers as a source of agricultural information in Sharqia Governorate, Egypt. *Tekirdağ Ziraat Fakültesi Dergisi*, 19(2), 412-425.
- Mapeshoane, M. J. (2020). A critical analysis into the land tenure system in Lesotho and its implication on foreign investment (Doctoral dissertation), North-West University South Africa.
- Maphephe, J. (2014). Information and communications technology lessons from Lesotho 2007-2013, benchmarking and evaluation towards full implementation of ICT policies and strategies. *Computing Information Systems Development Informatics and Allied Research*.
- Mardiana, H., & Kembauw, E. (2021, April). The role of diffusion of innovation in agriculture to compete in the ASEAN community. In *IOP Conference Series: Earth and Environmental Science* (Vol. 755, No. 1, p. 012074). IOP Publishing.
- Martey et al. (2014). Fertilizer Adoption and Use Intensity Among Smallholder Farmers in Northern Ghana. *Sustainable Agriculture Research*, 3(1).
- Masele, J. J. (2022). Information needs, sources, and access by small-scale horticultural crop farmers in Tanzania: A case of Morogoro urban district. DOI: <https://doi.org/10.21203/rs.3.rs-2159841/v1>.
- Masia Johane, Professor Philip Makama, Professor Oluremi, Ehsan Rizvi, Dr. Fedelis Asanjor, and Dr. P. Nkhabutlane (2021). *Lesotho Food Systems Context, Challenges, Opportunities*.
- Matthews & Ross, E. (2010). *Research methods: A practical guide for the social sciences*. Pearson Education Ltd. ISBN 9781405858502.
- Matuha, M., Molnar, J. J., Boyd, C. E., & Terhune, J. S. (2016). The role of mobile phones in facilitating aquaculture development in Uganda. *World Aquaculture*, 39.
- May, H., & Hearn, G. (2005). The mobile phone as media. *International Journal of Cultural Studies*, 8(2), 195-211.
- May, J., Karugia, J., & Ndokweni, M. (2007). Information and Communication Technologies and Agricultural development in Sub Saharan Africa: *Transformation and Employment Generation*, ( pp 26-34).
- Mbatha, M. W., Mnguni, H., & Mubecua, M. A. (2021). Subsistence farming as a sustainable livelihood approach for rural communities in South Africa. *African Journal of Development Studies*, 11(3), 55.
- McNamara, K. (2009). Improving agricultural productivity and markets: The role of information and communication technologies.
- Mdoda, L. (2023). Assessing the contribution and impact of access to extension services toward sustainable livelihoods and self-reliance in Eastern Cape Province, South Africa. *African Journal of Food, Agriculture, Nutrition & Development*, 23(4).



- Mhlaba, P., & Yusuf, S. F. G. (2020). Prospects of community radio broadcast as agricultural extension service delivery tool to smallholder farmers in South Africa. *Journal for New Generation Sciences*, 18(1), 31-44.
- Mhlanga, D., & Ndhlovu, E. (2020). Socio-economic implications of the COVID-19 pandemic on smallholder livelihoods in Zimbabwe.
- Ministry of Agriculture and Food Security. (2019). *Challenges Facing Basotho Smallholder Farmers. Report*. Lesotho: Government Printing. Maseru,
- Mittal, S., & Mehar, M. (2012). How do mobile phones contribute to the growth of small farmers? Evidence from India. *Quarterly Journal of International Agriculture*, 51(892-2016-65169), 227-244.
- Mohajan, H. K. (2020 ). Quantitative research: A successful investigation in natural and social sciences. *Journal of Economic Development, Environment, and People*, 9(4), 50-79.
- Mojaki, R. A., & Keregero, K. J. B. (2019). Turning challenges into opportunity: Potential for adoption of e-extension in Lesotho. *Journal of Agricultural Extension and Rural Development*, 11(11), 184-191.
- Mokotjo, W., & Kalusopa, T. (2010). Evaluation of the agricultural information service (AIS) in Lesotho. *International Journal of Information Management*, 30(4), 350-356.
- Molahlehi, L., Steyn, J. M., & Haverkort, A. J. (2013). Potato crop response to genotype and environment in subtropical highland agroecology. *Potato Research*, 56, 237-258.
- Mothibeli, K., Lekota, M., Liphoto, M., Morojele, M. E., & Muzhinji, N. (2023). First Report of Rhizoctonia Solani Associated with Black Scurf of Potato Tubers in Lesotho. *International Journal of Phytopathology*, 12(1), 87-97.
- Mphahama, L. E. (2011). Institutional Constraints to Horticulture Production and Marketing in Lesotho. *The University of Fort Hare*.
- Msangi, N. H. (2020). The Contribution of Radio in Promoting Agricultural Activities in Rural Tanzania: A Case of Radio Nyemo FM in Dodoma Rural District (Doctoral dissertation), The Open University of Tanzania.
- Mtega, W. P. (2021). Communication channels for exchanging agricultural information among Tanzanian farmers: A meta-analysis. *IFLA journal*, 47(4), 570-579.
- Mubofu, C., & Elia, E. (2017). Disseminating Agricultural Research Information: A case study of Farmers in Mlolo, Lupalama, and Wenda villages in Iringa district, Tanzania. *University of Dar es Salaam Library Journal*, 12(2), 80-97.
- Murray, C. (2001). Livelihoods research: some conceptual and methodological issues. *Chronic Poverty Research Centre Working Paper*, (5).
- Musingafi, M. C., Mapuranga, B., Chiwanza, K., & Zebron, S. (2015). Challenges for open and distance learning (ODL) students: Experiences from students of the Zimbabwe Open University. *Journal of Education and Practice*, 6(18), 59-66.

