THE NATIONAL UNIVERSITY OF LESOTHO

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THE CONTRIBUTION OF POTATO SEED FARMING TO THE LIVELIHOODS OF THE FARM HOUSEHOLDS AT SEMONKONG AND HA MARAKABEI IN THE MASERU DISTRICT, LESOTHO.

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DECLARATION

I, Rethabile 'Malikhetla Pelane, 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 presented as a requirement for any degree in the Faculty of Humanities at the National University of Lesotho or anywhere else before. The literature, data and models that have been borrowed from other people or organisations and cited in the paper are all acknowledged accordingly and are included in the list of references. Finally, I 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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Date……

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Date……

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LIST OF ACRONYMS

ASTGS	Agricultural Transformation and Growth Strategy
AU	African Union
BOS	Bureau of Statistics
CAPI	Computer Assisted Personal Interview
CGIAR	Consultative Group on International Agricultural Research
CNAP	Comprehensive National Agricultural Policy
COMESA	Common Market for Eastern and Southern Africa
DAR	Department of Agriculture Research
DG	Director General
DOC	Department of Crops
DRC	Democratic Republic of Congo
EABC	Ethiopian Agricultural Business Corporation
ECOWAS	The Economic Community of West African States
FAO	Food and Agriculture Organization of the United Nations
FCS	Food Consumption Score
FIES	Food Insecurity Experience Scale
GAP	Good Agricultural Practices
GDP	Gross Domestic Product
HDDS	Household Dietary Diversity Score
HFIAS	Household Food Insecure Access Scale
HHS	Household Hunger Score
HLIs	Higher Learning Institutions
IFAD	International Fund for Agricultural Development
IFDC	International Fertilizer Development Centre
IFPRI	The International Food Policy Research Institute
IPC	Integrated Food Insecurity Phase Classification
ITA	International Trade Administration
IYP	International Year Potato
KALRO	Kenya Agricultural and Livestock Research Organization
KEPHIS	Kenya Plant Health Inspectorate Service
LAFIA	Lesotho Agri Food Systems Association
LENAFU	Lesotho National Farmers Union
L-IBNAIP	Lesotho Instrument Base National Agriculture Investment Plan
LVAC	Lesotho Vulnerability Assessment Committee
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MAFS	Ministry of Agriculture and Food Security
MAFSN	Ministry of Agriculture Food Security and Nutrition
MoA	Ministry of Agriculture
MoALF	Ministry of Agriculture, Livestock and Forestry
NAIP	National Investment Plan

NAP	National Agriculture Policy
NARI	National Agricultural Research Institute
NGOs	Non-Governmental Organizations
NPS	National Potato Strategy
NSDP	National Strategic Development Plan
NSDP 11	National Strategic Development Plan 11
NUL	National University of Lesotho
OCHA	United Nation Office for the Coordination of Humanitarian Affairs.
OCOP	One Country Priority Product
PLA	Potato Lesotho Association
RARI	Regional Ethiopian Research Institute
SADC	Southern African Development Community
SDGs	The United Nations Sustainable Development Goals
SLA	Sustainable Livelihood Approach
SLF	Sustainable Livelihood Framework
SPS	Sanitary and Phytosanitary
SPSS	Statistical Package for the Social Sciences
TPS	True Potato Seed
UNGA	United Nation General Assembly
UNGEGN	The United Nation Group of Experts on Geographical Names
WB	World Bank
WC	Western Cape

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ABSTRACT

This study investigated the contribution of seed potato farming to the livelihoods of farm households at Semonkong and Ha Marakabei (in Lesotho) as well as the surrounding communities. The Sustainable Livelihoods Framework (SLF) was used in the research study to explore the different variables of seed potato producers including their demographic characteristics, household size, gender, age, educational background/level, land ownership, agricultural practices, sources of the agricultural inputs, land size, quantity of seed potato planted, quality of seed potato harvested, marketing strategies and the challenges and threats experienced.

Mixed methods, using quantitative and qualitative approaches, were employed. Simple random and purposive sampling techniques were used. Data was gathered using face to face interviews and the research tool was administered to three Seed Potato Producers' Associations. The study was designed in such a way that the ethics were highly considered, ensuring informed consent, confidentiality, as well as respect for the respondents' cultural values and practices during the entire research process.

The findings indicate that seed potato farming in rural households' livelihoods is very important for both the youths and the adults who are faced with limited formal job employment. It generally generates income and sustains food and nutrition security in farm households. This contribution is beneficial even to the entire surrounding communities because other, non–farm, households get agricultural casual labour opportunities such as weeding and harvesting. The study reveals that the basic seed potato is imported from South Africa, increasing the cost of production for the farmers. The government remains the main buyer of these seed potatoes from the local farmers in bulk.

The study further found that seed potato farming is a potential employer in the rural areas and that the government should initiate the necessary supporting programmes to upscale it. These interventions should include extensive capacity building of the farmers on climate smart agricultural technologies, using both indigenous and modern equipment.

CHAPTER ONE

INTRODUCTION

1.0 Introduction

This chapter provides an overview of potato seed farming which presents the identified opportunities and threats of the potato seed production sector and potato value chain. The specific goal of this study is to investigate the contribution of potato seed production to the livelihoods of the farming households.

1.1 Background to the study

Potato (Solanum tuberosome) originated almost 8,000 years ago in the high Andes between Peru and Bolivia near Titicaca Lake (Singh B. P, Sharma Sanjeev, 2018) in South America. It was later spread slowly to the rest of America. About 5,000 varieties of potato were developed and grown in different climatic regions and altitudes as stated by Singh, Sanjeev Sharma (2018) in that region. The Spanish explorers brought it further to Europe in the 1500s. That was when it started spreading globally. It reached Mexico 2000-3000 years ago, passing through the lower Central America or the Caribbean Islands. Singh B P, Sharma Sanjeev (2018) highlight the fact that this crop was also introduced to North America in the 16th and 17th centuries.

FAOSTATS (2007) indicates that in the 20th century, potatoes arrived in Africa. The port of entry here in Southern Africa was Cape Town for the potatoes coming from Holland to provide food for the marines visiting the Cape (Agriculture, 2003). In the countries such as Egypt, potato was introduced in 1800s, and its large scale production started during the First World War, when the British colonial officials encouraged its cultivation to feed the troops (FAOSTATS, 2007). In the recent years, potato production is in continual expansion both in the Eastern and Southern Africa due to increased population growth, urbanisation and lifestyle changes (Muthoni Jane, Shimelis Hussein and Mashilo Jacob , 2022).

It has currently become the third most vital staple food in the world preceded by only rice and wheat in terms of human consumption, according to Muthoni Jane, Shimelis Hussein and Mashilo Jacob, (2022). Muthoni (2022) further explains that potato serves more than one billion people

worldwide as the main food source. Most of its production takes place in the developing world (Scotts, Suarez, 2012). Continentally, it is mostly grown in Asia and Europe, accounting for more than 80% of the global production while Africa is the least producer with only 7% (Muthoni Jane, Shimelis Hussein and Mashilo Jacob , 2022). In Africa, potatoes are grown under a wide range of conditions. There are irrigated commercial farms in Egypt while in other areas it is intensively cultivated in the tropical zones of the eastern part. In central Africa it is mainly rainfed. In the past two decades potato production has doubled globally due to the expansion of the cropping area while in Sub Saharan Africa it has more than doubled since 1994, with 70% growth concentrated in Eastern Africa (Muthoni Jane, Shimelis Hussein and Mashilo Jacob , 2022).

It is estimated that 2.5 million small–holder farmers depend on potato production for both cash and consumption at the household level, as indicated by Jane (2022). This makes it to be a good contributor to the reduction of hunger and poverty. Its demand has increased rapidly in each corner of the globe due to the high demand of the fast food especially by the younger generation who make a huge proportion of the global population. FAO declared potato, a future food crop in 2008 (B P Singh & Sanjeev Sharma, 2018).

Potato yield surpasses the other top crops (maize, wheat and rice) worldwide (Cele, 2024). It had an average yield of 21.1 tons per hectare in 2022, exceeding 50kg human consumption per person annually as compared to 5.7 tons per hectare for maize, 3.7 tons per hectare for wheat and 4.8 tons per hectare for rice according to Cele. However, despite its importance, potato production has not kept the pace with the global population growth of 11.6% in recent years (PotatoSA, 2024e). On the other hand, it plays a vital role in the world both economically and socially, generating approximately R8 billion at the primary production level and about R25 billion at the secondary production level (PotatoSA, 2021).

Due to the prevailing uncertainties in the markets (for example, the number of commercial potato producers in the Western Cape (WC), SA, decreased significantly from 1,700 in 2003 to 513 in 2021, small scale producers decreased 373 in 2008 to 16 in 2021 and the number of registered seed producers declined from 400 in 2000 to 138 active growers in 2023 (PotatoSA, 2021). Potato industry employed 50 – 60 thousand people at the primary level and 66.6 thousand farmworkers

in 2003, according to Cele in the WC. This industry is expected to generate 15,515 jobs and to support 115,715 livelihoods by 2030, contributing 1% on the industry value, as stated by Cele. Potato processors also accounted for 18.8% in 2022 as compared to 17% in 2021 (Cele, 2024). Most of the potatoes are converted into dry, frozen and fresh chips in large quantities; their processing generates several job opportunities for both the potato farms and other industries.

Despite this huge potential of potato, its productivity is low ranging from 6 to 10 t/ha against potential yields of over 30 t/ha as highlighted by Muthoni (2022). Its massive production is prohibited by inadequate supply of good quality seed tubers, preferred varieties, poor adoption of the available improved varieties and limited awareness/application of good crop management practices by the farming households. The availability and accessibility of good quality seed to several farm households remains a challenge and threat, compromising a final yield and the income which can be generated by the crop. For example, Muthoni Jane, Shimelis Hussein and Mashilo Jacob (2022) indicate that in Tanzania the seed prices remain high and volatile during the planting season and sometimes increase even four times more than the normal prices, ranging from USD 2.5 to 10 per basket of approximately 10kgs and contributing 40 to 60 % of the production costs.

Due to the high prices, the farm households plant potatoes from the informal sources which in most cases are cheaper and of low quality; these do not give good yields. This chronic shortage of certified seed is a great concern, which requires the relevant stakeholders to consider taking this golden product seriously for the global economic and social growth. There is a need to increase availability of cheaper quality seed to the farmers to increase and improve the productivity of the crop. The chronic quality seed shortage in the majority of the countries plays a major role in low potato production, reducing the food security levels and livelihoods coping strategies of the seed producers. For instance, (Muthoni Jane, Shimelis Hussein and Mashilo Jacob , 2022) show that in East Africa quality seed accounts for 1% of the requirement and that most of it is not subjected to quality control mechanisms making seed health a major concern. It is further indicated that over 95% of the seed in the Sub-Saharan Africa comes from the informal seed systems/markets. These informal systems are the most prevalent where the majority of the farmers retain their own seed from the previous harvest or buy from their fellow farmers. If these seed potatoes are planted for

several agricultural seasons without renewing the lot from a reliable source, there is a likelihood of tuber borne disease which can cause severe yield and quality losses.

The informal seed systems normally supply poor quality seed and usually accelerate the spread of diseases especially bacterial wilt (Muthoni Jane, Shimelis Hussein and Mashilo Jacob , 2022). In this system, the farmers select the smallest tubers and keep them as seed after harvesting. According to Muthoni (2022), these tubers are often latently contaminated with pathogens and once they are planted, produce weak crops that are mostly vulnerable to harsh climate related conditions which contribute to low yields. In addition, the small weak tubers produce few stems thus depressing the yields and further reducing the incoming cash opportunities. On the other hand, the formal systems are weak and inefficient, making the quality seed less accessible to the small holder farmers. The complications brought about by the fact that the production of early generation seed potato is carried out by the national agricultural research institutions (NARI) and then sold to the private and public investors for multiplication and production of certified seeds. As a result of limited human resources and physical capacity from NARI, adequate production of quality seed is prohibited and the formal seed systems contribute less than 2% of the total seed potato demand in Africa, as depicted by Muthoni et al….. (2022).

Potato seed is the key factor for the quality and productivity of potato crop (Hingrat Yves Le , Quere Bernard, 2023) in the farming households. It is the first link in the whole potato industry and value chain, contributing positively to table potato production. The fact that potato is in high demand as a fourth vegetable crop, that it is grown in more than 150 countries around the world and that its total production goes up to 359.1 million tons (Hingrat Yves Le , Quere Bernard, 2023), this (Yves Le Hingard, 2023) implies that the demand for the seed is high. According to Muthoni (2022), formal seed in Kenya constitutes 2%, Ethiopia, 1.3%, Rwanda, 3% and Uganda, less than 5% respectively. In Lesotho, several farming households struggle to obtain quality certified seed in the local markets, as the potato seed production exists but is extremely low.

1.2 A Problem Statement

Although the shortage of seed potato in Lesotho presents a golden livelihood opportunity for seed producing farmers, is not clear whether or not farmers can utilise this opportunity to benefit socio

- economically and in terms of food security from this activity. Ideally, if farmers can take full advantage of the demand - supply gap, then the seed potato farming becomes a good livelihood strategy which would contribute significantly to socio – economic well – being among the farming households. If they cannot, the opposite maybe true. In light of the golden opportunity emanating from shortages of seed potato amidst the high demand for it in Lesotho, this study seeks to examine the extent to which seed potato production contributes to livelihoods in seed producing households.

1.3 Statement of the Purpose

This study investigates the contribution of seed potato farming to the livelihoods of the farm households in Semonkong (Tsenekeng) and Marakabei (Ha Tsiu).

1.4 Specific research objectives

The objectives of this research study are:

- To establish the factors explaining the adoption of seed potato production in Semonkong (Tsenekeng) and Marakabei (Ha Tsiu).
- To examine the contribution of seed potato production to socio-economic well – being among the farming households in Semonkong (Tsenekeng) and Marakabei (Ha Tsiu).
- To examine the contribution of seed potato production to food security among farming households in Semonkong (Tsenekeng) and Marakabei (Ha Tsiu).
- To trace the challenges of seed potato farming as a livelihood strategy in Semonkong (Tsenekeng) and Marakabei (Ha Tsiu).

1.5 Specific Research Questions

- Which are the factors that explain the adoption of seed potato production in Semonkong (Tsenekeng) and Marakabei (Ha Tsiu)?
- What is the contribution of seed potato production to socio – economic well – being among the farming households in Semonkong (Tsenekeng) and Marakabei (Ha Tsiu)?
- What is the contribution of seed potato production to food security among the farming households in Semonkong (Tsenekeng) and Marakabei (Ha Tsiu)?

- What are the challenges of seed potato farming as a livelihood strategy in Semonkong (Tsenekeng) and Marakabei (Ha Tsiu)?

1.6 Hypothesis

- Potato seed production contributes positively to the livelihoods of farm households.
- Potato seed farming plays a major role to the food security of farmer's households.
- Potato seed farming has several opportunities, challenges and threats.

1.7 Significance of the Study

The literature review has not presented any research study conducted on this topic. Therefore, this study was intended to inform and provide the policy, law and regulation makers about the necessary steps and strategies needed to improve the seed potato sector systems as well as to improve the seed potato and table potato production in the country. It further informed the decision makers about the socio-economic importance of seed potato farming in the rural households. It highlighted its contribution to the sustainable food security among the farming communities. The study also showed how seed potato can improve the livelihoods of the farmers despite of their age, education level or gender. It further brought into highlight the needs related to the marketing seed potato in Lesotho. The study was also intended to highlight the opportunities and threats that potato seed farmers face and to make some recommendations and solutions for the sector. The study was further expected to be beneficial to the farming communities in the rural areas.

1.8 Assumptions of the study

The study was also intended to provide the future researchers, policy makers, decision makers and service providers with the necessary information and strategies that are needed to improve the potato seed production and its value chain in Lesotho. It was assumed that the respondents would answer all the questions without honesty and with bias just to satisfy their needs during the interview sessions. It was also assumed that the respondents who are responsible for the potato seed sector systems management would not expose the law makers regarding the law and regulations surrounding the sector.

1.9 Delimitation of the Study

The research will be limited to Tsenekeng in Semonkong and Ha Tsiu in Marakabei in the Maseru district of Lesotho. Only the two areas in the mountain livelihood zone will be covered as there

are several areas in the seed potato producing agro - ecological zone. Time, lack of financial support and human resource constraints are likely to be the major limiting factors to obtain a satisfactory response. Only the potato seed producers and extension workers will be interviewed, excluding the other relevant stakeholders in potato seed production.

1.10 Limitation of the Study

Lack of previous research studied related to this topic resulted in not getting an important information to identify the prevailing gaps in seed potato production sector. Additionally, the sample size used could not be considered as a good representation of the population producing seed potato, now allowing the researcher to come up with the scientific conclusions. The time constraints also seen as major limiting factor in the research, requiring further research on the same topic.

1.11 Definition of Key terms:

1.11.1: Potato seed: is a potato that has been grown to be replanted to produce a potato crop, (Doughty, 2017).

1.11.2: Potato Sector: This is an area which works solely on potato from seed to the final product, potato production.

1.11.3: Livelihood: (UNDP, n.d.) defines it as a combination of the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stress and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base. Chambers and Conway (1991) define it as a means of making a living and it encompasses people's capabilities, assets, income and activities required to secure the necessities of life.

1.11.4: Food Security: According to Fahy (2021), Food security is the measure of an individual's ability to access food that is nutritious and sufficient in quantity. Some definitions of food security specify that food must also meet an individual's food preferences and dietary needs for active and healthy lifestyles. During the 1996 World Summit which held in Rome, Italy, WB (1996) also defined food security as when all people, at all times, have physical and economic access to

sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life

1.12 Summary

Seed potato sector systems in Lesotho are facing several challenges where there are no clear rules and regulations supporting them. These challenges include lack of seed certification, storage and access to the local and international markets. The only accredited sites for potato seed production are in the highlands. On the other hand, there seems to be more opportunities surrounding the sector, as most of the farming households are showing a bigger interest in potato production (FAO, 2009). The demand for the seed is tremendously alarming as more projects are being implemented. The government has also identified potato as a one country product where the farmers are encouraged to produce it in large quantities because of its nutritional status.

CHAPTER TWO

LITERATURE REVIEW

2.0. Introduction

This chapter reviews the literature on the role of seed potato farming in developing countries. It further reviews the contribution of potato seed farming to the improvement of the farm households. The discussion also covers agricultural policies in relation to seed potato farming strategies. Several challenges and threats were further identified and discussed, taking into consideration how they impact negatively to seed potato production, thus compromising sustainable livelihoods of the farmers. The Sustainable Livelihood Framework (SLF) and Seed Potato Value Chain Framework were applied and aligned to the study.

2.1. The Theoretical Structure

The research study was guided by the SLF pioneered by Robert Chambers and Gordon Conway (1992). Potato production has witnessed robust growth in recent years globally according to the Food and Agriculture Organization (FAO) (2008) of the United Nations, influencing increased seed potato production in many developing countries. Several countries have acknowledged seed potato production as a source of incoming cash as well as restoring and building livelihoods of the farm households. Potato has globally become an agenda focusing on economic development and sustainable food and nutrition security in the households. Therefore, the promotion of potato production has diversified crop production into the next level and has become an alternative livelihood source in many households in the rural areas.

SLA, rooted from the rural development phenomenon, has been applied and adopted in different incidents (Scoones, 1998; Ellis, 2000). Accordingly, Scoones (2009), "many development agencies started to advocate livelihood approaches as central to their programming, and even organizational structures". Livelihood perspectives have their own ways and are manifested in several situations. The concept has been described by many scholars from the development field. For instance, Scoones (2009) reported that SLA starts with how different people in different locations live. Chambers (1995: 174) suggested that SLA is "the means of gaining a living". In order to make a living, livelihood comprises the capabilities, assets and activities. This relates to the locales such as (rural or urban livelihoods), occupations (farming livelihoods), social

differences (gendered, age-defined livelihoods), directions (livelihood pathways, trajectories), dynamic patterns (sustainable and resilient livelihoods) (Scoones, 2009). The most cited definition of SLA has been produced by Chambers and Conway (1992) in their working paper for the Institute of Development Studies. They said the following about SLA:

> ***"A livelihood comprises the capabilities, assets (including both material and social resources) and activities for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets, while not undermining the natural resource base" (Scoones, 1998: 5).***

SLA is a people-centred paradigm which emphasises people's concerns, aspirations, inherent capacities and knowledge. Similarly, the SLA is primarily focused on community level actions (Chambers, 1986). The community is the local champion who has the traditional knowledge to overcome possible threats from outside and to ensure the security of their livelihoods. Based on the above definition from Chambers and Conway (1992), a prime concern for sustainable living was deduced. A livelihood comprises capabilities, assets and activities that are required for people to make a living. A livelihood should be sustainable and should cope with and recover from threats, stresses and shocks coming from different situations, maintain or enhance capabilities and assets and pave a way to enhance new opportunities for the younger or next generation. SLA involves the development of short-term coping mechanisms and longer-term adaptive capacities for the people to deal with unexpected circumstances which may happen at the local level (Chambers & Conway, 1992).