- Musonda, C. (2020). The impact of a good road network on agricultural development in Zambia. A *Case Study of Mumbai District (Doctoral dissertation)*.
- Nandi, B., & Subramaniam, G. (2012). Evolution in Broadband Technology and Future of Wireless Broadband. In *Wireless Technologies: Concepts, Methodologies, Tools and Applications* (pp. 1928-1957). IGI Global.
- Narine, L. K., Harder, A., & Roberts, T. G. (2019). Farmers' intention to use text messaging for extension services in Trinidad. *The Journal of Agricultural Education and Extension*, 25(4), 293-306.
- Nasiru, M., Haruna, U., & Garba, A. (2012). *Economics of livestock marketing in Gamawa local government area, Bauchi State, Nigeria* (No. 304-2016-4818, pp. 411-424).
- Nazari, M. R., & Hasbullah, A. H. (2005). Farmers' approach and access to information and communication technology in the efficient use of modern irrigation methods. *Editorial Advisory Board*, 21(1), 37-44.
- NSDP II. (2019). *In Pursuit of Economic and Institutional Transformation for Private Sector-led Jobs and Inclusive Growth. Maseru: Government of Lesotho, National Strategic Development Plan(NSDP II)*. Maseru: Kingdom of Lesotho.
- Nayak, J. K., & Singh, P. (2021). *Fundamentals of research methodology problems and prospects*. SSDN Publishers & Distributors.
- Ndimbwa, T., Ndumbaro, F., & Mwantimwa, K. (2019). Delivery mechanisms of agricultural information and knowledge to smallholder farmers in Tanzania: A meta-analysis study. *University of Dar es Salaam Library Journal*, 14(2), 87-98.
- Ngezahayo, E., Burrow, M., & Ghataora, G. (2019). Rural Roads—roles, challenges and solutions for Sub-Saharan Africa's sustainable development. *Int. Journal of Latest Eng. and Manag. Research (ISSN: 2455-4847)*, 4(10), 70-79.
- Nguimkeu, P., & Okou, C. (2021). Leveraging digital technologies to boost productivity in the informal sector in Sub-Saharan Africa. *Review of Policy Research*, 38(6), 707-731.
- Nirmala, Y. (2018). Role of Community Radio in Promoting Agriculture in India, *International Journal of Research*, 5(1), 3-5.
- Njelekela, C., & Sanga, C. (2015). Contribution of information and communication technology in improving access to market information among smallholder farmers: The case study of Kilosa District. *The International Journal of Management Science and Information Technology (IJMSIT)*, (17), 56-71.
- Nwaerandu, N. G., & Thompson, G. (1987). The use of educational radio in developing countries: Lessons from the past. *Journal of Distance Education*, 2(2), 43-54.
- Nwafor, C. U., & Nwafor, I. C. (2020). Communication networks used by smallholder livestock farmers during disease outbreaks: A case study in the Free State, South Africa. *Open Agriculture*, 7(1), 808-819.

- Oben, A. I. (2021). Research Instruments: A Questionnaire And An Interview Guide Used To Investigate The Implementation Of Higher Education Objectives And The Attainment Of Cameroon's Vision 2035. *European Journal of Education Studies*, 8(7).
- Obidike, N. A. (2011). Rural farmers' problems accessing agricultural information: A case study of Nsukka local government area of Enugu State, Nigeria. *Library Philosophy and Practice*, 660(1), 1-11.
- O'Dea, B., Han, J., Batterham, P. J., Achilles, M. R., Cleave, A. L., Werner-Seidler, A., ... & Christensen, H. (2020). A randomized controlled trial of a relationship-focused mobile phone application for improving adolescents' mental health. *Journal of Child Psychology and Psychiatry*, 61(8), 899-913.
- Ogola, P. A. (2015). *Assessing communication channels and the impact of agricultural information used by farmers in watermelon production in Yimbo eastward, Siaya County* (Doctoral dissertation), University of Nairobi.
- Ogutu, S. O., Okello, J. J., & Otieno, D. J. (2014). Impact of information and communication technology-based market information services on smallholder farm input use and productivity: The case of Kenya. *World Development*, 64, 311-321.
- Olorunfemi, S. O. (2020). Rural road infrastructural challenges: An impediment to agricultural development in Idanre Local Government Area of Ondo State, Nigeria. *Ghana Journal of Geography*, 12(2), 108-124.
- Oluwatayo, I. B., Sebetha, P., & Ojo, A. O. (2021). Assessment of factors hindering marketing among smallholder vegetable cooperative farmers in Polokwane Municipality, Limpopo Province, South Africa. *Mesopotamia Journal of Agriculture*, 49(2), 45-55.
- Olowu, F. (1998). Quality and costs of family planning as elicited by an adolescent mystery client trial in Nigeria. *African Journal of Reproductive Health*, 2(1), 49-60.
- Opara, U. N. (2008). Agricultural information sources used by farmers in Imo State, Nigeria. *Information Development*, 24(4), 289-295.
- Otekunrin, O. A., Momoh, S., & Ayinde, I. A. (2019). Smallholder farmers' market participation: Concepts and methodological approach from Sub-Saharan Africa. *Current Agriculture Research Journal*, 7(2), 139.
- Pace, D. S. (2021). Probability and non-probability sampling entry point for undergraduate researchers. *International Journal of Quantitative and Qualitative Research Methods*, 9(2), 1-15.
- Panda, S., Modak, S., Devi, Y. L., Das, L., Pal, P. K., & Nain, M. S. (2019). Access and usage of Information and Communication Technology (ICT) to accelerate farmers' income.
- Pankomera & van Greunen, D. (2019). Opportunities, barriers, and adoption factors of mobile commerce for the informal sector in developing countries in Africa: A systematic review. *The Electronic Journal of Information Systems in Developing Countries*.
- Paradza, G. G. (2021). Women and land inheritance under legal pluralism in Lesotho. In *Land governance and gender: the tenure-gender nexus in land management and land policy* (pp. 182-192). Wallingford UK: CABI.

- Parvizian, F., Hosseinejad, G. H., & Lashgarara, F. (2011). Investigating the role of radio and television programs on the improvement of agricultural extension. *American Journal of Scientific Research*, 16(1), 6-14.
- Patwary, A. K., Chowdhury, M. M., Mohamed, A. E., & Azim, M. S. (2020). Dissemination of Information and Communication Technology (ICT) in the tourism industry: Pros and cons. *International Journal of Multidisciplinary Sciences and Advanced Technology*, 1(8), 36-42.
- Poulton, C., Kydd, J., & Dorward, A. (2006). Overcoming market constraints on pro-poor agricultural growth in Sub-Saharan Africa. *Development Policy Review*, 24(3), 243-277.
- Poku, N. K., Renwick, N., & Porto, J. G. (2007). Human security and development in Africa. *International Affairs*, 83(6), 1155-1170.
- Prell, C. (2011). Social network analysis: History, theory, and methodology. *Social Network Analysis*, 1-272.
- Pule, N. (2017). *The state of ICT in Lesotho (2016)*-. Lesotho Communications Authority and The International Telecommunication Union.
- Phuu, S. M. M. (2022). *A Study on Rural Road Infrastructure Development in Gyopinkauk Township* (Doctoral dissertation,) Meral Portal.
- Prell, C. (2011). Social network analysis: History, theory, and methodology. *Social Network Analysis*, 1-272.
- Rahm, M. R., & Huffman, W. E. (1984). The adoption of reduced tillage: the role of human capital and other variables. *American journal of agricultural economics*, 66(4), 405-413.
- Rahman, M. S., Haque, M. E., & Afrad, M. S. I. (2020). Utility of mobile phone usage in agricultural information dissemination in Bangladesh. *East African Scholars Journal of Agriculture and Life Sciences*, 3(6), 154-170.
- Rajagopal, A. (2019). *Managing startup enterprises in emerging markets: Leadership dynamics and marketing strategies*. Springer Nature.
- Rangayasami, A., & Kannan, K. (2022). Information and Advanced Technology Applied at Agriculture and Livestock Development. In *Agro-biodiversity and Agri-ecosystem Management* (pp. 323-339). Singapore: Springer Nature Singapore.
- Rantšo, T. A. (2016). The role of the non-farm sector in rural development in Lesotho. *The Journal of Modern African Studies*, 54(2), 317-338.
- Rantšo, T. A., & Seboka, M. (2019). Agriculture and food security in Lesotho: Government-sponsored block farming programme in the Berea, Leribe, and Maseru Districts. *Cogent Food & Agriculture*, 5(1), 1657300.
- Rathod, P., Chander, M., & Bardhan, D. (2016). Adoption status and influencing factors of mobile telephony in Dairy sector: A study in four States of India. *Agricultural Economics Research Review*, 29(1), 15-26.