Therefore, seed potato production has the potential to be the main or alternative livelihood activity along with other conventional economic activities in rural areas. Since seed potato production has the potential in terms of providing alternative job opportunities and income, it is useful to examine how its production is and may be incorporated into the existing mix of livelihoods under agricultural strategies. It is important to know how people can sustain their livelihoods by having multiple livelihood strategies along with seed potato production. If the farming households perceive and decide that seed potato production has the potential to be incorporated as one of their livelihood strategies to accomplish sustainable livelihoods outcome, the agriculture sector will be a form of livelihood diversification. Livelihood diversification is defined by Khatun and Roy

(2012:116) as “the process by which rural families construct a diverse portfolio of activities and social support capabilities in their struggle for survival and in order to improve their standard of living”. The livelihood diversification, including seed potato production, has several advantages if it is properly involved and managed by the farming households. For example, it is a platform for farm households to experience new livelihood activities besides focusing only on conventional economic activities such as cereal and livestock farming in the rural areas. On the other hand, the livelihood diversification through seed production is expected to provide seed potato producers with the opportunity to gain additional income and material accumulation. This is the main concern of the farm households to improve their socio-economic status and improve their standard of living. Finally, livelihood diversification, through seed potato, is the best choice for the rural farming households especially in the highland’s areas of the developing countries, including Lesotho (FAO, 2024.

2.2. The Conceptual Framework

The seed potato value chain framework provides an understanding on the stages and actors involved in bringing seed potato from production to farmers, thus ensuring quality and availability. The framework encompasses seed production, multiplication, processing, storage, distribution and the delivery of seed improved quality seed to the farm households. Seed production and multiplication enhances quality seed production and distribution, profitability of quality seed use, upgrading the seed value chain coordination. The actors linked to seed potato production are an important contributing factor which needs to be highlighted across all the value chains. Their costs in the chain have been well recorded; they include service provision, the use of quality seeds, storage and delivery expenses. The market opportunities, needs and profitability which drive the seed potato value chain play a major role. The seed value chain is shaped by the policy transaction environment taking place in the process of provision of services. The high return of the use of the quality improved seed potato generates several business opportunities for decentralized seed potato providers and producers to meet the seed requirement needs in a certain area.

2.3. The Role of Agriculture in Africa’s Development

Agriculture is the mainstay of most Sub-Saharan economies. It contributes 54% of the employment rate and 15% of Gross Domestic Product (GDP) (Bahiigwa, 2021). Agriculture is also an important sector sustaining growth and reducing poverty in the developing countries, (Wilfrid,

2004). It is a sector which dominates most of the economies of developing countries in terms of its contribution to the GDP, employment and income generating activities (Wilfrid, 2004); its growth and development are essential for the overall process of socio-economic development of developing countries. Wilfrid (2004) indicates that this sector provides adequate output to assure global food security and enhance economic development prospects. Since the majority of the world's population lives in the rural areas in the developing countries, agriculture remains the key economic activity providing people with the capacity to feed their households by producing their own food or as a source of employment and income to access food supplies.

Agriculture in the developing countries has been identified as a critical driver of well-being for centuries, ensuring food security and catalysing the productivity needed for economic prosperity (Kanza, 2015). The International Food Policy Research Institute (IFPRI) indicates that, 65% of African people relies on agriculture as a primary source of livelihood, where small scale farmers are responsible for 90% of agricultural production (Kanza, 2015) . The Tony Elumelu Foundation (2023) added that the agricultural sector contributes to the establishment of the agribusiness industry in the developing countries, presenting a significant opportunity for youth entrepreneurs driving to economic growth and creating more employment opportunities.

The increasing population growth, climate variability and change in African developing countries pose daunting food security challenges, (Bahiigwa, 2021). Since the annual increase of Africa population is projected to grow on average by 2.52% (Worldometer.com, 2019), if this rate remains constant, the United Nations (2019) projected that by 2050, Africa's population would have doubled, surpassing that of Asia. This rapid population growth is mostly accompanied by socioeconomic changes such as urbanization, changing food preferences, changing livelihood structures, industrialisation and changing relationships with the global economy, putting more pressure on the agricultural sector, (Bahiigwa, 2021). Agenda 2063 developed by the African member states in 2015, identified the critical enablers for Africa's transformation, prioritizing agriculture development (Bahiigwa, 2021).

2.4. Seed Production

The agriculture sector is surrounded by low or stagnant yields of the main staple food, while population is increasing, hence seed production recognition (Bahiigwa, 2021). African Seed Systems, consider seed production as a prime requirement of good and sustainable yield of any

crop (Chaudhari, 2021). According to Louwaars (2022), seed is a basic input for all crop production and as such seeds are basic to food security and fundamental for the livelihood improving strategies of the farming communities worldwide. Seeds are the reproductive units of higher plants and have a significant place in agriculture and plant diversity maintenance (ElMaarouf-Bouteau, 2022) who explained that seeds are dehydrated and can remain in the environment for centuries. They are the central component of the plant life cycle because the establishment of a new generation of plants depends on them, (Cortez, 2022). All farmers/farm households need to access quality improved seeds for every agricultural planting season for better production and productivity. This can lead to global food and nutrition security for rural development and for the farm households' livelihoods including the green value chains (Louwaars, 2022).

Seed production is featured by externalities, risks, significant skill requirements, good public characteristics, compromising its magnitude of accessibility and availability in the markets (Jaffee, 1992). Jaffee (1992) further states that the market demand for commercial seed is increasing, leading to profitable opportunities in the farm households for producing hybrids and improved open pollinated varieties of seeds. These types of seeds contribute to high value crops such as cereals and horticultural crops as they are resistant to pests, disease and climate-related shocks such as drought, (Walsh, 2020). Despite the importance of seed production in the agriculture sector, there have been some volatile situations which impacted negatively on its supply according to Walsh (2020) That observation came because of the structural adjustments inclusion and implementation in the 1980s to 1990s when the seed system was dismantled through lower seed subsidies, with concerted efforts to create private sector space and project-based seed support to civil society organizations.

2.5. African Seed Systems

Seed production and its distribution activities are essential agricultural support services for agricultural development as they influence the sector's level of productivity, (Jaffee, 1992).

Therefore, seed production has been recognised as a basic need in the agricultural sector, hence the existence of different types of seed systems, formal and informal systems. A seed system is defined as a means through which farm households gain access to quality seeds of appropriate crop

variety or animal species, (AU, 2022). Toolbox (2020) mentions that a seed system is the network of stakeholders involved in providing, managing, replacing and distributing the seeds of a particular crop in a certain area. In a formal seed system, these components are regulated by the public sector; they are standards set by the government. In an informal seed system, the farmers manage these components personally. According to Mondo (2024) seed systems are the channels that farmers use to obtain planting materials, encompassing activities related to crop diversity conservation, variety development, seed production and delivery.

2.5.1. A Formal Seed System

Even though the smallholder farmers in Southern Africa rely heavily on agriculture as their source of food and livelihood (Gollin, 2014) the national policies and local interventions often do not address the constraints that affect them and the seed systems. The formal seed system is described as a system whereby a seed which has been produced by seed producers or seed companies follows the seed certification procedures implemented by the national and international regulatory bodies, (Mondo, 2024). On the other hand, a formal seed system is defined as mainly a governmentsupported system in which several institutions such as the agricultural research and academic institutions (Kifle, 2022) are involved. Kifle (2022) further states that in Ethiopia the major actors in the formal seed system are the Ministry of Agriculture (MoA), Regional Ethiopian Research Institutes (RARI), Higher Learning Institutions (HLIs) as well as the Ethiopian Agricultural Business Corporation (EABC). In Zimbabwe, a formal seed system includes a well-functioning seed industry surrounded by the scientific breeding efforts, (Ncube, 2023). Hlatshwayo (2021) added that formal seed systems are about vertically organized production and distribution with the use of tested and approved cultivars for commercial purposes, with clear agro value chains.

2.5.2. The advantages and disadvantages of Formal Seed Systems

Seed production is more useful when seeds are grown for commercial purposes, where seed quality and uniformity need to be guaranteed (Hlatshwayo, 2021). Hlatshwayo (2021) further highlights that the process of formal seed production starts with plant breeding, where desired characteristics of a particular variety are used to produce quality seeds. This happens following the maintenance of seed variety purity, identity, assurance of physiological, physical and hygienic quality under regulated conditions, later followed by certification. According to McDonald (1997), seed

certification is a quality control system whereby seeds, and propagating materials of improved crop varieties are maintained at a high level of genetic purity and made available to the public. The formal seed system also involves seed multiplication by seed companies following the established procedures such as processing, bagging, labelling, and marketing (Mamo, 2023). In this system, the seed is sold to farming households through the agro–dealers, seed companies, government and non–governmental agencies (NGOs) in countries such as Uganda (IFAD, 2018).

Mamo (2023) adds that the formal seed system ensures that the cultivar identity and purity are kept throughout the various levels of seed multiplication. These kinds of systems are also less vulnerable as they are generally equipped to respond to the changing needs of the customers (Louwaars, 2022). However, the formal seed systems only serve the farmers who are able and willing to pay for quality seeds. More importantly, IFAD (2018) indicated that systems also provide an essential link between the development of new varieties and the getting them into the hands of the farmers. Even though the formal seed systems are important, they have some limitations and challenges which negatively affect the smallholder farmers in the rural areas (Louwaars, 2022). These challenges include, among other, s sustainability of the system, the costs of producing quality seed, centralized storage, seed treatments, packaging, marketing, operating on a distance bases from the customer, labeling, reliability and certification (Louwaars, 2022). In developing countries such as Guatemala, Vietnam and Niger, seed policy training is limited, thus depriving the farmers of 'knowledge on those ones which assist in boosting their productivity and production' (Dey, 2010: 45).

The national policies and local interventions do not often address constraints that affect smallholder farmers' production and seed systems (Louwaars et al., 2013; Visser, 2015). For example, in Ethiopia the seed potato system is hindered by a disjointed regulatory framework, insufficient quality assurance processes and lack of collaboration among stakeholders; the factors collectively impede agricultural productivity and food security, Tessema, (2024).

2.5.3. The informal seed system

The informal seed system is described as a channel which represents farming households and the communities that produce, save, sell or exchange uncertified seeds of improved varieties and local landraces, according to IFAD (2018). In this instance, farm households normally save seed from the previous harvest to plant in the next agricultural planting season, (IFAD, 2018). This system is

defined as a system that consists of seed producing farmers who are involved in the selection, production and dissemination of the seeds saved from their own production (Javier, 2017). This is often a combination of exchange and sales within the local communities (Javier, 2017). In addition, an informal seed system is also described as that system which encompasses several components, namely the seed/planting material from the farmers' own production (harvest, selection, storage), seed obtained through farmers' social networks (such as relatives, neighbors, or friends) and the seed selected from the local markets (as distinct from formal seed-specific markets such as agro-dealers (Sperling, 2023).

The informal seed system, which distributes uncertified seed, is not certified, is often a better option for the farm households because it is more accessible and better adapted in many cases than the seed from the formal system (Sperling, 2023). It is estimated that in developing countries, the informal seed system is responsible for more than 80% of the total area planted with subsistence crops, especially beans, (Odhiambo, 2016). This is very system resilient and active even without the support of the public or private institutions (Rubyoko, 2010). Informal seed sources include farm saved seed, farmer to farmer exchange, local markets, non-governmental organizations (NGOs) and community-based organizations, (Odhiambo, 2016). The informal systems often offer seeds at lower prices due to lack of overhead costs associated with production, distribution and quality testing that formal systems incur (Javier, 2017). This type of system dominates among the smallholder farmers, in countries like Guatemala, allowing them to sow a diversity of varieties for each native crop such as maize, beans, chillis and squash, (Vásquez, 2017). It implies that there are several varieties of seed found in the farmers' fields still maintaining these varieties in situ (original make up).

The informal seed system is characterized by challenges including lower seed quality, lower yields, potential losses, limited access to new technologies and breeding programmes (Javier, 2017). This limits the seed adaptation to the changing environmental conditions in large scale production because farm households may struggle to produce large quantities, according to Biemond (2013). This, in most cases, excludes the farm households from meeting the commercial market demands due to lack of formal recognition and potential support by government policies coupled with lack of financial and technical assistance (Javier, 2017). The seed obtained from this kind of market

is likely to be easily contaminated by pests and diseases which reduce the seed quality and yields (Javier, 2017).

2.6. The Five Principles of Quality Seed Production and Procedures

Quality seed as explained by (Kumar, 2023), is the most important input for enhancing crop production and crop yields. Kumar added that quality seed production entails profit maximization, quality seed supply and better crop production to the farming households. It improves the farmers' livelihoods and food security. Quality seed production is the backbone of the formal seed industry (Bishaw, 2007). Its availability, access and use are critical in increasing agricultural productivity, ensuring food security and improving the farmers' livelihoods, (Bishaw, 2007) and (Krisdiana, 2024). (Bishaw, 2007; Krisdiana, 2024). Bishaw highlighted that maintaining seed quality is essential if the variety is to meet the expectations of the farmers and the consumers. Quality seed production is characterized by principles including genetic, agronomic and seed technology principles according to Bishaw, 2023.

2.7. Seed Production Policy in Different Developing Countries or Africa

The majority of the countries on the African continent have national seed policy and regulations; they also have seed laws and various regulatory instruments, (AU, 2021), the countries include Kenya, Uganda, Senegal, among others. Some countries such as Cape Verde, Democratic Republic of Congo (DRC) and Mauritius do not have national seed policies. Mozambique does not have either a seed policy or law (AU, 2021).

In 2014 COMESA adopted its harmonized seed regulatory system. In 2008, ECOWAS passed the seed regulations, and the Southern African Development Community (SADC) adopted its own seed regulation in 2013 (AU, 2021). These policies were developed to provide guidance on seed quality control and certification as well as seed production. African countries developed and implemented seed policies because there was a lot of fake seed sold in the local markets, and they wanted to stamp out that kind of seed. Below are examples of countries and their national seed policies.

2.8. Uganda National Seed Policy

In 2018, Uganda developed a National Seed Policy whose vision was to produce a competitive, profitable and sustainable seed sector which would enable the farmers and seed users to have access to affordable quality seed (MAAIF, 2018). As MAAIF (2018) observed, the main goal of a seed policy is to guide, to promote and to regulate the seed sector to ensure availability and access to safe and high-quality seeds to all the relevant stakeholders for increased food and nutrition security, household income, wealth creation and export earnings. This seed policy contributes to agricultural production and productivity, increased households' incomes and the overall socio– economic transformation, as explained by MAAIF (2018). The ministry indicated that the seed policy was developed with the consultative and participatory process that solicited the key stakeholders' input from government institutions, seed companies, civil society, non–Governmental Organisations (NGOs), academia, farmers, international research institutions and development partners.

The reason why there was need to develop a national seed policy by the Uganda government, was that agriculture is the mainstay of Uganda's economy, contributing to 46% of the export earnings and a large share of raw materials for industry (MAAIF, 2018) with three quarters of agricultural households deriving their livelihoods from the subsistence rain fed agriculture. The agricultural sector in this country is characterized by several challenges that contribute land degradation that is aggravated by poor soil management practices, the low level of commercialisation, poor linkages between research farmers, low use of fertilizers, limited irrigation, the low level of value addition, high cost of financing, lack of agricultural support machinery, prevalence of diseases and pests as well as transportation mechanisms which affect the distribution of inputs and farm produce (Nabyonga et..al, 2022). The policy is intended to contribute to addressing these challenges and to ensure increased production, availability, accessibility and affordability of quality seed, associated with technologies which help in increasing productivity.

2.9. Malawi National Seed Policy

The National Seed Policy of Malawi, 2018, indicates that over 80% of the population depends on agriculture for household food security, livelihoods and incomes. It drove the government of Malawi to develop and improve the seed sector to alleviate poverty and hunger as stipulated in the National Agriculture Policy (NAP). As was the case in other countries, the government recognised

the seed sector as an important catalyst for the development of agriculture and the foundation for quality crop production and productivity (Malawi National Seed Policy, 2018). The government understood that seeds are the precursors to crops and food diversification. The seed policy was developed through the engagement of diverse stakeholders such as the government departments, the civil society, international organisations, the international potato centre, academia and the development partners. Since the seed sector had undergone a massive transformation over the years due to the mushrooming of seed companies, agro dealers, growers and other players in the seed industry, hence the need to develop a national seed policy according to the (Malawi government, 2018).

The National Seed Policy has priority areas which contribute towards providing the solutions to the issues, as indicated in the policy. The priority includes institutional, regulatory and legal frameworks, seed certification and the quality control information system for the seed industry, production of different classes of seed, biotechnology and biosafety research, seed marketing and distribution, seeds orchards and vegetative propagated materials and integration of seed topics in the education curriculum. For example, seed certification was included to supply high quality seed to the farmers and other growers. This is true to identity, high in purity and germination capacity and free from certain pests and diseases, while promoting quality crop production, as high-quality seed is essential for high crop yields (National Seed Policy of Malawi, 2018).

2.10. Seed Potato Farming in Developing Countries

2.10.1. The Origin of Potato Production

In Africa, potatoes were introduced during the colonial era and Egypt became one of the first countries to adopt large-scale production during the First World War to supply troops with food (FAOSTATS, 2007). In the sub-Saharan Africa, potatoes became significant in the highland regions where the crop thrives due to cooler temperatures and fertile soils (Cele, 2024). Despite Africa contributing only 7% to global potato production, its significance has grown as urbanization, population growth and as the changing dietary preferences increase the demand (Fahy, 2021), leading to the high demand of seed potato to the farming households. Potatoes also play a vital role in the global economy accompanied by transformed agri–food systems worldwide (Devaux, 2021). Over the last decade, potato production and consumption have grown in every continent, with around 1.3 billion people eating potatoes as a staple food, (Devaux, 2021). Devaux, (2021) further

indicated that potato production has shifted to the developing countries, with the highest increases observed in Asia and Africa.

Potatoes have also been recognised by FAO as an important crop due to their exceptional high nutritional value and ability to produce a substantial amount of dry matter per unit area, (Devaux A, Goffart JP, Petsakos A, 2020). (Devaux, Goffart and Petsakos (2020) According to FAO, (2025), potatoes contain several micronutrients, including B vitamins, vitamin C, folate, potassium, phosphorus and magnesium, and are a vital part of the global food system, playing a critical role in strengthening world food security and alleviating poverty. FAO, 2025 further indicated that due to their large and genetic diversity, their current cultivation and demand, potatoes contribute to sustainable agri-food systems and contribute positively to achieving Zero Hunger, Sustainable Development Goal number 2. According to Tessema (2025), FAO has identified and celebrated 2008 as the International Year of the Potato (IYP) as it is a universally loved staple food. FAO highlighted that in December 2023, the United Nations General Assembly (UNGA) endorsed the proposal made by Peru regarding the annual observance of the International Day of Potato on 30 May every year. Devaux, Goffart, Petsakos (2020) added that potato is grown on an area of 18.13 million hectares, accounting for 376.12 million tons of global production. This potato production has been forecasted to double within 25 years at the global level (Singh, Singh, Kumar, 2023). Despite potato being a vital crop, there is a shortage of good quality seed potato in the developing countries (Lal, 2023), hence the need to plant more seed potato.

2.10.2. Seed potato production

Improved potato production in sub–Saharan Africa has been identified as a pathway out of smallholder farmers' poverty (Geldermann, 2022) because potatoes grow quickly, are high yielding and make more efficient use of water than many food crops do. Several developing countries face challenges including lack of good quality seed potato influenced by the consequence of the prevailing seed systems, where the majority of the farmers recycle their own seeds or get them from informal sources, (Muthoni, 2013). Muthoni (2013) added that this leads to seed degeneration and builds up tuber–borne diseases, compromising potato yields. In mitigating the problem of shortage of good quality seed potato, the strategies have been put in place by different developing countries governments such as Kenya (WB, 2019). This is because potato is the second most important crop in this country after maize, (WB, 2019) and its productivity is negatively impacted

by low availability of certified seed, persistent use of older varieties, poor soil fertility, high pest and disease incidence, accompanied by low levels of good agricultural practices. WB further indicated that with the high demand of potato, the government of Kenya worked very hard to incorporate the relevant stakeholders to increase the supply of quality seed potato, as the local smallholder farmers depend on poor seed, from the informal seed sources, including farm saved (self-supply), local markets or neighbours. As a result of limited supply of the certified seed potato, the cost of seed potato in Kenya is very high discouraging the farm households from using them (Ayieko & Tschirly, 2006).

Seed potato production is taken into great consideration because in Kenya, the root and tuber crops are the vital food crops that have gained increased importance in the recent years due to their role in contributing to food and nutrition security as well as improving the livelihoods of the farm households, (KEPHIS, 2016). The Kenya Plant Health Inspectorate Service (KEPHIS) (2016) indicates two main sources of seed production systems namely, the Formal or legally recognised and the Informal or not legally recognised, KEPHIS,2016). The formally recognised sources of seed undergo seed certification by KEPHIS, following well laid down legal procedures which involve the public and private organisations such as the Kenya Agricultural and Livestock Research Organisations (KALRO) (KEPHIS, 2016). The seed produced under the formal sources has a better quality than that one saved from the farm, as explained by KEPHIS (2016). The informal, and not legally recognized, seed sources refer to the ones where seed potato is produced outside the formal seed certification system and it includes positive selected farm saved seed and clean seed (clean seed usually starts with planting certified or basic seed potato) (KEPHIS, 2016).

According to KEPHIS (2016), the two seed potato production systems result in three different types of seed potatoes. Firstly, certified seeds are used by less than 2% of potato producers. The quality of certified seed has been assured according to the law initiated by an independent organisation (KEPHIS, 2016). Secondly, the Clean Seeds are used by 4% of the potato farmers. They are produced using Good Agricultural Practices (GAPs) and quality is normally assured by the extension officers of the Ministry of Agriculture, Livestock and Forestry (MoALF). Thirdly, Farm saved seeds are used by 95% of potato producers but they have no quality standards. They are generally of poor quality. They are often blamed for endemic spread of diseases especially late blight, bacterial wilt and viruses.

2.11. Factors that Affect Crop Yield and Quality

There are several factors to consider when producing seed potato in different countries. These include altitude, the choice of variety, the physiological age of seeds, early planting and crop management (KEPHIS, 2016). It is argued that the high-altitude areas make a better place to plant potatoes (Hu, 2023). The suitable altitudes are often between 1,500 to 3,000 meters above sea level (KEPHIS, 2016). For example, Marco (1984) indicates that potato seeds that were planted in Mount Katherina in Sinai mountains in 1984, yielded 11% compared to 7% other places. This shows that the area is suitable for growing high quality seed potatoes.

The choice of seed variety is also an important factor, because availability and access to healthy seed is a critical determinant of the farmers' decision-making on a variety to plant, (Kwambai, 2023). He further added that the choice should be supported by agronomic traits and marketability of the variety. Correct physiological age of seed, as noted by Zou (2024), influences the subsequent performance of the crop, conditioning its growth and development while it was added that seed potato with good physiological characteristics has the potential for rapid germination, good emergence and proper development, (Zarzynska, 2022). Early planting of seed potato results in vigorous plant production, larger tubers, increasing the yielding capacity (Salari, 2025).

2.12. Seed potato strategies and policies in the Developing Countries

In different parts of Africa, the demand for root and tuber crops, particularly Irish potato (Solanum tubersome) and its processed products, is growing tremendously, leading to potato becoming a cash crop (Banda, 2018). This has influenced several African developing countries to have explicit policies and regulations that govern the seed systems and markets to address the challenges related to seed potato shortages (Spielman, 2021). According to Spielman (2021) Kenya is one of the African countries that developed seed potato strategies. For instance, the National Potato Strategy (NPS) (2016 - 2020), the Agricultural Transformation and Growth Strategy (ASTGS) (2018) and the Big Four Agenda are considered important for ensuring food security as a national priority The NPS aims to transform the potato industry by focusing on improving productivity, quality, and value addition while, on the other hand, promoting business –to–business interaction and knowledge sharing (MoALF, 2017). The strategy further provides a road map for the seed potato

industry players and is intended to increase the job opportunities, thus contributing to the livelihoods of the smallholder farmers in Kenya.

2.13. The National Potato Strategy

The National Potato Strategy (NPS) was developed in alignment with the Kenya constitution 2010, Kenya 2030, Agriculture Policy, 2015 and the United Nations Sustainable Development Goals (SDGs), (MoALF, 2017). NPS is intended to harmonise the synergies and complementarities between the different seed potato production key stakeholders (NPS, 2016 – 2020). The NPS focused on seven strategic objectives including strengthening the relevant institutions. The Legal and Regulatory Framework, promoting variety development and seed production, enhancing Research in the potato industry, increasing potato production, improving post–harvest handling, promoting public–private partnerships in the potato industry development and improving funding to the potato industry (MoALF, 2017).

Ethiopia also developed the National Potato and Sweet potato Development Strategy for 2024 to 2030, according to the Ministry of Agriculture (2024). Both potato and sweet potato are among the most important root and tuber crops grown and consumed in Ethiopia. They contribute to food and nutrition security as well as the livelihoods of the farming households, (MoA, 2024). These two crops create more farm and off farm jobs (64%) than other crops and provide income to farm households including other chain actors, (MoA, 2024). The MoA adds that the emerging agro processing enterprises and food service providers heavily rely on these two crops as raw materials. For example, the agro processing companies use more than 18,000 tons of fresh potato tubers per year to make chips, with a growth of 40 percent per year, and adding momentum to the country's import substitution and export promotion programme. The earnings reach 70% for the ten-year average (MoA, 2022).

According to the Ministry of Agriculture, the strategy has been intended to address the rapid population growth and urbanization immersed pressure on land resources and food availability. This has been developed to address the food requirements and demands, reducing reliance on massive food importation. The strategy further addressed the issues related to malnutrition which is relatively chronic as stated by MoA (2022). It looked close to diversification and intensification of crop production, technological and innovation advancement such as gene editing technologies,

genetic engineering and cis–genes biotechnology (MoA 2022). Its main objectives include increasing national potato production by 87% and that of sweet potato. This strategy strengthens the capacity of the institutions engaged in research, thus reducing the post–harvest losses, promoting value addition activities such as processing, preservation and product development, creating effective and innovative marketing and information delivery systems along the value chains and finally creating seamless coordination, monitoring, evaluation, learning and information sharing platforms (MoA,2022).

2.14. Seed potato production value chains

A value chain refers to a production sequence for the final consumer goods. Each stage is added value, (Gereffi, 2011). The sequence includes production, processing, marketing, transportation and distribution, with at least each stage taking place in a different area (Gereffi, 2011). According to Kumar et al. (2020), a value chain refers to the functional activities of a business that adds value to its customers. In Tunisia, seed potato value chain follows several channels from production to the destination (Zandstra, 2018). This implies that from production to farming households, seed goes through seed traders, marketing, ware production, ware imports, local markets, farm level markets, national wholesale market, sorting, packaging, processing, retail, consumer and export as Zandstra (2018) indicates. Tiwari et al. (2022) indicates that in India seed potato accounts for 40% to 50% of the total potato production cost. The seed potato value chain in India involves a multistage process, starting from the basic seed production on research farms and progressing through the field multiplications by various entities to produce certified seed for the farmers (Patel et al., 2025). This chain includes seed production, multiplication, storage and distribution, with the key actors such as research institutions, seed producers, state departments of agriculture and, ultimately, farmers (Patel et al., 2025). The efficiency and quality of each stage according to Patel, (2025) are crucial for ensuring a reliable supply of healthy seed potatoes to farmers.

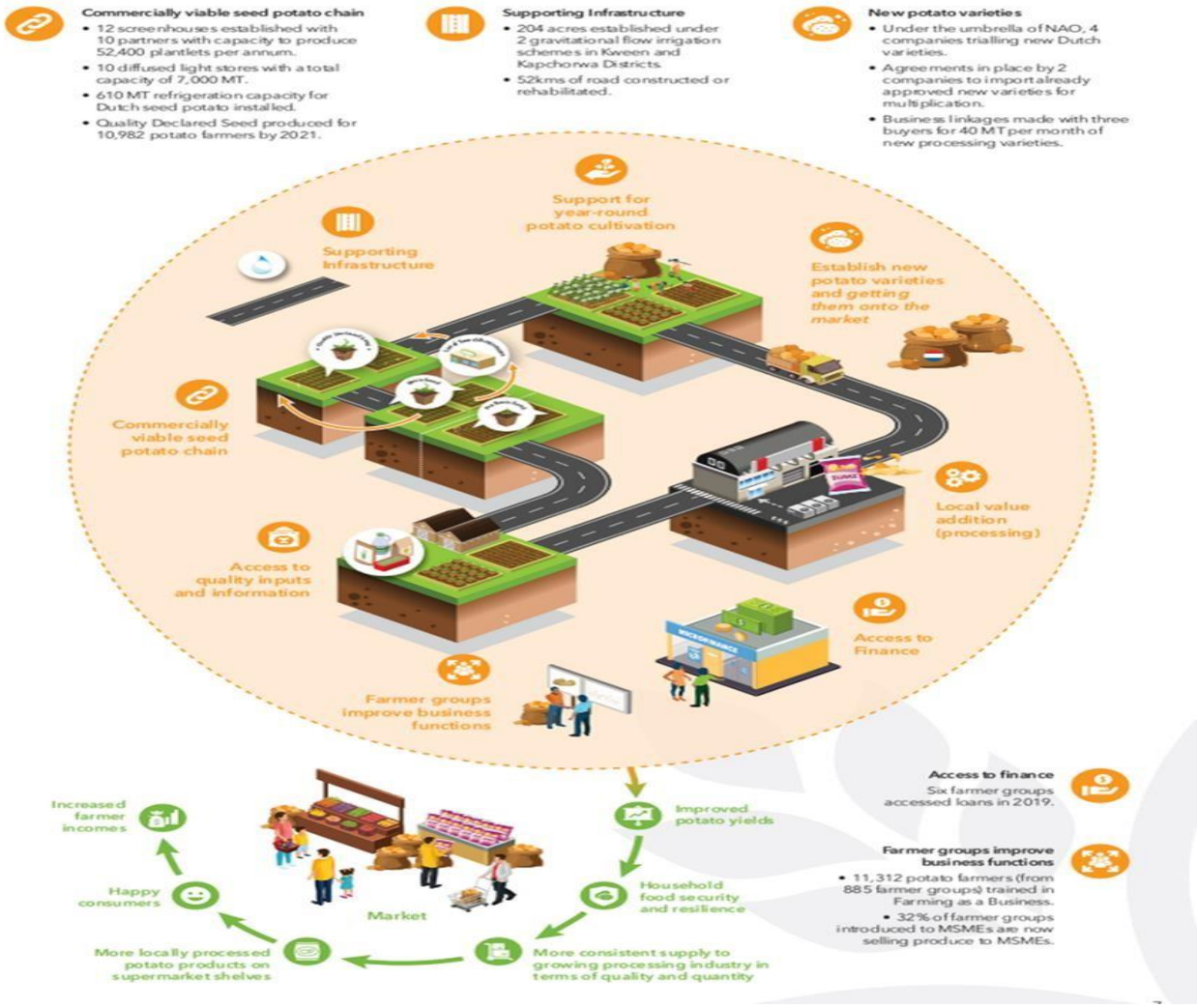
2.15. The Contribution of Seed Potato Production to the Livelihoods of the Farm Households or Smallholder Farmers.

Demand for potatoes has grown rapidly in eastern Africa due to population growth, urbanization, and lifestyle changes, increasing the demand for quality seed potato (Muthoni Jane , Shimelis Hussein and Mashilo Jacob , 2022). Muthoni indicates that the demand has contributed positively to improving food security and enhancing the livelihoods of the farm households living in the rural

areas as they depend entirely on agriculture to sustain their livelihoods. Seed potato production in a developing country such as Ethiopia has contributed to the increases in both yields and farmers' incomes, enabling them to develop their financial and material assets (Tadesse, 2019). The professionalized seed potato production in Ethiopia has also changed the household income sources, knowledge and skills, resulting in improved potato farming practices which led to higher potato yields, fewer losses, higher quality seed potato produce and commercialisation of the produce (Bymolt, 2014). According to Bymolt, (2014) that has translated into substantially higher incomes from seed potatoes than what the farm households were earning before with other traditional crops such as barley, wheat, beans and peas.

In Uganda, over 73% of the rural people directly and indirectly depend on agriculture for their livelihood. As a result, potato productivity has been increasingly essential to smallholder farmers (Gebru et al., 2017; Gildemacher et al., 2009). Seed potato business in Uganda, has also been the key input for increasing productivity while also contributing to the farmers' households (Etiang, 2019). Due to the lucrative opportunities brought about by seed potato farming in the smallholder households and through the support of REACH, Uganda developed the Uganda Potato Sector Strategy in 2020, and the Market Based Strategy for Potato, (IFDC, 2020). The strategy was developed as shown below.

Figure 2. 1: Uganda Potato Sector Strategy



Source: IFDC,2020

The Ugandan Potato Sector Strategy, as illustrated by IFDC (2020), indicated the proper potato value chain channels from production to the end user, incorporating commercially viable seed potato value chain, improvement of the farmers' groups business functions, access to quality inputs, information, finance, potato yields, household food security, resilience and incomes.

In Nepal, as in other developing countries, agriculture is the dominant player of the economy, contributing to 27% shares to the gross domestic product and it employs 66% of the population (Urmula Gautam, 2021). Among the agricultural commodities, horticultural crops such as potatoes in Nepal play a significant role in improving the livelihoods of the farmers in general and the economic growth of the country (MOAC, 2018/2019). Cash crops like potatoes in Nepal contribute

to the economic activities in the rural areas and high value agricultural commodities are increasing (Gulati, 2006). In Ethiopia, most of the smallholder farmers rely on root tubers as a source of income, food and foreign exchange (Aklilu, 2024). Potatoes are largely grown to reduce poverty, to generate income and to create job opportunities in other subsectors that handle production, processing and marketing (Degebasa, 2019). The increased and improved potato yields in Ethiopia help the farm households to support themselves as the country's population is expanding tremendously and is influencing the necessity to meet the rising demand (Gildemacher et al., 2009).

2.16. The Challenges and Threats Facing Seed Potato Production in Developing Countries.

According to Muthoni (2023), over 95% of seed potatoes are acquired from informal seed systems which contribute to the problems including disease and pests, ineffective marketing systems, high cost of production inputs, poor post-harvest handling and storage, and erratic climatic conditions. For example, climate change, as indicated by (Kirina, 2025) has contributed to the major decline in potato yields in East African counties such as Kenya. Poor potato yields have remained low in Uganda at 7.5 t /ha, and this has been attributed to the low yielding varieties, poor management practices and lack of quality seed potatoes, among other factors (Aheisibwe, 2015).

Amongst the 15 farmer groups which were randomly selected and interviewed from a sample size of 200 farmers and individually interviewed, the findings of the study indicated that high transaction costs (43.5%), lack of clear seed delivery system (40.5%) and limited information on the source of seed (14.0%) were the main constraints limiting farmers' access to and use of quality seed potato (Aheisibwe, 2015). Up to 93% of the farmers used home saved seeds from previous harvests and conventional ware potato markets, whose quality is not guaranteed, (Aheisibwe, 2015) . Although over 70% of the farmers were convinced that the quality of seed had a positive effect on yield increase, 72% of them still used poor quality seed often infected by bacterial wilt. An additional 52% of the farmers lacked specific storage facilities for potato seed and this further lowered the grade of the seed quality (Aheisibwe, 2015).

Widespread drought which affected 1,4 million in 2008, 10 million in 2009, 2010 in Kenya, put the population at high risk of hunger after the harvest failed, (Karanja, 2014).The same populations further faced limited access to the financial markets, lack of involvement of private sector investment,

government intervention to address high input prices and engagement of policies that spurred the investment in public infrastructure (Kuyiah, 2007). Lack of sustainable potato farming practices negatively affect quality yields of potatoes in Senegal, as the farmers fail to rotate their crops, experience continuous potato disease outbreaks and because of the high summer temperatures which cause crop wilting (Arnoldus, 2021). In addition, potato producers complain that potato production business has unfair competition in the market. It is influenced by the expansion of the Senegindia farm (Arnoldus, 2021).

2.17. Conclusion

Despite the challenges experienced by seed potato producers, potato has been recognized as a future crop by FAO (2008). FAO underscored that potato production has potential to combat hunger and poverty in the farm households due to its high yield per hectare as well as its role as a staple food in many countries (Hingrat, 2023). With the reduction in hunger and poverty, the livelihoods and food security of the farm households are expected to improve and remain sustainable. Regarding the prevailing challenges and threats, the relevant stakeholders in the seed potato production need to join hands and to properly collaborate to ensure and enhance the sustainability of this crop.

CHAPTER THREE

The Contribution of Agriculture and Seed Potato Farming on the Livelihoods of the Farm Households in Lesotho.

3.0 Introduction

Agriculture in Lesotho is a pillar rural livelihoods, engaging over seventy percent of the rural workforce, (Edith, 2020) and several farm households produce agricultural goods, mainly crops, for subsistence purposes, even though commercial agriculture has been on the rise in the past decade. It is mostly practised in areas where there is lack of or limited income generating activities. Over 60 percent of the rural population depends directly or indirectly on agriculture, and it contributes to poverty reduction. Its growth is very critical to sustain the livelihoods of the marginalized groups. It is mainly practiced under rainfed conditions across all the five livelihood zones, with a small percentage of land under irrigation (only for vegetable production) especially

in the low-lying areas such as Hololo in the Butha Buthe district, and Masianokeng in the Maseru district.

Most farming households produce the main staple food such as maize, pulses and wheat to meet their dietary and energy food requirements and needs. When the farmers have the production surplus, they sell it to generate more income and to buy the additional basic food items not produced locally as well as the non-food items which are the necessities in the households. The basic food items in a normal situation include cooking oil and salt while the non-food items include hygienic items such as vaseline, bath soap. For some farming households, the agricultural inputs and livestock vaccines also fall under the non-food items. Some farming households, particularly those living in the mountains and foothills livelihood zones and who rear livestock, complement the crop production by selling live animals or their products when there is need to do so.

3.1. The background of Agriculture in Lesotho.

Lesotho is characterized by a strip of arid arable land on its western border with South Africa, and steep and rugged mountainous terrain for most parts of the country (Nhemachena, Matchya,and Nhlengethma, 2016) . According to the African Development Bank (AfDB) (2013) the highland areas cover about two thirds of the country's land area, leaving a smaller portion suitable for crop production. Therefore, agriculture has been identified by the International Trade Administration

(ATA), (2024) as one of the productive sectors for job creation and poverty reduction under the 2018 to 2023 National Strategic Development Plan (NSDP). Over 80% of the Lesotho' population depends on subsistent agriculture for their livelihoods, especially for the population living in the rural areas. In the past decade, Lesotho's agriculture has transformed, with increases in the establishment of commercial farm enterprises, (Nkoko, 2023). This transition from subsistence to commercial farming creates agricultural labour opportunities, promotes economic growth and reduces poverty, as highlighted by the WB (2019).

The total land that is suitable for agricultural production in Lesotho is Approximately 75% (ITA, 2025) and the country's irrigation potential is estimated at 112,500 hectares (ha), with only 20% of the farmers engaged in irrigation practices while on the other hand the remaining 80% rely on the rain fed type of agricultural production (ITA, 2025). The country's major crops are maize, wheat, sorghum, potato, beans, peas, cabbage, and tomatoes. Some farmers practise animal

husbandry which supports the wool and mohair industry that supports many households, (Rantšo,2020). Potato production has recently been on the rise, significantly increasing the demand quality of certified seed potato in the formal and informal markets. There are also some opportunities in aquaculture, horticulture, and poultry farming. According to (ITA,2024), Lesotho has a great potential in producing high value crops such as potatoes, spinach, mushrooms, beans, peas and tomatoes, with European Union (EU) being the most likely reliable market for these products.

Despite the importance of agriculture to Food and Nutrition Security as well as the farmers' livelihood improvement and sustainability, there are many challenges that influence its substantial decline on an annual basis. These challenges include climate related shocks such extreme hot temperatures, drought, flash floods, early frost or hailstorms. The recent world conflicts and pandemics/epidemics have also contributed significantly to the deterioration of agricultural production. For example, the Russia/Ukraine conflict has resulted in high prices of the agricultural inputs because Lesotho depends entirely on the imports from other international and neighbouring countries such as South Africa and Zambia. The prices of agricultural inputs such as basal fertilizers and different types of seeds have increased significantly compromising the purchasing power of the vulnerable population to access the quality improved seeds. With the lack of seed in the country, the farmers end up using their own locally produced which are not resistant to drought and pests.