- Razaque, A., & Sallah, M. (2013). The use of mobile phones among farmers for agriculture development. *Int. J. Sci. Res*, 2, 95-98.
- Reva, A. (2019). *Linking Smallholders to Markets: A Supplier Development Program for Vegetable Farmers in Lesotho*. World Bank.
- Ribba, E. (2019). Factors affecting radio broadcasts to schools in Kenya: A case study of public primary schools in Rangwe Division, Homa, Bay County. *International Journal of Recent Innovations in Academic Research*, 3(11), 1-23.
- Rogers, S. L., Letourneau, P. C., Palm, S. L., McCarthy, J., & Furcht, L. T. (1983). Neurite extension by peripheral and central nervous system neurons in response to substratum-bound fibronectin and laminin. *Developmental Biology*, 98(1), 212-220.
- Rogers. (1998). The definition and measurement of innovation (Vol. 98) Parkville, VIC. *Melbourne Institute of Applied Economic and Social Research*, (pp. 1-27).
- Rogers, E. M. (2003). *Diffusion of innovations*. New York:: (5th ed.). Free Press.
- Rohini, P., Tripathi, S., Preeti, C. M., Renuka, A., Gonzales, J. L. A., & Gangodkar, D. (2022, April). A study on the adoption of wireless communication in big data analytics using neural networks and deep learning. In *2022 2nd International Conference on Advance Computing and Innovative Technologies in Engineering (ICACITE)* (pp. 1071-1076). IEEE.
- Rolling, N. (1988). *Extension science: Information systems in agricultural development*. New York: Cambridge University Press.
- Ross, T. (2012). *EBOOK: A Survival Guide for Health Research Methods*. (UK).: McGraw-Hill Education.
- Sabo, B. B., Isah, S. D., Chamo, A. M., & Rabi, M. A. (2017). Role of smallholder farmers in Nigeria's food security. *Scholarly Journal of Agricultural Science*, 7(1), 1-5.
- Sadiq, M. Sanusi, I. P. Singh, and Muhammad Makarfi Ahmad. "Effect of IFAD-VCDP on input-output commercialization of rice farmers in the Niger State of Nigeria." *Alinteri Journal of Agriculture Science* 35, no. 2 (2020).
- Saka, T. K. (2003). *Radio Lesotho in a changing broadcasting environment*. (Doctoral dissertation), University of Natal.
- Scott, S., & McGuire, J. (2017). Using Diffusion of Innovation Theory to Promote Universally Designed College Instruction. *International Journal of Teaching and Learning in Higher Education*, 29(1), 119-128.
- Sefika, M. R., Mavetera, M., & Mavetera, C. G. (2013). Investigating the benefits of ICT in Lesotho Rural Communities of Mabote and Khubetsoana. *Journal of African Research in Business & Technology*, 2013, 1-17.
- Sehar, M. (2018). Factors influencing market access and livestock marketing inefficiency in Mpumalanga Province, South Africa. Master of Science thesis. *The University of South Africa*, 1-93.