The prevailing land degradation, especially in the productive agricultural areas such as the Mafeteng and Berea districts and some parts of Mohale's Hoek also contribute to the deterioration of agricultural production and productivity, leaving some households severely food insecure and engaging in the negative coping strategies for survival. These challenges further contribute negatively to the food security indicators like the Food Consumption Score (FCS), Household Hunger Score (HHS), Household Dietary Score (HDDS) and Food Insecurity Experience Scale (FIES) at the household level. The food security indicators often stay at moderate to low levels, increasing malnutrition levels in the farming households. The other challenges facing the farmers include the unreliable markets (formal or informal) in the country. This lack of markets contributes to a high increase in post-harvest loss, as the majority of the farming households do not have standard food storage.

With these challenges compromising the livelihoods of the farming households, the government of Lesotho has developed different frameworks, strategies and policies to ensure that agriculture becomes sustainable while on the other hand improving the farmers' livelihoods, food security and the nutrition status. The policies developed are the Comprehensive National Agricultural Policy (CNAP) for Lesotho whose main aim is to ensure that agriculture remains a major contributor on the population's economic status especially in the rural areas which concentrate more on the poor marginalized wealth groups. The Agricultural Sector Strategy was also developed in 2003 by the government, importantly taking into consideration that agriculture has great potential in improving the livelihoods of the farming households. One other policy which was developed is the Lesotho Food Security Policy and Strategic Guidelines (2005) document. The government also developed the Lesotho Seed Policy which facilitates the enhancement of the agricultural input supplies at the household level.

3.2. Comprehensive National Agricultural Policy (CNAP) for Lesotho.

According to MAFSN (2022- 2026) the Comprehensive National Agricultural Policy development was inspired by the need to develop an overarching agricultural sector policy that would provide strategic direction to the agricultural sub-sectors and all the programmes relevant to agriculture regardless of the ministry's mandates. The policy ensured sustainable commercial agriculture and food security as envisioned in the National Strategic Development Plan II (NSDP II, 2018/19 – 2022/23), the vision and objectives of the Ministry of Agriculture and Food Security (MAFS). This policy represents the first ever comprehensive policy for the agricultural and food security sector in Lesotho (MAFSN, 2022 - 2026). It was implemented in order to ensure that there is sustainable irrigation and other infrastructure for agriculture, improved access to finance and risk sharing in agriculture, technology and use for agriculture, functioning land markets for agriculture, genetic resources, value chains development in agri-food systems and enhanced agricultural markets, including the enhanced capacity of farmers, agricultural institutions and associations as well as agricultural productivity and production.

CNAP is also intimately aligned to the Lesotho Instrument Base National Agriculture Investment Plan (L-IBNAIP) while taking into consideration the National Strategic Development Plan (NSDP II) and other related policies. This policy further promotes commercialisation and diversification of agriculture. The development of CNAP followed the two principal policy frameworks, the

Agricultural Sector Strategy (2003) and the Lesotho Food Security Policy and Strategic guidelines (2005) that guided the food and agricultural sector in the past two decades. These policy frameworks were outdated but included agricultural issues which were still relevant to CNAP.

CNAP development was expected to create a more functional agricultural ecosystem and food system providing an enabling environment, using organizational, financial and the necessary technical instruments. This functional ecosystem is expected to be an enabling environment to the private sector, including the Civil Society Organisations, smallholder farmers' organisations, corporates, small to medium enterprises that provide different types of goods and services at various levels of the supply value chain, from production to processing, to distribution and marketing. This properly organized ecosystem is expected to influence the stable increased food and nutrition security, food self-sufficiency, job creation, added value, exports and imports substitution, while on the other hand improving the livelihoods of the farming households.

According to CNAP, agricultural sector growth rate, if things run normally, can at least be increased by 6% over the period of five years from the time of its development. The policy further targets to change the food self-sufficiency ratio of the main staple food (maize) by 75% and 50% for all imported basic food commodities. Additionally, CNAP concentrates on improving the household's food security indicators including the FCS, HHDS, HHS access to food and dietary diversity and Household Food Insecure Access Scale (HFIAS). The policy targets to reduce the level of food insecure individuals by at least 50% and for the children under five years of age by 50% as well, ensuring that they receive minimum acceptable diet during their five years of growth. Since agriculture has great potential in creating decent job opportunities for the youth, the government targeted to create decent jobs (under this agricultural value chain) by 30%. The policy has put a critical eye on the Lesotho Agri Food Systems Associations (LAFIA), the public sector governance and accountability system, private sector enterprises and the financial management system, ensuring a stable sustainable environment in the agricultural sector and leaving no one behind. According to CNAP, this policy is expected to build transparency and trust among the agricultural sector relevant stakeholders including the local farmers' associations, the government ministries, the private sector and the development partners.

The policy is also aligned with the NSDP 11, which targets State Support and direct transfers to the value chain players and the emergency preparedness, nutrition and social protection. It further

focuses on upgrading the value chain organisation, aggregation, traceability and operations visibility. It promotes agro processing development and supports the private sector participation in agro processing, as well as the improvement of the farm level pre-processing activities. CNAP, (2022 – 2026), defines and enforces the agricultural labour practice standards through the establishment of the labour associations in the agriculture sector. It promotes production of good quality products from the improved agricultural value chains. The policy takes into consideration the sanitary and phytosanitary (SPS) measures, agricultural products quality control and assurance of certification and labelling processes in the value chains for food safety, quality nutritional value and residues. More importantly, it facilitates trade agreements with neighbouring countries and trading partners for the agricultural products.

3.3. The National Seed Policy for Lesotho

The National Seed Policy for Lesotho, is defined by the Ministry of Agriculture, Food Security and Nutrition (MAFSN) as a policy used by the government of Lesotho to ensure that through actions consistent with other sectoral policies and development goals including the Sustainable Development Goals, the availability of, and access to quality seed of various crops in an efficient and sustainable manner is enhanced for better crop productivity, food and nutrition security and trade in Lesotho.

The national seed policy indicates that agricultural production can be enhanced by improving the input supplies in the country, including quality improved seed varieties for different types of crops, among other things. This would enable access to quality seed by the farm households, ensuring resilience of the agricultural production base which can provide inherent capacity of a country to respond to and mitigate the impacts of disasters or shocks. The seed policy further considers quality seed as an essential agricultural input, and its unavailability is one the reasons why under disaster conditions, normal food production may collapse. For example, during the 2015/16 El Nino induced drought, several farm households primarily relied on saved seed and social networks, with limited access to formal seed sectors and government subsidy programmes (FAO, 2016).

The seed assessment conducted by FAO in 2016 also highlighted that there is a potential formal seed sector availability in the country to address the need and demand for quality seed, and this can reduce the seed dependency ratio from the neighbouring countries such as South Africa. The

COVID–19 pandemic which led to the disruption of the market value chains, due to lockdown and border closures, negatively affected the main livelihood sources of the farm households including agriculture and agriculture-related activities, (LENAFU,2024). This meant that economic growth, poverty alleviation, food security improvement was compromised as the farmers struggled to access the quality improved seed. The developed National Seed Policy has been able to translate Vision 2020 into concrete and discrete actions to contribute to the sustainable development of agriculture, with the improvement of seed availability in the country.

The seed policy, according to the Ministry of Agriculture, Food and Nutrition (MAFSN) (2016) has also been considered as the declaration of intent to shaping how the seed sector in the country should be developed and operated, as it is the key for the achievement of sustainable agricultural production, food and nutrition security. MAFSN (2016) ensured that the policy is in line with the National Strategic Development Plan 2012/13 to 2016/17, Lesotho Agriculture Sector Strategy of 2003, The National Agricultural Food Security Policy of 2005, Vision 2020, World Food Summit Declaration, Sustainable Development Goals and Malabo Declaration on Agriculture in the Southern African Development Community (SADC) region. The ministry enhanced the seed sector through this policy because it considered agriculture as one of the main sources of employment especially in the rural areas of Lesotho, further contributing to Gross Domestic Product (GDP), MAFSN (2016), even though there has been a significant decline over time to about 8 percent with the crops and livestock sector contributing 2.3 percent and 4.1 percent respectively (National Strategic Development Plan 2012/13 to 2016/17). The decline in agricultural production has been identified as one of the principal causes of poverty in the rural areas, leaving the majority of the rural population engaging mostly in the negative coping strategies (LVAC, 2024). According to MAFSN (2016), lack of investment in agriculture and lack of income generating activities in Lesotho comprises the livelihood coping mechanisms for the rural population.

3.4. Seed Subsidy Policy

With the persistent decline of agricultural production and productivity, the government, through the Ministry of Agriculture, Food and Agriculture (MAFSN) developed an additional policy called Seed Subsidy Policy which is a tool helping the government of Lesotho to achieve Economic, Social, Poverty Reduction and Food Security objectives, building a concrete foundation for

sustainable agriculture that will eventually be predominantly commercial (driven by the business sector).

3.5. The Purpose of the Seed Subsidy in the Agriculture Sector

The Seed Subsidy policy has been developed to encourage own food production against food importation from the neighbouring countries. The policy, according to the MAFSN (2016) had been firstly intended to increase the capacity of the country for producing own staple food crops, mainly maize, while on the hand lowering the cost of agricultural production by making the inputs easily accessible to the farmers at lower prices than the commercial ones. Secondly, it is also aimed at reducing poverty and promoting household food security. Thirdly, it ensured efficient use of all the available resources in the country.

The provision of seed subsidy policy, as stated by MAFSN (2003), included the appropriateness of the crops considering the suitability in terms of the agro-ecological zones, while on the other hand ensuring crop diversification depending on the efficient comparative advantage, particularly because the farmers in the remote rural areas often struggle to access the quality seeds. The policy further takes into consideration the appropriateness of the technologies (mechanization) that are subsidised, leading to the modernisation of agriculture in Lesotho. The importation seed dependency by the farmers was lowered, making sure that the majority of the farm households get the necessary quality input.

3.6. Potato Production and Farming in Lesotho.

The Agricultural Policy states that the country has a competitive advantage in potato because it has the cool highland areas suitable for potato production (Bokaako, 2023). The main purpose of potato farming is to support the smallholder farmers and promote commercialisation of the crop, while addressing climate change, economic shocks and land degradation, according to Bokaako (2023). Bokaako further indicates that the policies included the initiatives such as the National Investment Plan (NAIP), Climate smart agriculture and the other related programmes which were implemented to improve the seed quality, storage and market access for the potato. Letuma (2003) added that potato is a cool season crop, enabling Lesotho with its cool highlands weather conditions, to produce good quality potatoes, which can be used as seed tubers. This gives a country the best potential opportunity to produce a virus free tuber which can be supplied to other

countries in the SADC region Letuma (2003), creating more income-generating activities such as crop weeding, harvesting, cleaning, processing and packaging with further improvement of the potato market value chain. These highlands areas include places such as Semonkong, Ha Marakabei and Mantsonyane. The fertile black loam soils in these places are considered the most conducive to cultivating high quality potatoes.

According to the Lesotho National Farmers' Union, (2024), potato production began with the introduction of the crop from other regions, potentially Europe and spread through farmer-based seed systems. Even though the exact historical timeline is not explicitly known according to LENAFU (2021). Lesotho's favorable climate for the cool season crops such as potatoes, especially in the highlands, exposed the country to the potential of growing this crop. The country's current focus is on improving seed potato production and access to technologies to enhance yields and improve livelihoods, (LENAFU,2021). The major challenge facing the potato producers is lack of access to quality and seed potato and improved varieties, (LENAFU,2021).

FAO (2025) reported that the efforts are underway to improve the potato and seed potato industry in Lesotho, including access to high-quality certified seed, training for farmers, and development of local seed production. The Lesotho government and organisations are also working together to develop and to implement modern agricultural technologies, including those related to potato production, (FAO,2024). According to Scott, (2012), amongst the countries in Sub-Saharan Africa (SSA), potatoes are the most important food crop in terms of total production in Lesotho.

Through the FAO flagship initiative, the government of Lesotho has identified potato commodity as a One Country One Priority Product (OCOP), (FAO,2024). This is FAO Director General's (DG) support, intended to boost potato production in Lesotho. According to FAO (2024), the organisation has pledged funding under the support on Global Action on Green Development Products which is a five-year programme (2021–2025). This support aims to promote at global, regional and local levels specialised agricultural products with unique qualities and special characteristics that can contribute to the transformation into more efficient, inclusive, resilient and sustainable agri food systems for the four: Better Production, Better Nutrition, Better Environment and Better Life, leaving no one behind.

LENAFU has also decided to aggressively produce potatoes both for seed and table, and most importantly creating jobs through agriculture, (LENAFU, 2024). This farmers association also organized a dialogue on 26th March 2024 whose main theme was ***"Turn Potato into an Employer"***. LENAFU also added that Lesotho has selected potatoes as the Specialized Agricultural Product (SAPs) under the multinational programme called One Country One Priority Product (OCOP) Initiative. The product was chosen as an SAP based on the country's competitive advantage that embraces the altitude, good quality soils, and water to produce this crop. According to LENAFU (2024), the Potato Lesotho Association (PLA), is a national group of potato producers in the embarked-on potato production for commercial purposes. PLA grabbed the seed potato support from FAO, as highlighted by LENAFU, (2024). In addition, the FAO Lesotho country office, mentions that PLA has received seed potato packages consisting of 30 bags x 25kg of seed potato, 6 bags x 50 kg of basal fertilizers in the agricultural year 2024/2025, at Semonkong, in the Maseru district and in Matelile, in the Mafeteng district.

3.7. Seed Potato Production in Lesotho.

Despite Lesotho's potential for domestic potato production due to its favourable cool temperature in the highlands, the farmers rely heavily on imported seed potatoes. LENAFU, (2024) further indicated that seed potato production is still at an infant stage even though there is quite a significant increase in potato production support. LENAFU further highlights that the lack of local seed potato breeders and seed multiplication systems, the potato producers rely on farmer-based seed systems, which are often of lower quality. These identified challenges hinder the development of high yields varieties, (LENAFU, 2024). Potato Lesotho Association (PLA), as indicated by LENAFU needs effective research by the Department of Agricultural Research (DAR) and the Department of Agriculture, at the National University of Lesotho (NUL). FAO (2025) has even extended its financial support to NUL, rehabilitating the seed potato tissue laboratory, so that the country can breed its own quality seed potato. FAO believes that with this support, seed potato production will improve and positively address the current seed demand.

The Lesotho Potato Food System Dialogue Facilitation Report (2024) conducted by LENAFU in March 2024, pinpointed out that there are several challenges and threats facing Seed Potato Production. The challenges highlighted are as follows; Lack of Local Breeding Capacity which refers to the absence of potato breeders in Lesotho preventing the development of early-generation

seed which is crucial for high yields. Limited Seed Multiplication Protocols as lack of locally produced seed potato often results in the farmers relying on informal seed multiplication practices which lead to reduced seed quality in the country. LENAFU indicated that the country stands a good Opportunity for True Potato Seed (TPS). This implies that Lesotho can utilise TPS technology to produce virus free seed potato tubers for local consumption and for export. Lesotho's Cool Highlands puts it at a better Advantage since this provides a suitable environment for potato cultivation and seed potato production, particularly for the cool season varieties. Therefore, there is a need for research and infrastructure in order that effective tissue culture to improve seed potato production can be achieved.

3.8. The Importance and Benefits of Seed Potato Production in Lesotho.

According to the Department of Agricultural Research (DAR), seed potato production contributes to food security as it has been recently considered as a staple food, while ensuring a reliable supply of high-quality seed potatoes to meet the demand of this crop, (DAR,2024). DAR indicated that the potato sector is contributing significantly to the growth of agriculture in Lesotho. Therefore, strengthening quality seed potato is a fundamental step towards its value chain. The department additionally showed that seed potato production contributes to the livelihood of the farmers, providing income and employment opportunities. As Lesotho stands the potential to become a major supplier of virus free seed potato to the SADC region. MAFSN through DAR (2024), emphasizes that this can generate more income opportunities to the smallholder farmers.

The seed potato sector, according to DAR, can introduce more advanced technologies to improve potato production and yields for farmers. When potato production is high, MAFSN (2024) says that the country is likely to experience the expansion of products (seed potato) in the region and in the international markets, boosting exports and economic growth and reducing its importation as well. This can therefore contribute to greater food self-sufficiency in the farm households. DAR indicated that the improved yields enhance sustainable food security. The department highlighted that the Lesotho seed potato, which is more resistant to diseases and pests, often reduces the use of chemicals, building a resilient and sustainable agricultural sector. The knowledge transfer is also another significant item for the smallholder farmers if they engage in seed potato production, (DAR, 2024). Therefore, seed potato farming is a major foundation for Lesotho’s potato sector.

3.9. The Importance of Certified Seed Potato Production in Lesotho.

Certified seed is crucial in Lesotho for improving crop yields, enhancing agricultural production, and bolstering food security, (DAR, 2024). It ensures higher quality seeds, better germination rates and healthier plants, ultimately leading to increased yields and profitability for the farmers. Furthermore, certified seed helps Basotho farmers to access improved traits such as pest resistance and drought tolerance, thus contributing to more resilient and sustainable agriculture**.**

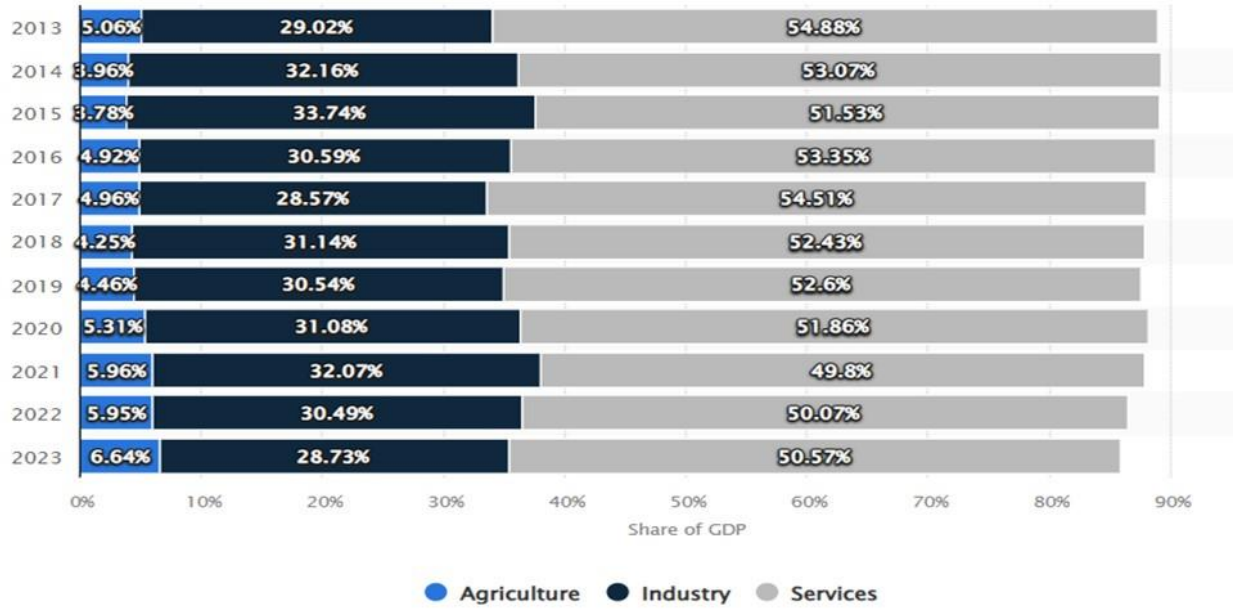
3.10. The Importance of Promoting Seed Potato Production in Lesotho.

Seed potatoes are important for Lesotho's agricultural development, particularly for food security and economic growth, as they enable consistent, high-quality potato production and ensure the genetic purity and quality of the crop (Public Eye, 2025). Even though there are several important and potential benefits of seed potato production in the country, there are no clear strategies and policies which facilitate the proper production of seed potato, its certification and labelling processes, marketing measures, traceability and other related issues in the value chains.

3.11. The Contribution of Agriculture to GDP in Lesotho.

The Second Lesotho National Strategic Development Plan (NSDP II) (2023/24 – 2027/28) recognizes agriculture as the key driver for national development and emphasises its role in achieving inclusive and sustainable economic growth. The contribution of agriculture to the Gross Domestic Product (GDP) in Lesotho in 2019/2020 agricultural census was 4.7% according to the Bureau of Statistics (BOS) (2022). Its contribution seems to fluctuate because in 2023, it increased significantly to 6.64% (Statistica, 2023). While agriculture in Lesotho is lower than that of other sectors such as services and industries, it remains a backbone of the rural economy, (BOS, 2020), a great contributor to the improvements of the livelihoods, to food security and to rural development, ((FAO, 2019). These GDP fluctuations are attributed to limited arable land, recurrent droughts and the country's reliance on remittances and manufacturing, particularly textiles (Statistica,2024). Figure 3.1 indicates the trends of the country's GDP over the past ten years, (2013 to 2023).

Figure 3. 1: Distribution of Lesotho gross domestic product (GDP) across economic sectors from 2013 to 2023.



Source: Statistica, 2025.

3.12. The Contribution of Agriculture to Farm Households Livelihoods.

Agriculture significantly contributes to the livelihoods of farm households in Lesotho, despite the declining share of national GDP, (WB,2018). Over 70% of the rural workforce is engaged in agriculture and it remains a primary source of income and food for the majority of rural Basotho, according to IFAD (2019) and the World Bank (2018). While the sector's contribution to GDP is relatively small, it remains vital for food security and income generation in rural areas. Agriculture ensures food availability for home consumption and is a source of income generation, through selling surplus produce and social benefits or cohesion, (FAO,2019). It helps farm households to access resources and it's a foundation for rural development.

Agriculture is an important means of livelihoods for the majority of rural Basotho, (FAO,2019). It is also considered to be an important source of employment and subsistence in Lesotho with more than 70% of Basotho depending on it for food and income, (IFAD,2019) and (WB,2022). This sector holds the potential for increasing food security, improved nutritional status, reducing rural poverty and generating on and off farm jobs, (WB,2022). It provides a foundation for selfsufficiency and reduces the farm household reliance on external aid. It empowers farmers

socially as the farm households usually work together in groups (matsema/mekhatlo) to speed up the agricultural work.

3.13. The Contribution of Agriculture to Development and Livelihoods of the Lesotho's Population including the Farm Households

Agriculture is an important source of employment and subsistence in Lesotho, (WB,2022). According to World Bank (2022), more than seventy percent of Basotho is dependent on agriculture for both food and income, allowing the sector to have more potential in generating on and off farm jobs while at the same time reducing rural poverty. This recognition came as far as during the colonial period, when the colonial government developed and implemented the programmes, strategies and policies which were intended to increase productivity in agriculture (Ntobo,Lekunutu, Masualle, 2017). From the 1930s to 1965, several measures were taken to lay the foundation for improving agricultural productivity in Lesotho and the farming households were supported with the improved agricultural inputs (seeds, tractors), (Makoa,1999). According to Rantšo, (2015) the other measures included control of soil erosion by building terraces, contour banks, dams, silt traps and planting trees The Lesotho Vulnerability Assessment report of integrated food security phase classification (IPC, 2021) indicates that the agricultural casual labour activities including weeding and harvesting contribute significantly to the livelihoods of the vulnerable households. In an effort to improve household agricultural commercialisation, the government has implemented the smallholder agriculture development project 11 (SADP 11) with financial support from World Bank, the government of Japan and the International Fund for Agriculture Development (IFAD), (MAFSN, 2023). This is a vital initiative undertaken by the government to ensure that farming households have enough support to engage in agricultural income generating projects which will restore and improve their livelihoods. The government has also opened the financial doors for the farmers, where they are able to borrow money from the Lesotho Post Bank for up scaling their agricultural work.

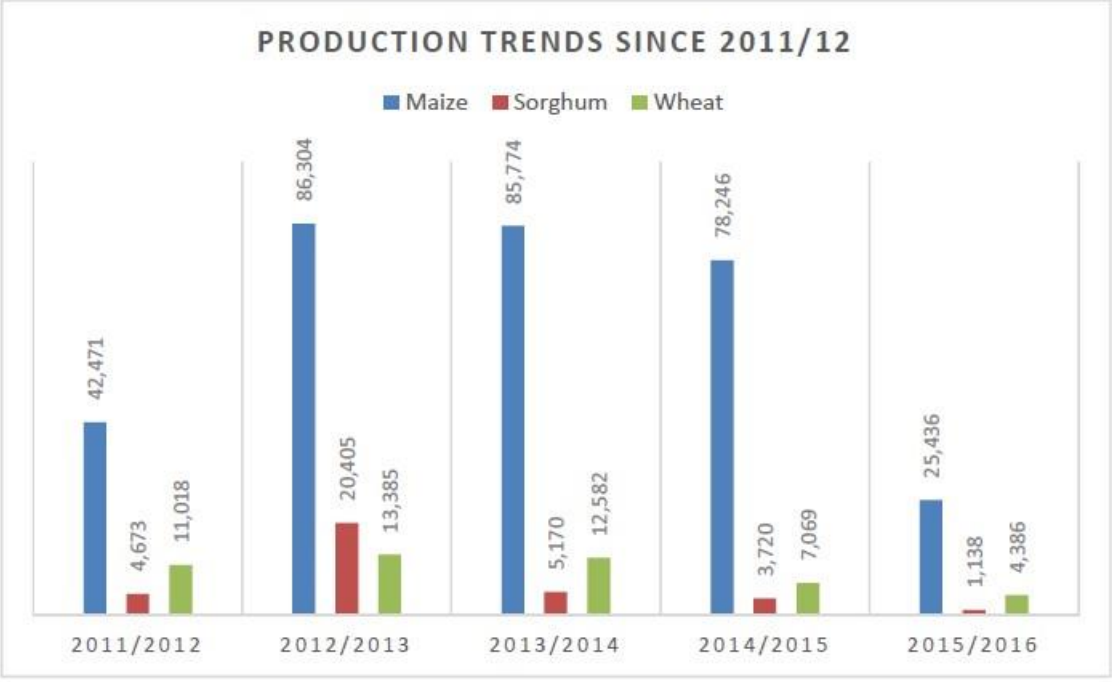
3.14. The Challenges Facing Agriculture in Lesotho.

Lesotho's agriculture faces multiple challenges, including climate change, extreme weather conditions, land degradation, limited arable land, global economic shocks and rural migration, (WB,2022). According to the World Bank, Lesotho's mountainous terrain makes it highly vulnerable to the negative effects of climate change the erratic rainfall and increased frequency of

droughts and flash floods impact badly on the crop yields and livestock production. For instance, severe droughts in 2016 and 2019 and flash floods in 2021 and 2022 have severely negatively affected agricultural production and productivity, as the World Bank explains. The Lesotho vulnerability Assessment Committee, further added that in 2021/2022 agricultural year, 23% of the rural population was facing high acute food insecurity (IPC Phase 3 or above) due to heavy rains which destroyed crops as a result of waterlogging in the fields (LVAC, 2022).

In the 2015/2016 agricultural cropping season, Lesotho experienced the poor rainfall, late onset of rains which were delayed by 20 to 40 days, (LVAC, 2016). That contributed to the decline in the area planted resulting in a significant drop in crop production. The report indicated that the area planted for maize had declined by 34% (111,639 ha to 73,509 ha) compared to 2014/2015 cropping season and 65% (151,748 ha to 73,509 as compared to the baseline year (2009/2010). In the same drought year (LVAC, 2016) maize as a staple food declined by 61% compared to 2014/2015 planting season. Figure 3.2 indicates the trends of maize, sorghum and wheat production from the 2011/2012 agricultural year. The drought year, which is 2015/2016, shows a tremendous decline in crop production compared to the other years.

Figure 3. 2: Production Trends from 2011/2012 to 2025/2016



Source: *LVAC REPORT, 2016.*

Overgrazing and unsustainable farming practices lead to soil erosion, loss of soil fertility and put pressure on the limited arable land, with only 10% suitable for crop production. This makes efficient land use crucial in Lesotho. The agricultural sector in the country is struggling with more emerging challenges such as agricultural input shortages, climate variability, limited access to markets and dependency on the import of the agricultural inputs, (Farmonaut, 2025).

The farm households in Lesotho face hiking prices of the agricultural inputs every year according to OCHA, (2009). This implies that farmers with low purchasing power cannot access agricultural inputs and are forced to depend on their own seed production which is of poor quality not resistant to drought, pests and other related crop diseases. The Lesotho government subsidy does not benefit the farmers as there are no clear criteria in place to assist those who have disadvantaged farm households (Makhooane, 2011). Lack of infrastructure, such as roads and storage facilities, makes it difficult for farmers to transport agricultural inputs from the markets to their places for utilization. The seed informal markets and lack of implementation of the seed policy also poses a big challenge on the farming households, comprising their productivity and production. The small number of formal markets, particularly in the remote rural areas existing plays a monopolistic role and increases the input prices for the farmers.

Seed potato producers in Lesotho are not an exception as they face multiple challenges, including limited access to inputs, unreliable infrastructure and lack of local seed production capabilities, (Matheka, 2024). These issues are exacerbated by climate change impacts and inadequate data collection. Furthermore, the dependence on imported seeds and the limitations of traditional farming methods contribute to lower yields and post-harvest losses. Matheka explained that smallholder farmers often struggle to access agricultural inputs including fertilizers, seeds and machinery in a timely manner. This impacts negatively on their planting schedules and yields. He also indicated that land ownership and security amongst the seed potato producers is a serious challenge, especially for the farm households which want to go commercial. The farm households cannot secure and protect the arable fertile agricultural land, and this limits them to operate on a large scale. Limited infrastructure according to Matheka (2024). It hinders the farmers from easily accessing the markets, posing them to post harvest handling and transportation negative impacts. Lack of Local Seed Breeding programmes further necessitates the farmers' reliance on imported

seed potato which costs them, while the seed may not even be well suited to the country's specific climate and soil conditions as explained by Matheka (2024).

The additional challenges identified by Matheka include limited access to technical support, postharvest losses due to lack of storage facilities and marketability of potatoes, climate change which imposes the unpredictable weather patterns, including droughts and floods. This significantly poses negative impacts on yields, creating challenges for planting and harvesting. Soil degradation causes the unsustainable farming practices and further reduce potato production, data and market access hinders planning and marketing of the Lesotho government, as the farmers in the remote rural areas do not have access to fair prices, lack of modern technologies for planting, harvesting, and post-harvest activities contributes to inefficiencies and losses as well as lack of technical capacity in seed systems and potato sector hinders the adoption of improved technologies and practices.

3.15. Conclusion

This chapter discussed the contribution of seed potato production to farm households, and the challenges and threats associated with seed potato production. The conclusion drawn from the literature review is that even though seed potato production plays a significant role in contributing to the livelihood of the farm households, the challenges regarding this type of agriculture are characterized by many challenges and threats. This is why the country is experiencing a low contribution of agriculture to the country's GDP while, on the other hand, those engaged in seed potato production benefit a lot. High-quality seed potatoes are more necessary as potato demand rises.

CHAPTER FOUR

Research Methodology

4.0. Introduction

This chapter discusses the methodology used to conduct the research study as well as the issues related to the chosen research methodology when investigating the contribution of seed potato farming to the livelihoods of farm households including the agricultural sector policies, the seed potato policy, the legal frameworks and strategies within the seed potato industry. The data collection and analysis methods used to conduct the research study are presented in this chapter, plus the research design description. The issues that address the basic research objectives, hypothesis and the relevant research questions that were discussed in Chapter one and the research framework discussed in chapter two are also presented. The research methodology for this research study was justified in terms of its appropriateness and usefulness to achieve the basic research objectives. The research population, research sample, data collection methods, stages of collecting the data from the field, the procedures and problems encountered during each stage of the fieldwork as well as the actual data collected, and the methods of analysis have been explained in this chapter.

4.1. Research Paradigm (positivism, post positivism or pragmatism).

A research paradigm is defined as a method, model or pattern for conducting research or a set of ideas, beliefs, or understanding within which the theories and practices can function (Abbadia, 2022). It is further defined as an abstract of beliefs and principles that shape how a researcher sees the world, and how s/he interprets and acts within that world (Kivunja, 2017). The pragmatic paradigm was chosen- as the most relevant paradigm to follow for this study. A pragmatic paradigm enables the researcher to investigate and assess internal and external circumstances related to the research topic (Gobo, 2023). Pragmatism has the potential to closely engage and empower marginalised and oppressed populations (Kaushik, 2019).

This pragmatic paradigm helped the researcher to prioritize the study challenges and better approaches to use and understand the prevailing problem. In response to the research challenges and opportunities, a mixed method strategy combining qualitative and quantitative methodologies

was used, converging the evidence obtained while, on the other hand, maintaining the production of high quality and reliable results to address the research problem.

4.2. Research Methodology

Research methodology refers to the process of designing, conducting and analyzing research studies (Bahishti, March 2022)**.** This is an essential component of the research process that guides the researcher in the collection, analysis and interpretation of data. It also ensures that the researcher obtains valid and reliable results which address the study aims, objectives and research questions (Rochi, 2016).

The study used a combination of qualitative and quantitative methods to explore the contribution of seed potato farming on the livelihoods of farm households at Semonkong and Marakabei in the Maseru district. This mixed method allowed a comprehensive understanding of seed potato producers' personal experiences and perceptive, while additionally incorporating data collection and analysis of quantitative data such as income, demographic characteristics and agricultural practices.

Qualitative and quantitative research methods enabled gathering diverse insights and experiences of both the farmers and relevant stakeholders engaged in seed potato farming. The strategy was precisely aligned with the pragmatic research paradigm, which enables the researcher to investigate and assess internal and external circumstances related to the research topic. As Smith (2017) indicates, a mixed method approach allows the researcher to obtain a comprehensive understanding of a research question(s) and addresses the limitations of using only one method while contextualizing the research to the experiences and attitudes of the respondents. The approach incorporated research techniques such as household surveys, in-depth interviews, participant observations, structured interviews and statistical analyses.

In addition, the pragmatic philosophy investigates the real-world problems experienced by the research participants (seed potato farmers), allowing the flexible use of multiple sources of data and knowledge to answer the research questions (Allemang Brooke, Sitter Kathleen, Dimitropoulos Gina , 2021). It emphasised actionable knowledge that may effectively provide practical solutions to the existing challenges/threats (such as the socio–economic and political ones through tangible and actionable production outcomes. This is a problem-driven approach which

addresses complex problems by employing the most effective tools and approaches. It overcomes the drawbacks related to the researcher bias when interpreting the results (Brierly, 2017) . Researchers using a pragmatic framework could successfully develop the tools and interventions that would be implemented to enhance the livelihoods of people and social justice.

Pragmatism serves as a relevant research paradigm for this study because it is a problem-solving oriented approach which satisfactorily addresses the real-world challenges and orients the inquiry towards problem solving through the construction of habits as well as the continuation of vital and social experience. The approach is well aligned with the research objectives investigating deeper into the farmers' experiences and perceptions in relation to seed potato farming to identify the areas which need critical improvement.

4.3. Sampling Techniques Used.

In this study both purposive and snowball sampling techniques were used to collect data from the relevant respondents (the seed potato producers). A purposive sampling technique is described as a technique whose characteristics are defined for a purpose that is relevant to the study (Andrade, 2020) and as a targeted selection method, focusing on selecting the participants who meet specific traits or criteria relevant to the study (Williams, 2022). Snowball sampling technique is a chain–referral sampling, where a pool of initially enrolled participants is used to recruit more participants who meet the required criteria of the study. Hulatt (2022) and (Ting, 2025) (Ting, 2025) described it as a technique which involves asking initial respondents to refer others who meet the criteria of the study, thus allowing researchers to expand their sample through social networks by leveraging the connections such as friends, relatives, colleagues, mentors, customers or community members.

4.3.1 Data Collection Tool.

A questionnaire was developed, designed and uploaded in the Kobo collect tool. A questionnaire is a list of questions used to gather data from respondents (Bhandari, 2023) and (McLeod, 2023) explained that it is a research instrument consisting of a series of questions for purpose of gathering information from the respondents using face to face, telephone, computer or post. In this study a face-to-face interview was used to collect information from the respondents (seed potato producers). According to Poloju, (2022), the Kobo collect tool, is a free open-source tool

used for data collection just like google forms or survey monkey in remote areas where internet facility is uncertain. The United Nations Group of Experts on Geographical Names (UNGEGN, 2023) is a tool which offers a wide range of question types, skip logic, to validation rules and allow users to create forms that are built to user specific data collection needs.

4.4. Types of collected data

Data Collection is the process of information in order to gain insights regarding the research topic, (Taherdoost, 2021). According to Jain (2025), data collection is a process of gathering and analyzing accurate data from various sources to find answers to the research problems, trends and probabilities to evaluate possible outcomes. In this study data collection played an essential role in getting the necessary information which was needed from the farm households which produce seed potato. Data was collected using both primary and secondary data collection methods.

4.4.1. Primary Data

The researcher collected primary data from Semonkong and Ha Marakabei. Primary data collection is the process of gathering data directly from a first-hand source, using household composition surveys, where a researcher or enumerator asks the respondents, questions based on a predetermined questionnaire (Costa, 2022). Primary data collection can be done using computers or tables to record the responses. The process is called Computer Assisted Personal Interviewing (CAPI) (Brahme, 2018). It is a technique used for data collection on a portable device, (Brahme, 2018). According to World Bank (2025), CAPI is defined as a face-to-face data collection method in which an interviewer uses a tablet, a mobile phone or a computer to record the answers given during the interview.

In this study, after developing a questionnaire for household interviews, the questionnaire was transferred and uploaded into the Kobo collect tool in a tablet. Then primary data was collected using face to face interviews and CAPI to get information from the seed potato farm households. After the data collection stage, data was transferred to the Statistical Package for the Social Sciences (SPSS) for coding, cleaning and analysis. SPSS is a software program used for statistical analysis, data management and data documentation (Caplova, 2020). It is considered as one of the most important and influential statistical tools for quantitative data analysis (Rahman, 2021).

Additional data was collected from the relevant stakeholders, including LENAFU, PLA,

Department of Crops (DOC) - Seed Multiplication Unit, using a guided developed questionnaire.

4.4.2. Secondary Data

Secondary Data Collection is the process whereby an investigator/researcher uses data collected by other researchers to address different questions (Wickham, 2019) through a range of sources such as censuses, government departments, organizational records (Kumara, 2022) or obtaining information from the surveys, official records, official statistics, academic studies, and archival data repositories (Bookstavaver, 2021). Additional information was collected from MAFSN, LENAFU, OCOP and PLA reports. The primary and secondary data were converged to ensure quality results.

4.5. Research Design.

A research design is defined as a plan or framework used to conduct a research study, outlining the overall approaches and methods that are used to collect and analyze data to answer the research questions and test hypotheses (Singh, 2023). The researcher therefore used mixed method design to ensure that the study objectives would be achieved through the relevant data. The data which was collected using CAPI was later finalized and sent to the server, then transferred into the SPSS software. Then data was cleaned and analyzed into outcomes which were described and visualized for easier interpretation without being manipulated. The outcomes were visualized into percentages, graphs, bar charts and maps.

Conclusions were drawn from the data collected and analyzed from the study areas, as well as from the respondents. The quantitative research methodology which is defined as the process of collecting and analyzing numerical data according to Bhandari (2020) was used. That method assisted the researcher to come up with the patterns and averages, making predictions, extracting the causal relationships of different variables and was able to generalize the findings to the wider population. The study also explored some aspects of qualitative research which provided deeper insights into the real-world problems (Tenny, 2022). That also helped in gathering the participants' experiences, perceptions and behaviours.

4.6. Population and Sampling.

Population is the entire group that a researcher draws the conclusions from (Bhandari, 2023). It is also described as a complete group with at least one characteristic in common (Australian Bureau

of Statistics, (2023). In this case, the seed potato producers in Semonkong (Tsenekeng and Ha Phallang) and Marakabei (Ha Tsiu) in the Maseru district were studied. Fifty targeted farmers were sampled and interviewed from Ha Tsiu (21), Ha Phallang (8) and Tsenekeng (21) using both purposive and snowball sampling. This sample was drawn from a population size of 113 seed potato farming households. These communities are in the rural and mountain livelihood zones of Maseru district, in a remote area called Semonkong, which is 113 km (about 1hour 45 minutes from Maseru, the capital town of Lesotho) and Marakabei 130 km about 2 hours 20min from Maseru.

Sampling is a statistical technique for efficiently analyzing large datasets by selecting a representative subset (Hussain, 2025). A sample of 50 seed potato producers was picked from the whole population of farmers who produce field crops. That allowed the researcher to draw the necessary conclusions based on the analysis of the collected responses. Purposive sampling according to Bullard (2024) is a judgmental, selective or subjective sampling. It is a nonprobability sampling technique where researchers intentionally select the participants based on the specific characteristics relevant to the study. The farm households which produce seed potatoes were found to be the most relevant participants in the study. Purposive sampling was used because it minimises the information bias and ensures representation across the sampled population. Hence why were only the seed potato producers considered for the research study.