- Sehloho, M. E. (2013). *The role of networks in civil society in Lesotho: A case study of World Vision Lesotho* (Doctoral dissertation), University of KwaZulu-Natal.
- Seko, Q. A., & Jongrungrot, V. (2022). Economic modeling and simulation analysis of maize-based smallholder farming systems in the Senqu River Valley agroecological zone, Lesotho. *Cogent Food & Agriculture*, 8(1), 2086287.
- Selvaraj, M., & Ibrahim, M. S. (2012). Indian agricultural marketing- a review. *Asian Journal of Agriculture and Rural Development*, 2(1), 69-75.
- Sennuga, S. O., Conway, J. S., & Sennuga, M. A. (2020). Impact of information and communication technologies (ICTS) on agricultural productivity among smallholder farmers: Evidence from Sub-Saharan African communities. *International Journal of Agricultural Extension and Rural Development Studies*, 7(1), 27-43.
- Sife, A. S., Kiondo, E., & Lyimo-Macha, J. G. (2010). Contribution of mobile phones to rural livelihoods and poverty reduction in Morogoro region, Tanzania. *The Electronic Journal of Information Systems in Developing Countries*, 42(1), 1-15.
- Starkey, P. and Hine, J., TRL (2020). Rural transport services: operational characteristics and options for improvements. Phase 3 Report. Interactions: Maintenance and Provision of Access for Rural Transport Services (IMPARTS) Project. Recap GEN2136A. London: ReCAP for DFID.
- Sule, B. A., Datsu, J. B., Abubakar, S., & Tauheed, L. (2021). Farmer's perception of the effectiveness of information and communication technologies in dissemination of agricultural information to rural farmers in Niger state, Nigeria. *Journal of Agripreneurship and Sustainable Development*, 4(1), 150-158.
- Sullivan, B. (2019). The new age of radio: How ICTs are changing rural radio in Africa. *Gates Open Res*, 3(1171), 1171.
- Taherdoost, H. (2021). Data collection methods and tools for research; a step-by-step guide to choosing data collection techniques for academic and business research projects. *International Journal of Academic Research in Management (IJARM)*, 10(1), 10-38.
- Tehrani, M. (1999). *Global communication and world politics: Domination, development, and discourse*. Lynne Rienner Publishers.
- Tekka, R. S., & Msangi, S. M. (2020). Effect of a strong government in attaining outstanding performance on construction projects: Stakeholder's opinions in Tanzania. *Industrial Engineering*, 4(2), 55-60.
- Thamae, L. Z. (2015). Lesotho telecommunications sector reform: An assessment of regulatory governance and substance. *International Journal of Technology Policy and Law*, 2(1), 71-89.
- Thapa, A., Shrestha, D., Baudhacharya, N., Ramtel, R., Thapa, S., & Poudel, S. (2020). Information and communication technology (ICT) mediated extension services in agriculture in Nepal-A review. *Acta Informatica Malaysia*, 4(2), 33-36.
- The Government of Lesotho. (2022). *WFP country brief report*. Lesotho.

- Thompson, S., & Sonka, S. T. (1997). Potential effects of information technologies on the economic performance of agricultural and food markets. *American Journal of Agricultural Economics*, 79(2), 657-662.
- Twaakyondo, H. M. (2011). Key issues in information communication technology policy review process: The case of Tanzania. *Journal of Computing and ICT Research*, 5(2), 46-58.
- UNICEF. (2021). The state of food security and nutrition in the world 2021.
- Usman, T., Ango, A. K., & Barau, A. A. (2013). Evaluation of adoption of improved rice varieties among small-scale farmers: A case of Goronyo local government area of Sokoto State, North-Western Nigeria. *International Journal of Agricultural Innovations and Research*, 2(3), 408-414.
- Vadivelu, A., & Kiran, B. R. (2013). Problems and prospects of agricultural marketing in India: An overview. *International Journal of Agricultural and Food Science*, 3(3), 108-118.
- Vasumathi, P., & Arun, C. J. (2021). Young farmers' intention to use social media in marketing agro products: A conceptual framework. *Indian Journal of Economics and Business*, 20(2), 359-70.
- Vincent, K., & Cull, T. (2013). "Ten seeds": How mobiles have contributed to development in women-led farming cooperatives in Lesotho. *Information Technologies & International Development*, 9(1), pp-37.
- WFP & UNICEF. (2022). *The state of food security and nutrition in the world 2022*.
- Wagner, C., & Maree, D. (2007). Teaching research methodology: Implications for the road ahead. *South African Journal of Psychology*, 37(1), 121-134.
- Wahab, N. H. A., Sunar, N., Ariffin, S. H., Wong, K. Y., & Aun, Y. (2022). Indoor Positioning System: A Review. *International Journal of Advanced Computer Science and Applications*, 13(6).
- Walrand, J. (1991). *Communication networks: a first course* (pp. I-XVI). Boston, MA: Irwin.
- Wani, T. A., & Ali, S. W. (2015). Innovation diffusion theory. *Journal of General Management Research*, 3(2), 101-118.
- Wei, G., & Claire, K. (2022). The promise of the Internet for rural economic development in China: A study of agricultural e-commerce. *Peking University Law Journal*, 10(2), 151-172.
- World Bank. (2008). *Public sector reform: What works and why? An IEG evaluation of World Bank support*. The World Bank.
- World Bank Group. (2016). *World Development Report 2016: Digital dividends*. World Bank Publications.
- World Bank. (2018). *Global Economic Prospects, January 2018: Broad-Based Upturn, but for How Long?* The World Bank.
- World Bank. (2019). *The World Bank Annual Report 2019: Ending Poverty, Investing in Opportunity*.
- World Bank. (2020). *Poverty and shared prosperity 2020: Reversals of fortune*. The World Bank.

- Wudad, A., Naser, S., & Lameso, L. (2021). The impact of improved road networks on the marketing of vegetables and households' income in Dedo district, Oromia regional state, Ethiopia. *Heliyon*, 7(10).
- World Health Organisation (2009) Addressing Adverse Childhood Experiences to Improve Public Health: Expert Consultation, 4-5 May 2009: Meeting Report, [https://www.who.int/violence\\_injury\\_prevention/olence/activities/adverse\\_childhood\\_experiences/global\\_research\\_network\\_may\\_2009.pdf](https://www.who.int/violence_injury_prevention/olence/activities/adverse_childhood_experiences/global_research_network_may_2009.pdf) [accessed 29.01.2019].
- Yu, Z., & Zhang, K. (2022). The determinants of purchase intention on agricultural products via public-interest live streaming for farmers during the COVID-19 pandemic. *Sustainability*, 14(21), 13921.
- Yusuf, I. E. (2020). Impact of road transport on tomato production and marketing in Nigeria. *Journal of Nigeria Transport History*, 1(2), 1-18.
- Ziervogel, G. (2004). Targeting seasonal climate forecasts for integration into household level decisions: the case of smallholder farmers in Lesotho. *Geographical Journal*, 170(1), 6-21.



**APPENDIX**  
**QUESTIONNAIRE**

**SECTION A: DEMOGRAPHIC INFORMATION OF A FARMER**

**1. Gender of a farmer**

Gender	Tick [x]
Female	{ }
Male	{ }

**2. What is your age?**

Age categories	Tick [x]
15 – 20	{ }
21 – 25	{ } ..
26 – 30	..... { }
31 – 35	..... { }
36- 45	>..... { }
46-50	..... { }
Above 51	..... { }

**3. What is your level of education?**

Education Level	Tick [x]
No Education	{ }
Primary	{ }
Secondary	{ }
College	{ }
University	{ }
Other (specify).....	

**4. How many members are there in your household?**

Members	Tick [x]
None	{ }
2 – 4	..... { }
5 – 9	..... { } ...
10 – 14	.... ..... { }
15 and above .....	

**5. In which village is your field located?**

Village	Tick [x]
Ha Moahloli	{ }
Ha Tsekana	{ }
Tšenekeng	{ }
Likoeneng Ha Pakela	{ }
Ha Rasefale	{ }
Ha Tsionyana	{ }

Other (Specify).....

**SECTION B: LAND USE AND FARM PRODUCTION**

**6. When did you start potato farming?**

Farming Experience	Tick [x]
Under 5 years	{ }
5 - 10 years	{ }
10 - 15 years	{ }
16 - 20 years	{ }
21years and above	{ }

**7. What motivated you to be a potato farmer?**

.....  
 .....

**8. How many fields do you own or use for farming?**

Number of fields operate	Tick [x]
1	{ }.....
2	{ }
3	..... { }..
4	{ } ....
5	{ }.....
6 and above.....	