Snowball sampling, a recruitment technique which is designed for the specific situations and uses a non – probability sampling method, (Dovetail, 2023) was also used. This technique helped a researcher to recruit other potential respondents of the study. It assisted with increasing the size of the research group. Since the seed potato producers seemed to know each other in this sector, snowball sampling was the appropriate sampling technique to use to increase the sample size to reach fifty. These two sampling techniques saved time and resources because they included only the relevant respondents who were producing seed potato, the research phenomenon under study.

4.7. Research Instruments and Data Collection Procedure.

Research instruments are the tools that the researcher uses to collect data (Manoranjitham, 2015). They differ based on the structure of purpose, nature and availability of information. According to Manoranjitham (2015), the most used instruments are questionnaires, interviews and surveys.

In this study, a structured questionnaire and face – to - face interviews instrument were used to collect data from the seed potato producers. These face-to-face interviews allowed intensive probing of the respondents where necessary. Secondly, the relevant officers from PLA, LENAFU and the Department of Crops were also interviewed using well-prepared open-ended and guided questions to beef up the information collected from the farm households.

4.8. Data Presentation Procedure and Visualization

Data presentation according to (Tiwari, 2025), is defined as a process of using various graphical formats to visually represent the relationship between two or more data sets so that an informed decision can be made. The collected raw data from the field was organized, re-checked, finalised in the Kobo collect tool, and sent to the server. Then the data was transferred from the server to the Statistical Package for the Social Sciences (SPSS) software version 25, for data cleaning and analysis. The data collected was then run into outcomes, which were further taken into Excel for visualization. Data visualization is the presentation of data in a pictorial or graphical format (Li, 2020). According to Srivasta (2023), visualizations are used to identify patterns, trends and relationships within the data. They can help in assessing the data quality. Therefore, the collected data was visualized using descriptive statistics (frequency and percentages) to summarise the data from the respondents. The graphs, bar charts, pie charts, and tables were used as visuals and interpreted for what they conveyed.

4.9. Validity and Reliability/Trustworthiness and Credibility.

The research study validity and reliability were considered, to evaluate its quality, avowing the bias. That assessed how well all the methods and techniques employed in the study had been applied by the researcher. Validity refers to how accurately a method measures what it is intended to measure (Middleton, 2025) ensuring that the results correspond to real properties, characteristics and variations in the physical or social world. Reliability refers to how consistently a method measures something (Middleton, 2025) and if the same result can be consistently achieved by using the same methods under the same circumstances somewhere else. The measurement would then be considered reliable.

The questionnaire for the seed potato producers and the interview guide were used in the study, and their validity was evaluated using a content analysis which follows a systematic procedure

that could easily be replicated by other researchers with high reliability and flexibility. Test–retest reliability was also used to explore the reliability of the tools. That means their consistency was assessed to ensure that when applying the method of data collection to the same sample under the same conditions the same results would be obtained. Finally, the most recent relevant research papers (journals, articles, books, statistical reports) of not less than five years were published to strengthen the reliability of the research study.

4.10. Ethical Considerations.

The ethical considerations in research are a set of principles that guide a researcher's research design and practices Bhandari, (2021). This implies that the researcher adhered to a certain code of conduct when collecting data from the respondents. These considerations protected the rights of the respondents, enhancing the research validity and maintaining academic integrity. Therefore, the researcher was mindful of the Basotho cultural beliefs, norms values and the respondents were highly respected. The necessary procedures and principles were followed before interviewing the respondents. That is, the researcher engaged the discussions with the local authorities and the agricultural resource centre extension officers who were responsible for the farm households. The developed consent forms were given to the respondents to sign if they agree to take part in the research study. The researcher used the consent forms to contact the volunteer participants for further information and to make a statement that ensured privacy and liability and to indicate that the participant approved, agreed and was willing to participate in the research study, (Skidmore, 2023).

The voluntary participation, confidentiality, anonymity and informed consent were employed, to ensure that the respondents knew the purpose, benefits and risks of the study. They were made aware that their identities were private and confidential from everyone else. Their physical, social psychological and all other types of harm were kept to an absolute minimum. The respondents were given an opportunity to withdraw anytime they felt like doing so. The researcher ensured that the research study was free from plagiarism, or any other related research misconduct and the research results were accurately presented.

4.11. Summary:

The chapter highlighted the approach of the research study. It indicated the tools used as well as how they were used to directly collect data. Information on the contributions of the seed potato production on the livelihoods of the farm households in the communities of Semonkong and Ha Marakabei in the Maseru district was collected. The population and the sample of the study were explained. The semi–structured interviews and face to face interviews were used to obtain the data which was later analyzed using SPSS. The findings were visualized using excel and transferred into the major research document.

CHAPTER FIVE

THE RESEARCH FINDINGS

[THE CONTRIBUTION OF SEED POTATO PRODUCTION IN THE FARM HOUSEHOLDS IN SEMONKONG AND MARAKABEI]

5.1 Introduction

The data collected from the seed potato producers at Semonkong and Marakabei in the Maseru district was analyzed and interpreted. The data was collected from the three farmers' associations, namely the Maletsunyane Farmers' Association, Tapole Ke Letlotlo and Itataiseng Poloko Development Network in the mountain livelihood zone of Maseru district.

This chapter is divided into eight sections. The first section presents the demographic characteristics of seed potato producers. The second section is on seed potato farming practices while the third is on the seed potato planting period in the 2024/2025 agricultural year. The fourth section gives the reasons for planting seed potato. The fifth and sixth sections explain the cropping practices and seed potato marketing respectively. Section seven explains the contribution of seed potato farming to the farm household's livelihood. The last section presents the challenges that face seed potato farming. The findings of the study are summarized and visualized using frequency and percentage distribution tables as well as pie and bar charts.

5.2 The Demographic Characteristics of the Seed Potato Producers

The section presents the seed potato farmer demographic information with gender, age, level of education, household size, number of household members engaged in seed potato farming and the names of the farmers associations including their location as the variables.

5.2.1 Seed Potato Farmers' Information

Semonkong and Marakabei are in the mountain livelihood zone of Maseru district. The areas are well known for their cool weather conditions highly suitable for seed potato production. Potato is a cool season crop (Letuma, 2001) and the two areas are characterized by the cool environment

that allows the production of quality seed potato production. The cold climatic conditions contribute to disease and pests' free crops.

Seed potato farming in the mountains of Lesotho, according to Molahlehi et al. (2010) is mainly carried out by the farmer groups who work and buy the agricultural inputs together. For purposes of this study, the farmers' groups that were visited included Tapole Ke Letlotlo with 34 members, Maletsunyane Farmers' Association with eight members and Itataiseng Poloko Development Network with 71 members. Fifty farmers were interviewed. Maletsunyane split from Tapole Ke Letlotlo and is at its initial stage now hence the small membership. It split because Tsenekeng is in a remote place that makes holding meetings difficult. Transport is also limited in that community.

Table 5.1 presents the distribution of seed potato producers by association and Location. They are largely concentrated at Semonkong and Marakabei because the soil nutrients in the fields are fertile and are the best for seed potato production. The two areas fall within the belt of high potato production suitability.

Table 5. 1: Distribution of Seed Potato Producers by Association (Names and Location), June 2025

Name of Farmers 'Association	Location Name	Frequency	Percentage
Itataiseng Poloko Development Network	Marakabei	21	42
Maletsunyane Farmers Association	Semonkong	8	16
Tapole Ke Letlotlo	Semonkong	21	42
Total Frequency and Percentage		**50**	**100**

Source: Field Data

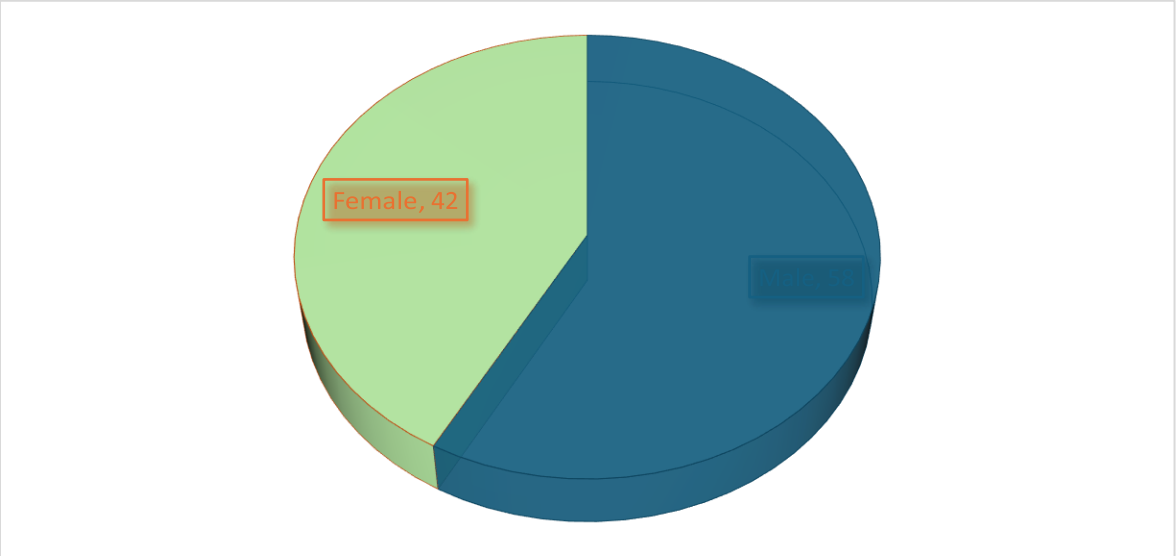
The study finds that the majority (58%) of seed potato producers come from the Semonkong area. This area is well known for its rich and adequate land with fertile soil which is suitable for agricultural production. They are both in the remote rural mountain livelihood zone of Maseru where job opportunities are limited and scarce. The households in these areas depend entirely on agriculture to sustain their livelihoods. A Table 5.1 shows that 42% of seed potato farmers come from Itataiseng Poloko development Network located at Ha Marakabei. This is because only a few of them planted seed potato in the previous agricultural season due to their low purchasing

power to buy the basic seed from South Africa. MAFSN, PLA and LENAFU support these farmers for better quality products.

5.2.3 Gender of Seed Potato Producers

Understanding gender dynamics and disparities is vital in this study. Gender plays a significant role in Africa, and women constitute the majority of the agricultural workforce (Kamau, 2018) . Most rural women in African countries engage in 60% of the family farming activities including growing vegetables, preserving harvested food, rearing livestock and have an added responsibility for preparing nutritious meals for their households (FAO, 2018). Men and women in Lesotho participate in agriculture but with different roles. Women are the primary producers in subsistence farming. They contribute to food and nutrition security as well as household livelihoods.

Figure 5. 1: Gender of the Seed Potato Producers at Semonkong and Marakabei



Source: Field Data

According to BOS (2025) the unemployment rate for men is 64.1% and is 53.7% for females in the rural areas. Figure 5.2 depicts that 58% of men participate in seed potato farming. The mining retrenchment in SA has left several men unemployed and they have resorted to farming. They identified seed potato farming as a potential income generating activity to sustain their households.

Women (42%) also participated in seed potato farming even though, research on Lesotho suggests that rural women migration to SA for domestic work opportunities is on the surge, (Tau, 2025). It can be concluded that the limited job opportunities and high unemployment rate in these areas, have influenced men and women to take the seed potato farming as a potential employer and to

diversify their income generation sources. Secondly, farm households receive good returns in terms of money and their livelihoods are improved. This is why they have a great interest in seed potato farming. One farmer indicated that he pays tuition fees for his wife who is in her third year of study at the National University of Lesotho (NUL).

5.2.4. Age of the Seed Potato Producers

Agriculture remains a critical component in the developing countries (Alabi, 2023). However, there is a declining appeal to agriculture among young generations (Ajao, 2011). The reluctance of youth to engage in agriculture is due to its association with poverty and the perception of farming as an unattractive, labour intensive and low-income occupation (Auta et al., 2010). This contributes to young people leaving rural areas where agriculture is the key factor for the urban centers migration to search for non-agricultural labour opportunities.

Table 5. 2: Frequency and Percentage Distribution of Seed potato producers by age group.

Age group of farmers	Frequency (N)	Percentage
19 - 35	9	18
36 - 64	33	66
65 and above	8	16
Total	**50**	**100**

Source: Field Data

The Public Pension Fund for Lesotho (2023) informs that the retirement age for Lesotho is 60 years except for the disciplined service such as law and medicine, where many people work until over 70 years of age. Table 5.2 indicates that 66% of seed potato farmers fall within the 36 – 64 age categories. This age group is composed of adults who are productive, active and responsible for household maintenance. The farmers in the retirement age group have shown a bigger interest in seed potato farming to increase their income levels in their households since they can no longer secure employment opportunities in the formal sector, in the mines and in the textile industries.

The youth unemployment rate in Lesotho stands at 39% among people aged 15 and 35 (BOS, 2024) as compared to the 2019 survey where it was 22.5%. This increase indicates that several youths cannot maintain and sustain their livelihoods. They may even engage in negative coping strategies to survive. The field data shows that 18% of the youth are involved in seed potato

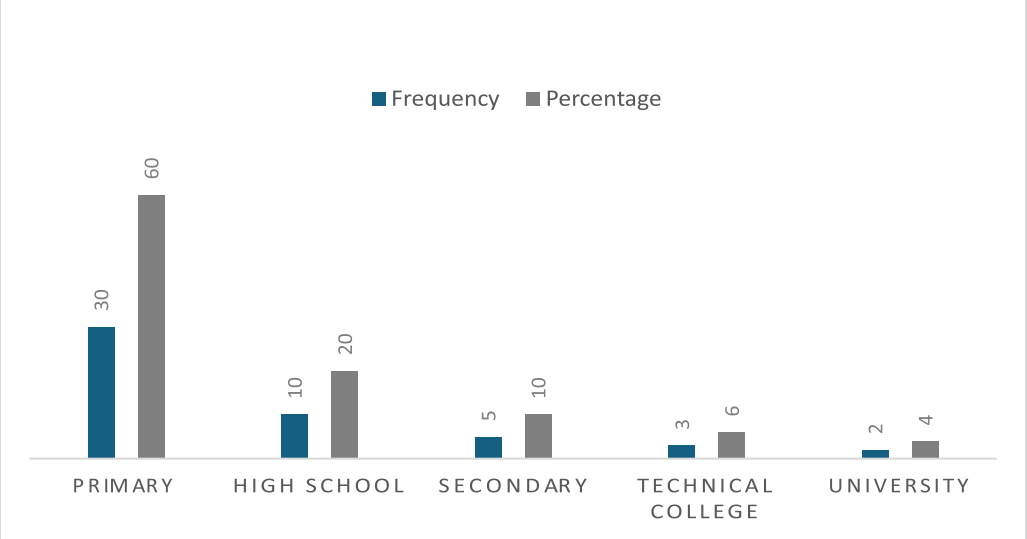
farming in the study areas. This is a smaller proportion of young people in relation to the high national rate of unemployment among them and about which the Lesotho Government declared as a state of disaster in the country in June 2025.

Seed potato farming in the rural areas contributes to the reduction of unemployment for both adults and youths. It is a source of income for several vulnerable farm households. In addition, it is a potential source of more jobs for the youths in the marginalized communities with limited job opportunities.

5.2.5: Education level of the Seed Potato Producers

Though it has improved over time, the education level of people living in the rural communities is generally still low, due to limited infrastructure and socioeconomic opportunities, as compared to that of the people in the urban areas who have higher levels of education *(USDA, 2025)*, The role of education in farming is crucial for its sustainability. It is a superpower and equips the farming communities with the skills and long-term success, awareness and environmental stewardship *(Petani, 2023)*. Abulencia (2023) adds that education develops critical thinking when making decisions and enhances self-reliance and empowerment. Figure 5.3 shows the educational level of seed potato farmers.

Figure 5. 2 : Education Level of Seed Potato Producers



Source: Field Data

Education and agriculture are interconnected. Education equips the farmers with the necessary skills and techniques for sustainable agricultural production. However, Figure 5.3 shows that 60% of seed potato farmers have primary education. This observation suggests that most seed potato farmers have a low level of education as agriculture is a practical sector which directly involves hands-on activities such as cultivating crops and providing essential goods and services. The predominantly low education level has not hindered the farm households from engaging in seed potato farming. Most of them cannot be employed in the formal sector.

Although seed potato farming is the main employer of the rural people with low level of education, it is likely to prohibit and limit the farmers from acquiring technical online information that is necessary to improve their farming skills. However, most online information is presented in English which is not understandable to the Lesotho primary education graduates. ICT technologies also require a better understanding of this second language.

It can be inferred that the low level of education among seed potato farmers can negatively affect production and yields. The decision making within the less educated is often limited and leaves the farming households vulnerable to hunger and poverty, with unreliable livelihoods building strategies.

5.2.6: Seed Potato Producers Household Size

Farm households in the rural areas contribute to sustainable agricultural growth through improving average incomes, food and nutrition security and enhancing a smooth transition of farms across generations (Gomez, 2024). They are considered important in undertaking agricultural activities in an organized manner, through family managed operations, predominantly reliant on family labour from both men and women (FAO, 2014). FAO even identified 2014 as the International Year of Family Farming to recognize how vital farming households are in the sector. Farm households are very important in the rural areas where agriculture is the main source of livelihood for the majority of the population (Hlatshwayo, 2023). However, the rural farm households still face severe food insecurity, unsustainable livelihoods and malnutrition.

Table 5. 3: Household Size of Seed Potato Producers.

Household Size of Seed Potato Producers	Frequency	Percentage
0 – 2	3	6
3- 4	15	30
5 – 6	15	30
7 and above	17	34
Total	**50**	**100**

Source: Field Data

Table 5.3 also shows that the seed potato producers farming household size ranges between seven members and above (34%) and 3-4 and 5-6 (both with a 30% proportion). The average household size in Lesotho is 4 members (BOS, 2016).

Large households indicate the importance of a large family for easy field operations because agriculture is labour intensive. Agricultural activities in the smaller households are still carried out through casual labour hire. The big families are accompanied by high demand for food and income expenditure. This leaves a persistent cycle of poverty, hunger and food insecurity, coupled with engagement in stress or crisis coping strategies within these families. With or without a big family, farming can still go on. The farmers engage other community members in their farms and pay them. Therefore, agricultural casual labour opportunities are highly vital in the farming areas.

5.3 Seed Potato Farming Practices

Seed potato farming practices generally refer to focusing on producing healthy disease-free seed for planting, using modern techniques such as tissue culture, limited field generations and rigorous inspections (Gildemacher, 2009). The practices maintain and improve seed potato quality over successive generations, ensuring high quality yields and disease resistance for commercial potato production. In several agricultural dependent rural communities, land accessibility to the farm

households is a critical source of livelihood, including the rural Lesotho communities (Thabane, 1998).

5.3.1 Land Ownership and Accessibility by Seed Potato Producers

Land ownership is very important for agriculture. It provides farm households with security, incentives for long term investment and a foundation for sustainable practices (Murken, 2022). Lack of land affects the farm households and undermines the farmers' development efforts, including resilience to shocks. It demotivates long-term investment regarding livelihoods and adoption of improved farming practices (Lambrecht and Asare, 2016). Agricultural land accessibility in the mountains is limited due to the terrain and severe land degradation hindering agricultural productivity, production and livelihoods improvement (World Bank, 2018). Land ownership by farmers includes own, hired, sharecropped and borrowed land. Table 5.4 illustrates the seed potato producers land ownership by the farmers' association.

Table 5. 4: Seed Potato Producers Agricultural Land Ownership and Accessibility by farmers' Association.

Name of Farmers 'Association	Frequency	Percentage
Itataiseng Poloko Development Network	**21**	**100**
Maletsunyane Farmers Association	**8**	**100**
Tapole Ke Letlotlo	**21**	**100**
Total	**50**	

Source: Field Data

Despite the limitations in agricultural land accessibility, all (100,0%) the seed potato producers have access to agricultural land through hiring of the fields they planted. Agriculture land hire remains the consistent practice because each year a farmer must rotate and change the field. This field rotation is done to allow the soil fertility recovery for the next another planting season in two to five years depending on the farmer's decision. Farm households are forced to hire land from other households which do not utilise their fields due to their low purchasing power as the agricultural inputs and services are expensive in the markets.