**9. How many of your fields are planted with potatoes?**

Number of planted fields	Tick [x]
1	{ }

2	{ }
3	{ }
4	{ }
5	{ }
6 and above	{ }

10. What is the ownership of your land?

Ownership of the Land	Tick [x]
Own/inherit	{ }
Sharecropping	{ }
Rented	{ }
Borrowed	{ }

Other (specify).....

11. What is the size of the land you plant potatoes?

Size of the land Hectares of Land	Tick [x]
1-5 Hectares	{ }
6-10 Hectares	{ }
11-15 Hectares	{ }
16-20 Hectares	{ }
21-25 Hectares	{ }
26 Hectares and above	{ }

12. Do you use any type of farm inputs

Yes	{ }
No	{ }

13. If yes to Question 12 above, what type of Fertiliser do you use?

Type of Fertiliser	Tick [x]
Inorganic Fertilizer	{ }
Organic Fertiliser	{ }
Organic Mineral Fertiliser	{ }
Bio Fertiliser	{ }
Manure	{ }

Other (Specify).....

14. Where do you source potato seedlings?

Sources potato seedlings	Tick [x]
From the previous harvest	{ }
From local agribusiness shops	{ }
From street vendors	{ }

Other (Specify).....

15. Are the seed certified?

Yes	{ }
No	{ }

16. If No, why do you use uncertified seedlings?

.....  
 .....

17. At what time do you plant potatoes?

Time to plant	Tick [x]
September	{ }
October	{ }
November	{ }
December	{ }
January	{ }
February	{ }
Other (Specify).....,	

18. What time do you harvest potatoes?

Time to Harvest	Tick [x]
January	{ }
February	{ }
March	{ }
April	{ }
May	{ }
Other (Specify).....	

19. What is the total quantity of crops produced from the previous harvest?

Number of bags per crop produced	Tick [x]
5 – 10 Bag	{ }
11 – 15 Bags	{ }
16 – 20 Bags	{ }
21 – 25 Bags	{ }
26 – 30 Bags	{ }
31- 35 Bags	{ }
36 – 40 Bags	{ }
41 – 45 Bags	{ }
46 – 50 Bags	{ }
51 and above bags	{ }

20. What is the total quantity of crops produced for the 2023/24 agricultural year?

Number of bags per crop produced	Tick [x]
5 – 10 Bag	{ }
11 – 15 Bags	{ }
16 – 20 Bags	{ }
21 – 25 Bags	{ }
26 – 30 Bags	{ }
31- 35 Bags	{ }
36 – 40 Bags	{ }

- 41 – 45 Bags { }
- 46 – 50 Bags { }
- 51 and above bags { }

21. What is the purpose of your production?

Production purpose	Tick [x]
Consumption	{ }
Market	{ }
Consumption and market	{ }

Other (Specify):.....

**SECTION C: AGRICULTURAL PRODUCTION COMMUNICATION INFORMATION.**

22. Do you use or access communication networks for agricultural Production?

- Yes { }
- No { }

23. If Yes to Question 22 above, what communication networks do you use for agricultural production?

Communication channels	Tick [x]
Mobile phone	{ }
Radio	{ }
WhatsApp	{ }
Facebook	{ }
Extension	{ }
Television	{ }
Books	{ }
Magazines	{ }
News Papers	{ }
Other (Specify).....	

24. How easily accessible are the production communication networks in your area?

- Accessible { }
- Easily accessible { }
- Not easily accessible { }
- Not accessible { }

Other (specify).....

25. If production communication networks are not easily accessible in your area, how do you access them?

.....  
.....

26. What kind of Production information do you get from the communication networks?

- | Production information  | Tick [x] |
|-------------------------|----------|
| Seed inputs             | { }      |
| Land Preparation        | { }      |
| Pest and Disease        | { }      |
| Methods of Irrigation   | { }      |
| Cropping Patterns       | { }      |
| Fertilizer applications | { }      |
| Soil Improvement        | { }      |

Other (Specify).....

27. How useful is information obtained from communication networks to help you increase agricultural production?

- | The usefulness of information | Tick [x] |
|-------------------------------|----------|
| Very Useful                   | { }      |
| Useful                        | { }      |
| Not Useful                    | { }      |
| Not useful at all             | { }      |

Other (specify).....

28. If information from production communication networks is not useful, what do you use as an alternative?

.....  
.....

29. What challenges do you encounter when accessing agriculture production information?

Challenges	Tick [x]
Poor networks Signal	{ }
The cost of networks is too high	{ }
Poor road access	{ }
Other (Specify).....	