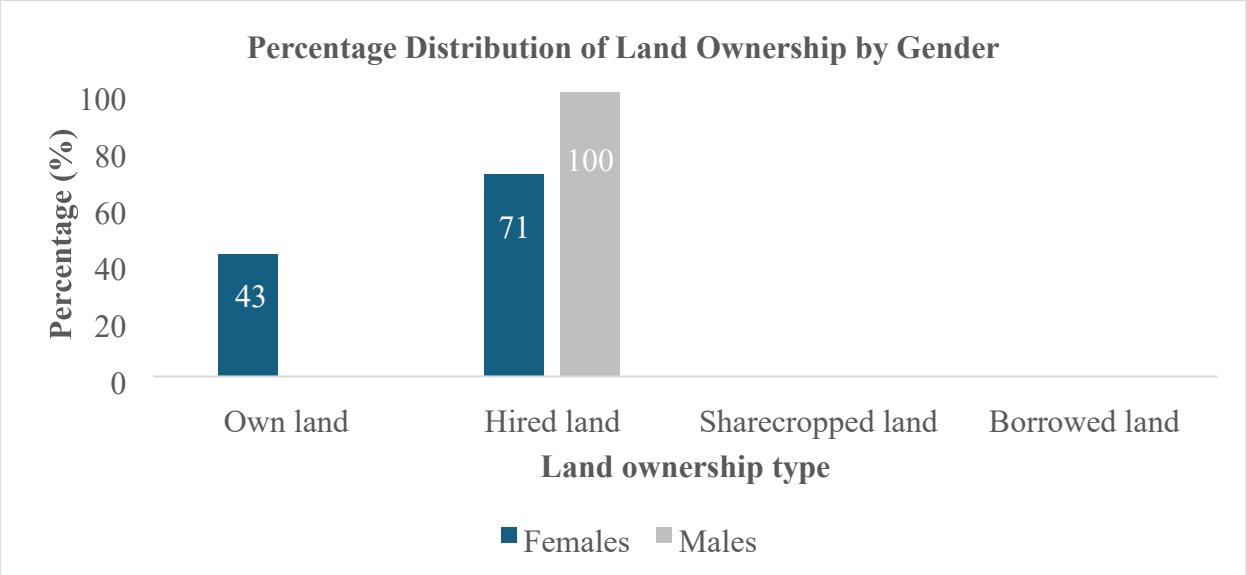
Reliance on field hire has become an income generation opportunity for the field owners. The hiring prices are not regulated, and farmers are compelled to pay more money. If production is low because of climate related shocks, those who have hired land lose, and remain vulnerable.

Land hiring exposes the farmers to unsustainability because they are faced with more production costs than gaining the profits.

5.3.2 Land Tenure

In several African countries, women play an important role in agriculture although they face a significant limitation in accessing and owning land, despite their crucial contributions to sustainable food production and livelihoods. According to Muiru (2025), this disparity is influenced by traditional customary laws and 70% of women come from families farming in Africa. Some women take an interim arrangement market transaction and hire land to produce their own crops for both commercial and subsistence purposes. Figure 5.4 displays a proportion share of landownership by the seed potato producers.

Figure 5. 3 : Type of Land Ownership by gender



Source: Field Data

The study finds that all men (100%) hire the agricultural land. In seed potato farming, agricultural land is rotated every year, and this forces the farmers to hire land. This applies to the 71% of women who hired land. Women (43%) who have their own land are obliged to use hired land in the next planting season when they have used theirs to plant seed potato in the previous season. However, they neither shared nor borrowed land because every farmer wants to gain all the production returns due to the labour intensity of the activity.

The farm households depend entirely on agricultural land. This benefits them because their fields became their sources of income and livelihood. This type of arrangement (hired land) enabled the field owners to make a living out of their fields but compromised those who produce seed potato as they cannot expand or make big investments in the fields.

5.3.3 Land size owned

Agricultural land in the mountains is limited due to the terrain, making potato farming more difficult (Tarolli, 2020). The areas are characterized by one cropping season, diversity and cold weather conditions which enable high value specialty crops such as potatoes to grow (UN, 2020).

Similarly, Lesotho has limited (10%) arable agricultural land (Farmonout, 2025) while 59% of the country consists of steep slopes and high altitude, making it difficult to cultivate and access land (World Bank, 2018). Land degradation, increased soil erosion and loss of soil fertility result from overgrazing, unsustainable farming practices and heavy rainfall. These factors reduce available arable land. Table 5.5 shows the size of land owned by the farm households.

Table 5. 5: Agricultural Land Size Owned by Seed Potato Producers

Size of land owned by frequency and percentage distribution		
Size of land	**Frequency (number)**	**Percentage (%)**
Less than 0.5 acres	0	0
0.5 acres to 1.5 acres	11	22
1.5 acres to 2.5 acres	19	38
2.5 acres and above	20	40
Total	**50**	**100**

Source: Field Data

Table 5.5 suggests that 40% of farm households had access to 2.5 acres and more in size of land. This is the recommended size of land for seed potato farming. It enables farmers to produce an expected high yield of seed potato production. Sixty percent of households have less than 2.5 acres of land, being the proportion share of farmers, 38% have 1.5 to 2.5 acres while 22% have 0.5 acres to 1.5 acres.

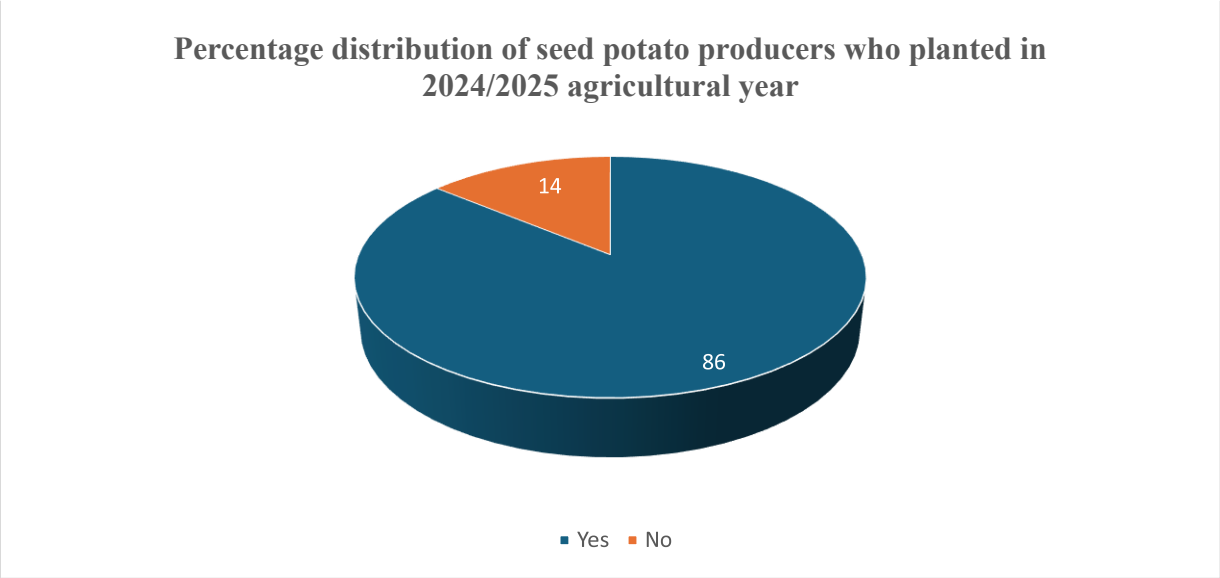
The farm households produce seed potatoes on a smaller land, not recommended by the MAFSN for commercial production. This was influenced by high rates of land hire, expensive agricultural

inputs and services. Lack of technical support from the extension officers contributes largely to the farmers who do not adhere to the recommended size of land. Low purchasing power to hire many fields also contributes to the use of small sized seed potato land.

5.4. Seed Potato Planting Period in 2024/2025 Agricultural Year

According to Rochi (2016) the rural economy of Lesotho has experienced a serious shift in its production from subsistence agriculture to limited manufacturing. This results in active groups of people migrating from the rural areas to the urban areas searching for other income-generating sources. This reduces agricultural production and increases reliance on seed purchases by farm households. Now the high input prices reduce the number of farming households. The pie chart 5.5 illustrates the proportional share of farmers who plant seed potato in 2024/2025 agricultural year.

Figure 5. 4: Percentage Distribution of Seed Potato Producers Who Planted Seed Potato in 2024/2025 Agricultural Year



Source: Field Data

Despite the high market input prices, the majority (86%) of the seed potato producers planted seed potatoes for 2024/2025 agricultural year. They prioritized planting because agriculture is their main source of livelihood and employs many casual laborers. Seed potato farming remains an important employer in these communities and enhances their income sources. Several community members also benefit from seed potato farming; they are hired for casual labour activities such as seeding, planting and harvesting, each receiving M50.00 per day. The farmers hire fields from

other community members who do not utilize them. This contributes to their household income. in their households. It can be concluded that seed potato farming is not only important to the seed potato producers, but it is also vital to the entire community.

5.4.1. Seed Potato Planting Season in the Mountains

The seed potato planting season in the Mountains varies depending on altitude and local climate but generally starts after the last frost in spring or the regions' rainy season (Macdonald, 2019). The growing season is shorter than it is in the low-lying areas. The mountain areas of Lesotho are characterized by one planting season. It allows the farm households to plant once a year, limiting crop production diversification and rotation.

The Agricultural Planting Season for Potatoes in the mountain areas of Lesotho starts in October and ends in December of every year, as indicated by MAFSN. However, for seed potato the farmers are advised to start planting in January to February every year to reduce seed potato loss in the stores since there are no cold storage facilities in their communities as indicated by the farm households. Table 5.6 indicates the distribution of farm households seed potato planting seasons.

Table 5. 6: Distribution of Seed Potato Planting Dates in the 2024/2025 Agricultural Year.

Months	Frequency(number)	Percentage (%)
Aug-24	0	0
Sep-24	0	0
Oct-24	0	0
Nov-24	0	0
Dec-24	27	54
Jan-25	14	28
Feb-24	2	4
Mar-24	0	0
did not plant	7	14
Total	**50**	**100**

Source: Field Data

All (100%) the farm households rely on rainfall for growing crops each planting season. After the first rainfall which started in October 2024 according to the Lesotho Meteorological Services (2024), it allowed the majority (54%) of the farm households to plant seed potato in December

2024, since the soil moisture content was then favourable. The next batch (28%) of farmers planted in January 2025 when there was still good rain. A few (4%) planted seed potato in February 2025, targeting to harvest in winter when the temperature is very low and does not enable early tuber sprouting. The farmers mostly planted Panamera and Mondial varieties due to their high yield and resistance to diseases.

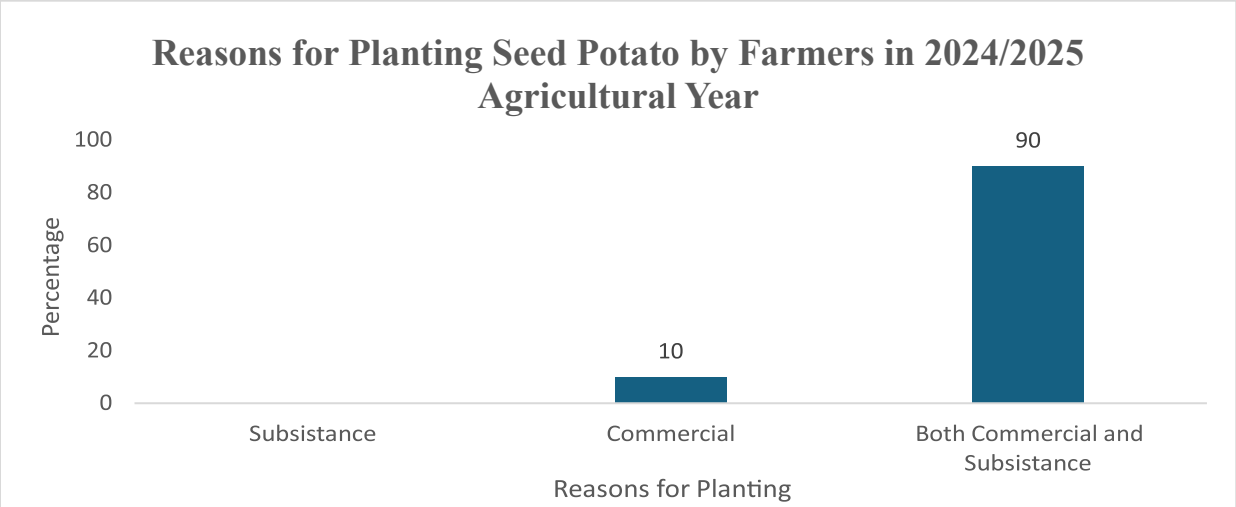
Planting seed potato in January or February allows harvesting to happen in winter when the temperatures are very low as many farmers do have good standard cold storage. Seed potato winter harvesting prevents early sprouting and quality deterioration, before the start of the next agricultural season. The cold weather maintained the seed quality. Reliance of farmers on the cold weather is likely to negatively impact the seed potato production expansion in the country, limiting more potential job creation. Rainfall dependency by farmers can also limit production as climate shocks are currently persistent.

5.5. Reasons for Planting Seed Potato in 2024/2025 Agricultural Year.

The seed potato producers in some developing countries such as Ethiopia do not produce seed potato due to some constraints such as shortage of good quality seed tubers, lack of adaptable and resistant varieties, lack of storage facilities and marketing systems in their areas coupled with significant potential for increasing their income, (Bymolt, 2014).

The farming households in Lesotho primarily engage in agriculture for several diverse reasons including subsistence farming, income generation, livelihoods improvement, food and nutrition security (World Bank, 2022). Figure 5.5 reveals the reasons for the farmers' planting of seed potato.

Figure 5. 5 Percentage Distribution of Seed Potato Producers by Reason for Planting in 2024/2025 Agricultural Year.



Source: Field Data

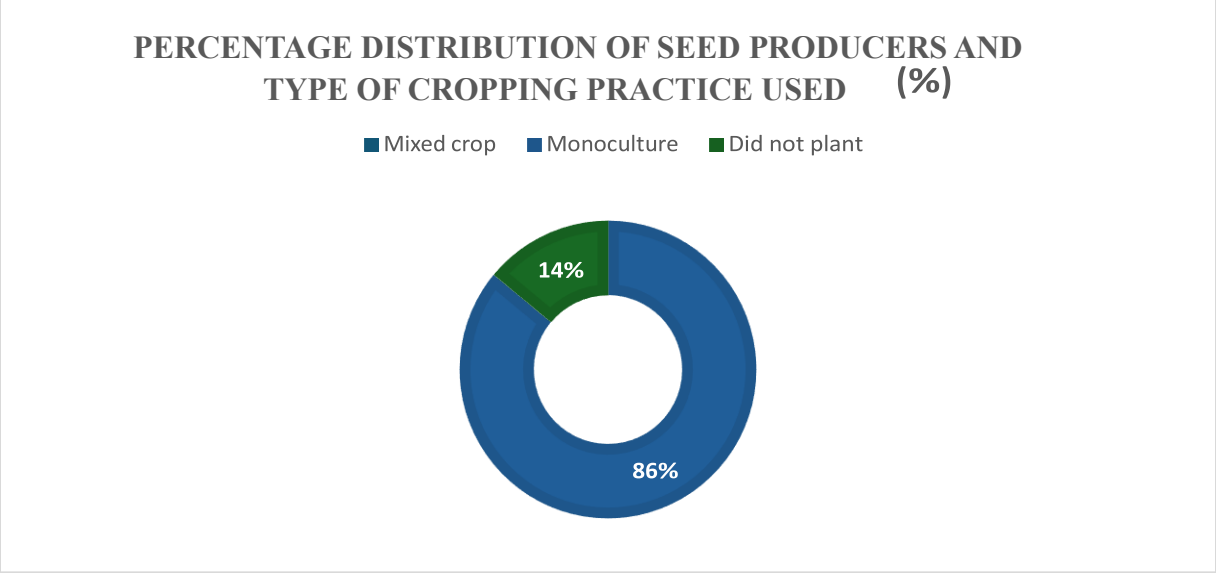
The study shows that a large (90%) number of farm households produce seed potato for both commercial and subsistence purposes. The high unemployment rate and shortage of quality seed potato brought this opportunity. This type of farming contributes significantly to employment and to food security opportunities. Households sustainably maintain their families. In this study 65% of farm households reported that seed potato farming is a sustainable livelihood source; 71% recognise it as the best income generating type of farming while 90.2% report that it creates job opportunities for the entire community. FAO considers the potato as a cash crop. The majority (96.1%) point out that this is the best farming practice for everyone. This type of farming has stabilized the poverty levels in the areas of study. People are busy and have work to do daily.

5.6. Agricultural Cropping practices

The cropping practices involve the specific techniques used to grow crops. They encompass crop selection, planting arrangements and management methods such as soil tillage, nutrient management, irrigation and pest control, all aimed at optimising crop production sustainability on a given field over time (Mohler, 2009). In seed potato farming, cropping practices are crucial for the good harvest returns for both commercial sales and household consumption.

Monoculture is the prominent technique that allows farmers to grow one or two crops (Franco, 2022) and was the most preferred technology in seed potato production to prevent the spread of crop diseases and pests.

Figure 5.6 : Percentage Distribution of Seed Producers by Type of Cropping Practice Used.



Source: Field Data

As depicted from figure 5.6, all (86%) the farmers who planted seed potato used monoculture cropping practice since it is the most recommended technique which allows the crops to grow freely from diseases and pests. It promotes good crop yields and production. Overall, 100% of the farm households who practised monoculture improved their soil fertility using inorganic fertilizers for crop basal dressing, to improve soil fertility. Since monoculture does not guarantee free crop diseases and pests, 88% of the farm households applied the pesticides on their crops to control them. The majority (85%) of the farmers used animal ploughing due to limitations or lack

of advanced seed potato equipment for planting. This leads to the conclusion that crop diseases and pests' management is an important aspect for quality seed potato and improved yields even under monoculture practices.

5.6.1. Quantity of Seed Potato Planted and Harvested in 2024/2025

The seed potato quantity planted is attached to the harvest expected, as each piece of seed potato grows into a plant, providing the energy for the sprouts to develop into a new potato crop (Tuku, 1994). The quantity of seed potato harvested varies from the quantity of seed potato, which was planted, the common yields range from 6:1 to a 10:1 multiplication of the planted seed potato. This means that for every 1 kg of planted seed potatoes, a farmer should expect to harvest 6 to 10 kg of potatoes in a single season, though this can fluctuate on the on the basis of seed potato variety, soil fertility, weather conditions and fertilizer application (Wang, 2008).

Table 5. 7: Frequency and Proportion of Farm Households by the Harvest in 2024/2025 Agricultural Year

Quantity of seed potato harvested (kg)	Frequency (N)	Percentage (%)
1250 kg and below	13	30
1275 kg to 2500 kg	11	26
2525 kg to 3750 kg	3	7
3775 kg and above	16	37
Total	**43**	**100**

Source: Field Data

Table 5.7 shows that 37% of the farmers harvested 3775 kg (151 bags x 25 kg). Some even obtained 500 bags. These are the farmers who planted seeds on a recommended size of land and in the required quantities. Thirty percent of the farmers harvested 1250 kg (50 bags x 25 kg). The heavy rain destroyed most of the crops resulting in an average harvest. Most of the products were too large and therefore not a good size for seeds.

A little more than half (54%) of the farmers, according to Table 5.5, planted seed potato earlier (in December 2024) than the recommended time, thus allowing the crops to grow big before the winter harvest time and to exceed the recommended sizes (small/medium) which are preferred by the customers. Later planting of seed potato farming enables harvesting to be done in winter when the temperatures are very low all (100%) of the farmers depend on traditional storage.

Lack of proper guidance from the extension services also contributed to the farmers planting seed potatoes early. Agricultural extension support remains a worrying concern because this type of farming requires close monitoring and the necessary support. Farmers mention that they receive support occasionally from MAFSN headquarters. The farm households lack technical expertise regarding proper seed potato management practices.

Despite all the challenges, half (50%) of the farm households are satisfied with their production and yields. A small (20%) reports that their harvest is fair while 16% indicates that the harvest was poor due to low soil fertility, heavy rain and waterlogging. The reliance of farmers on traditional storage deteriorated the harvest quality because some crops were attacked by pests (rats). The storage facilities are paid for, irrespective of their quality. Farmers even use school classrooms as storage facilities.

5.7. Seed potato marketing

Marketing seed potatoes involves various strategies. Farmers want to sell high-quality seeds to the relevant potential clients. The key aspects include understanding the market, meeting certification standards and ensuring proper labeling and packaging of the seed potato. Farm households are made aware of diverse marketing systems, including spot markets, direct sales and contracts. Other factors that influence seed potato prices include grade, appearance and provenance (European Union, 2021). Eighty-four percent of farming households rely on government subsidy for sales, because it buys in bulk. 54% of them indicated that their customers prefer small and medium-sized seed potato. It can be concluded that planting seed potato on a limited area of land denies the farmers bigger opportunities to penetrate the bigger markets.