SECTION D: AGRICULTURE MARKETING INFORMATION TECHNOLOGY.

30. What quantity of potatoes was sold in the last agricultural season?

Number of potato bags sold	Tick [x]
5 – 10 Bags	{ }
11 – 15 Bags	{ }
16 – 20 Bags	{ }
21 – 25 Bags	{ }
26 – 30 Bags	{ }
31 – 35 Bags	{ }
36 – 40 Bags	{ }
41 – 45 Bags	{ }
46 – 50 Bags	{ }
51 and above bags	{ }

31. What quantity of crops is sold for the year 2023/24 agricultural year?

Number of potato bags sold	Tick [x]
5 – 10 Bags	{ }
11 – 15 Bags	{ }
16 – 20 Bags	{ }
21 – 25 Bags	{ }
26 – 30 Bags	{ }



31 – 35 Bags	{ }
36 – 40 Bags	{ }
41 – 45 Bags	{ }
46 – 50 Bags	{ }
51 and above bags	{ }

32. Where do you sell your produce?

Market	Tick [x]
Farmgate	{ }
Local People/villagers	{ }
Shops	{ }
Supermarkets	{ }
Market Centre	{ }
Other (Specify).....	

33. Which communication networks do you use for marketing your products?

Communication channels	Tick [x]
Mobile phone	{ }
Radio	{ }
Facebook	{ }
WhatsApp	{ }
Extension	{ }
Television	{ }
Books	{ }
Magazines	{ }
News Papers	{ }
Other (Specify).....	

34. What are the benefits using of communication networks in promoting agricultural marketing information?

.....

.....

35. Which marketing information do you access?

Type of Information	Tick [x]
Market days	{ }
The market where the product can be sold.	{ }
Type of product to sell in the market.	{ }
Different market locations	{ }
Other (Specify).....	

**SECTION F: EXTENSION STAFF ON COMMUNICATION NETWORKS IN AGRICULTURE PRODUCTION**

36. Do farmers use communication networks to get information for the production of potatoes?

Yes	{ }
No	{ }

37. If Yes to Question 36 above, what information do they use for the production of potatoes?

Production information	Tick [x]
Seed inputs	{ }
Land Preparation	{ }
Pest and Disease	{ }
Methods of Irrigation	{ }
Cropping Patterns	{ }
Fertilizer applications	{ }
Soil Improvement	{ }
Other (Specify).....	

38. If No to Question 36 above, indicate Why?

.....  
.....

39. What communication networks do you use to share agriculture production information with farmers?

Communication networks	Tick [x]
Mobile phone	{ }
Radio	{ }
WhatsApp	{ }
Facebook	{ }
Extension	{ }
Television	{ }
Books	{ }
Magazines	{ }
News Papers	{ }
Other (Specify).....	

40. What type of agriculture production information do you disseminate to farmers?

.....  
 .....

41. What are the challenges hindering farmers from getting agricultural production information?

.....  
 .....

42. What can be done to improve communication networks for farmers to receive and use agriculture production information?

.....  
 .....

**SECTION G: EXTENSION STAFF: COMMUNICATION CHANNELS PROMOTING AGRICULTURE MARKETING**

43. Do farmers use communication networks to market their products?

- Yes { }
- No { }

44. If Yes to Question 43, What communication networks do they use?

Communication channels	Tick [x]
Mobile phone	{ }

- Radio { }
- WhatsApp { }
- Facebook { }
- Extension { }
- Television { }
- Books { }
- Magazines { }
- News Papers { }

Other (Specify).....

45. If No to Question 43, indicate why?

.....  
 .....

46. What agriculture marketing information is provided to the potato farmers through a communication network?

Type of Information	Tick [x]
Market days	{ }
The market where the product can be sold.	{ }
Type of product to sell in the market.	{ }
Price of the Products	{ }
Different market locations	{ }
Other (Specify).....	

47. Do you disseminate agriculture marketing information through communication networks to farmers?

- Yes { }
- No { }

48. If Yes to Question 47, What agriculture marketing information do you provide?

.....  
 .....

49. If No to Question 47, indicate why?

.....

.....  
50. What are the challenges hindering farmers from getting agricultural marketing information?  
.....

.....  
51. What can be done to improve communication networks for farmers to receive and use agriculture marketing information?  
.....  
.....

THANK YOU FOR YOUR COORPORATION