5.7.1. Marketing Techniques

The most prominent marketing strategy used by the farmers is the radio (51%). Due to lack of technical expertise, internet (WhatsApp status posts – 37.3%) was the easiest and internet platforms (18%) like Facebook came the last.

5.8. Seed Potato Farming Contribution to the Farm Household Livelihoods

The contribution of seed potato to the livelihoods is high since it is not affected by the global fluctuations in food prices, its inflation is lower than that of the cereals which are more globally traded (Scott et al., 2015). According to FAO (2008), seed potato farming significantly contributes

to the livelihoods by providing a vital source of income and food security in the rural areas. It allows farmers to generate revenue from selling seed potatoes and enhances their own food supply, thus improving their overall livelihoods. Table 5.8 shows the contribution of seed potato farming to farm livelihoods.

Table 5. 8: The Contribution of Seed Potato Farming to the Livelihoods

S eed potato contribution	Percentage
Job Creation	90.2
Income generation	71
Food and Nutrition Security Improvement	58.8

Source: Field Data

Table 5.8 demonstrates how vital seed potato farming is in the mountains. Most (90%) of the respondents gave the response that seed potato contributes to job creation while 71% see it as an income generation activity. Other (58%) of the farmers regard it as food and nutrition security strategy. It improves the farm households' livelihoods, and they were able to spend the money that they earned on repairing their houses, buying cars, agricultural input, improved livestock and paying for school fees for their children. One farmer said:

"I have been able to buy this van that I am driving, with the money generated from seed potato production. This van is called litapole (potatoes); to show how vital the seed potatoes are to me".

Another one said:

My wife is studying at NUL, and I am paying for fees so that she can come back and help me to improve the business."

An additional farmer said:

"I have been able to buy more improved sheep especially the rams to further improve my other source of income, which refers to wool sales" Another seed potato producer said:

"I have renovated my house which was badly dilapidated and built two more rooms allowing all the household members to fit in the house".

Other farmers said: "The more we make more cash from seed potato, the more we are able to buy more agricultural inputs, making seed potato production more sustainable in the area".

The government, PLA and LENAFU monitor the farmers closely. They want to make seed potato an employing commodity.

There are activities in the pipelines and ongoing government initiatives such as OCOP that support the farmers. The government has partnered with FAO and NUL under the OCOP initiative to improve the seed potato tissue lab.

5.9. Challenges Facing Seed Potato Farming

Despite the importance of seed potato farming, climate change appears to be a big challenge for 61% of the households. It leaves the crops damaged by heavy rain, flash floods and waterlogging.

Lack of storage facility is another drawback. It deteriorates the quality of the seed and 49% of farmers report that they have suffered from it. This is a challenge in other countries such as Ethiopia as well.

Another challenge is the unreliable supply of the appropriate generation of seed potato. This challenge was reported by 29.4% of the respondents. They had to buy seed potato from S A, thus increasing their expenditure on agricultural activities.

Other challenges include transport and shortage of markets. Farmers spend more money on transport than on the seed potato itself. In fact, 28% of the farm households reported limited secure markets. This compromises their time and money.

Further challenges reported by the supporting affiliated stakeholders are as follows.

The restricted diversity of potato varieties cultivated in Lesotho poses a limitation on the sector's resilience and adaptability. The absence of breeding seeds compels farmers to rely on seeds from previous harvests or neighbouring farms or imported seed potatoes from SA. The slow adoption

of modern agronomic practices, including fertilizers, irrigation and improved varieties, contributes to lower potato yields. The absence of mechanisation prohibits quality production with reduced labor-intensive tasks.

The potato sector does not receive adequate policy support like Maize and Sorghum, for example, through maize input subsidies. Lack of adequate support services such as storage and transportation presents a challenge within Lesotho's seed potato value chain, impacting its overall efficiency and competitiveness.

5.9. Conclusion

It can be concluded that seed potato farming has an admirable potential characteristic in contributing to the livelihood change of the farm households through increasing incomes for majority of the households directly or indirectly like in several developing countries. The are pipeline and ongoing efforts initiated by the government of Lesotho. The presence of agricultural policies strengthens full farmers' participation on seed potato farming, but more efforts are needed to tackle the sector challenges for sustainability and resilience.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter is an overview of the study. It summarizes the key findings, discusses their implications and draws conclusions on the contribution of seed potato farming to the farm households at Semonkong and Marakabei in the Maseru district. It also makes some recommendations to improve the resilience and sustainability of seed potato farming based on the findings from this research study. It is divided into three parts including the study summary, the key study findings related to the existing literature review, the conclusions drawn from the study and the recommendations. It presents the limitations of the study and suggests areas for further research.

6.2 Summary

This study investigated the contribution of seed potato farming to the livelihoods of the farm households at Semonkong and Marakabei in the Maseru district in Lesotho. The main purpose of the study was to investigate the potential role played by seed potato farming in sustaining and enhancing the livelihoods of the farm households. The study mainly focused on the seed potato farming practices, the sources of the basic seed potato accessed by the farmers, the planting time, the harvesting time, the storage facilities and the marketing strategies, the types of seed potatoes planted, how seed potato contributes to the farm households, as well as the major challenges experienced in this type of farming.

The study was guided by the following objectives: Investigating the contribution of seed potato production to the livelihoods of the farm households; assessing the role-played by seed potato farming to food security in the farm households and examining the opportunities and threats/challenges experienced in seed potato farming.

This study was conducted through a mixed - methods approach, including both quantitative and qualitative approaches from 50 seed potato producers. The key findings clearly reveal that seed potato farming has a great potential in sustaining and enhancing the livelihoods of the farm households, despite the challenges of basic seed potato accessibility and availability in the country,

availability of cold storage for harvested seed potato, climate change, unstable market, access to modern seed potato equipment as well as land and transportation costs encountered by the farmers.

One of the primary objectives of the study was to examine the opportunities and threats in seed potato farming. The study finds that seed potato farming is a big income generating activity in both areas, because several households (apart from those which produce seed potatoes, get agricultural casual labour opportunities including weeding, planting, seeding, harvesting and packaging. While the field-owners benefit from their land by getting money from those seed potato producers who had hired their land. The farmers also indicated that their food and nutrition security has improved significantly and remained stable and sustainable for a long period despite the existence of the socio-economic shocks happening in the country. They showed that their dietary diversity and food consumption score are acceptable.

In addition, the majority (71%) of the farmers indicated that through their harvest, they are able to get adequate income that allows them to improve their assets and pay school fees for their children. Others added that with the income that they generate from the sale of seed potatoes, they buy improved livestock and cars. They built houses and even have enough cash for investment and for buying more agricultural inputs for the next planting season.

All (100%) of the farm households used animal draught power, with 8% of them using tractors for harvesting. All of them used imported (from SA) inorganic fertilizers to improve their soil fertility. The most planted varieties are Panamera and Mondial. About half (54%) of the seed potato producers sow early seed potato generations in December 2024 while others (28%) planted in January (this was the case in 2025). Those who planted in February (4%) indicated that they did not want their seed potato to sprout earlier than the next planting season. Rainfed dependency affected them all. No farmer practiced irrigation type of farming.

Furthermore, the study found that seed potato farming is an important employment commodity for both youths and adults in the rural areas where job opportunities and resources are limited. Cold storage and road infrastructure development appeared to be the most in demand to sustain and improve this type of farming. The farmers mention that their harvest often gets destroyed, especially when the seed potato demand is stagnant and compromises their livelihoods.

Despite the advantages brought about by seed potato farming the farming households are faced with several challenges including lack or limited access to quality basic seed potato for multiplication, climate related shocks, high costs of production, transportation of the items from SA and the local markets in the main towns nearby, absence of cold storage, poor roads infrastructure, limited marketing strategies, lack of local market, poor agricultural extension support and unavailability of seed potato policy. Cold storage unavailability appears to be a universal challenge amongst all the farmers, with 100% of them identifying it as a prominent need.

This issue tremendously compromises the seed potato quality as it deteriorates before reaching the markets. The study revealed that 84% of farm households rely entirely on the government to buy their products. They also report that the prices are set by the associations depending on who is buying their seed potato. When the government buys, they charge more since it takes a long time to pay. Marketing strategies remain another challenge because many (51%) farm households depend more on radio advertising than on any other options.

Seed potato farming continues to improve the livelihoods of farm households and other community members. The study makes a positive finding from all the seed potato producers surveyed; they report resilient and sustainable improvement in their livelihoods from the entire dependency on seed potato farming. Specifically, 65% of the farm households indicate that their livelihoods, their standard of living as well as sustainable food and nutrition security at the household level, have improved significantly.

6.3 Conclusions

The study concludes that seed potato farming seed potato farming improves farm households at Semonkong and Marakabei. This improvement is likely to spread further to the other households in their communities. It also confirms the improvement in socio-economic status as well in food and nutrition security benefits from this type of farming. However, some interventions are necessary to address the prevailing challenges such as cold storage facility construction and timely access and availability of the basic seed potato to the farming households. By supporting the seed potato producers in the rural areas, seed potato farming is likely to be sustainable and to improve the livelihoods of the rural population in Lesotho.

6.4 Recommendations

To ensure that seed potato farming attracts many farm households because of its success and sustainability, it is very important to address several identified challenges through the implementation of the recommendations made for the various stakeholders in the sector. The recommendations include construction of the cold storage facility and road infrastructures, capacity building programmes for the farmers, collaboration of the farmers with the academia and research institutions, availing the seed potato near to the rural communities, promoting research and development and seed potato policy development support.

6.4.1 Construction of Cold Storage Facility

Cold storage facilities are essential for maintaining seed potato quality and extending their shelf life, especially considering Lesotho's climatic conditions and the need to preserve seed potatoes after harvest for extended periods. The existing storage infrastructure is insufficient. This situation leads to post-harvest losses, quality deterioration and market supply disruptions. Constructing a cold storage facility is important in addressing seed potato quality loss before reaching the market for the next planting season.

6.4.2 Improving the Support Services - Road Infrastructure

The prevailing lack of adequate support services such as poor gravel roads presents a significant challenge within Lesotho's seed potato value chain. It impacts overall efficiency and competitiveness. Transportation plays a vital role in ensuring timely and efficient movement of seed potatoes from production areas to the markets or to the packaging facilities.

The absence of well-developed transportation networks, including roads and logistics services, results in challenges such as delays, increased handling costs and product spoilage during transit. These shortcomings in support services not only affect the quality and availability of seed potatoes in the market but also hinder the value chain's ability to optimize production, to meet the market demand fluctuations and to capitalize on market opportunities, hence the need for more road networks improvement to reduce the burden on farmers to rehabilitate the road.

6.4.3 Promotion of Different Seed Potato Varieties

The restricted diversity of potato varieties cultivated in Lesotho poses a significant limitation on the sector's resilience and adaptability. Currently, farmers primarily produce the Irish potato variety which restricts their ability to respond to the changing market demands or environmental conditions. The lack of a diverse genetic pool increases the sector's vulnerability to diseases and pests, while also limiting the potential for specialty markets that require specific varietal characteristics.

The relevant stakeholders in seed potato production should support the seed potato producers in the identification of diverse seed potato varieties which allow them to reach a broader potential market. This will enable other potato farmers to have a large pool of varieties for specific purposes, such as potato processing, to make French fries.

6.4.4 Support for a Healthy Seed Potato Production System

The absence of breeding seeds compels the farmers to rely on seeds from previous harvests or from the neighboring farms. This leads to low yields. Currently there are also no certified seeds in Lesotho. Reliance on imported seed potatoes from SA South Africa, not only adds logistical complexities and costs but also limits Lesotho's ability to fully capitalise on its agro-climatic potential. These seeds are often not certified and could carry pathogens. Furthermore, lack of a tissue culture lab in Lesotho represents a significant gap in the country's agricultural infrastructure, particularly concerning seed potato production. Therefore, the stakeholders, including the government, the NGOs and the development partners, should support the construction of a tissue culture lab in the country, for seed potato production sustainability.

6.4.5 Improve the Agricultural Production Techniques under Seed Potato Production

The slow adoption of modern agronomic practices, including fertilizer, irrigation, and improved varieties, contributes to low potato yields. Unsustainable agricultural practices such as manual land tilling and unregulated use of fertilizers result in land degradation. Farmers show lack of knowledge about improved agricultural practices for production and post-production processes. Most farmers do not focus on productivity and scaling up their farming operations. Production techniques require more attention and improvement to enable the farming households to have a variety of choices on the techniques which they can use when producing seed potato.

6.4.6 Promotion of Modern Mechanization

The absence of mechanization, particularly during land preparation and harvesting, as well as primary processing stages such as cleaning and packaging represent a significant challenge in Lesotho's potato value chain. Mechanisation plays a crucial role in increasing efficiency, reducing labour-intensive tasks and improving the overall productivity in agricultural operations. Regarding harvesting, lack of mechanised equipment such as harvesters and potato diggers force farmers to rely on manual labour and/or other traditional methods such as the use of oxen-ploughs. This manual approach does not only increase labour costs, but it also slows down the harvesting process, leading to potential delays and inefficiencies.

Manual harvesting results in higher rates of seed potatoes damage and losses which affect their quality and market value. In terms of primary processing, such as cleaning and packaging, the absence of mechanized processing facilities further adds to the labour-intensive nature of these tasks. Without modern processing equipment such as washing machines and UV dryers, farmers and processors must rely on manual labor, which is time-consuming and less efficient. Lack of mechanisation in both harvesting and primary processing stages hampers productivity and limits the potential product diversification. Promotion of modern mechanization should be underscored, to maintain consistent quality standards and to reduce post-harvest losses.

6.4.7 Seed Potato Processing Sector Enhancement

The absence of a robust processing sector in Lesotho's potato value chain is a notable challenge, with farmers handling primary processing tasks and secondary processing being minimal. This situation poses several limitations and constraints on the value chain efficiency and value addition capabilities. Primary processing, which includes things such as washing, is mostly carried out on farms by the farmers themselves. This manual and decentralized approach to primary processing usually leads to inconsistencies in product quality, increased labour requirements and challenges in meeting market standards and demands.

Furthermore, the limited presence of formal secondary processing facilities for activities such as packaging hampers the ability of the value chain to add value and to diversify seed potato product offerings. Without adequate processing infrastructure, the scope for producing quality seed potato remains underutilized. The reliance on farmers for primary processing and the minimal presence of secondary processing facilities contribute to inefficiencies, higher post-harvest losses and lack

of product standardization within the value chain. It also limits the value chain competitiveness in meeting diverse market demands and accessing higher-value market segments. This situation calls for a critical seed potato processing sector enhancement to add a marketable value seed potato locally and internationally.

6.4.8 Improvement of Government Focus and Support on Seed Potato Production

Seed potato production, unlike maize and sorghum, is less subsidized, while its potential for improving rural livelihoods is increasing for both the youths and adult populations. The government of Lesotho should focus on and improve its support on seed potato production. It should promote it as a country's priority product through the subsidy of the costs of its production.

6.4.9 Strengthen Concentration of Activities on Seed Potato Producers

The shortened value chain resulting from the absence of aggregators and distributors, translates into farmers taking on multiple roles of storage, transportation and primary production. Aggregators play a crucial role in the value chain by consolidating produce from multiple farmers, streamlining distribution, risk-sharing and providing value-added services such as quality control, packaging, and marketing. However, lack of aggregators in Lesotho's seed potato industry leads to a fragmented supply chain, with increased transaction costs and limited market access for smallholder farmers.

The farmers are forced to handle storage, transportation and primary production tasks and this situation adds complexity and inefficiency to the value chain. It results in suboptimal utilization of resources, higher production costs and challenges in maintaining product quality and consistency. The absence of aggregators also hampers opportunities for specialisation and economies of scale. Concentration of activities on seed potato producers should be strengthened, and aggregators should be allowed to handle the logistics and marketing aspects so that the country can produce quality seed potato.

6.4.10 Marketing Strategies Diversification

The farmers' marketing strategies are highly limited and the farmers resort to and rely on radio advertising as the main solution. They should explore additional avenues that suit both the local and international markets. Working together in groups can enable them to increase their visibility and sales,

hence the need for the government, through agricultural extension support, to assist and capacitate them with the different and available marketing techniques.

6.4.11 Research and Development Promotion

Research and development promotion in seed potato farming is very important and can lead to critical innovations on breeding in the tissue culture laboratory, weeds, disease and pest management. The farm households should work hand in hand with the agricultural research institutions and academia, as well as with the extension services to acquaint themselves with the latest modern agricultural technologies and techniques. This work could involve implementing the research demonstration and trials together, while testing the new seed potato varieties, pests and disease prevention techniques.

6.4.12 Proper Development of the Seed Potato Policy

It is critical that the agricultural sector considers developing a seed potato policy. This should include subsidies, grants, or low institutional loans for infrastructure improvements, such as cold storage facilities. This could allow the farm households to upscale and invest more in seed potato farming without looking back and bearing the total production costs, which could importantly facilitate more profitability, sustainability and resilience to them.

6.5 Limitations of the Study and Recommendations for further Studies

The term 'limitations of the research study' refers to validity and generalising the findings. This study has identified some limitations that may have influenced the study findings. One of the identified limitations is the geographical choice of the study areas which only concentrated on the mountain agricultural and livelihood zones. Other zones were not considered. Farmers from other livelihood zones may have different views regarding the contribution of seed potato farming to the farm households in their zones.

Another limitation was the data collection reliance only from the seed potato farmers without including the control group of those who do not produce it. This would have made it easier for the researcher to get diverse views and information from different farmers.

Another limitation is that of statistical representativeness as only 50 seed potato producers were interviewed. This means that the researcher should have conducted a survey from 5% to 10% of the total farming households producing seed potato. The study period is seen as another limitation.

Data was collected during the season when the farmers were busy harvesting and could not have time for further probing.

To address these limitations for further studies on the contribution of seed potato farming to the farm households, researchers should consider upscaling the survey to all the livelihood zones, with recommended statistical representations. This would improve the research findings that enable the generalisability of the results. Secondly, data collection timing should be revised and not be done during the harvesting period when farmers are busy and not having patience to answer the questions. This could enhance more engagement with the farmers through reasonable probing, where necessary, concerning the contribution of seed potato farming to the livelihoods of the farm households.

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APPENDICES

APPENDIX 1:

QUESTIONNAIRE: Interview Instrument for the Farmers.

To be filled by Enumerator	*Questionnaire number*:		*Data entry number:*	

Section 1: Details

1. Name of Enumerator: _____
2. Data Collection Date: _____
3. District Name
4. Council Name
5. Village Name _____
6. Agro-ecological zone _____ _____

Section 2: Respondent Information

1. Name of respondent: _____ (***not to be entered into database***)
2. Age: _____(years)
3. Gender (Sex): ☐Male (1) ☐Female (2)
4. Mobile #: _____ ☐Not applicable

Section 3: Household Demographic and Livelihood Characteristics

1. Name of Farmer_____
2. Gender of Farmer. ☐Male (1) ☐Female (2)
3. Household size: How many people live in this household?_____total **4. (Note *give the number under each age group below)***

Age group→	< 5 years	5-17 years	1835 years	3660 years	>60 years
Number of HH members					

5. How many household members are involved (provide labor) in Agricultural activities, especially in seed potato farming?

15 years or more	Men_____	Women _____

Under 15 years	Boys_____	Girls _____

Section 4: Seed Potato Farming Practices

1. Do you have access to agricultural Land for seed potato production? ☐yes (1) ☐no (2)
2. If yes what is the size of your agricultural Land in acres?

Size of agricultural Land	Codes
Less than 0.5 acres	1
0.5acres to 1.5acres	2
1.5 acres to 2.5 acres	3
2.5 acres and above	4

3. What is the tenure of this land?

Land tenure type	Codes
Own land	1
Hired land	2
Sharecropped land	3
Borrowed land	4
Other specify	5

4. Seed potato farming parameters during the current season (2024/2025)?

Seed potato production parameters	**During current season (2024/2025)**
Did you plant seed potato this current agricultural season (2024/2025)? *1=yes or 2=* no	

What is the date that you planted seed potato? Month	
Why are you planting seed potatoes? *1=commercial 2=subsistence 3=both*	
What area (hectare) did you plant during the current agricultural year (2024/2025) for this crop?	
How much was the space between each tuber?	
How much was the depth of the seed potato basin?	
Land preparation method: *1=Conservation Agriculture/minimum tillage; 2= Animal ploughing; 3=Tractor ploughing; 4=Other (specify)*	
Quantity of seed used (kg)	
Was the crop in the field *1=rain-fed or 2= irrigated?*	
What was the cropping practice? *1=mixed crop; 2=monoculture*	
Did you apply **inorganic** fertilizer? *1=Yes, 2=No*	
If yes, what type of organic fertilizer? *1=basal fertilizer; 2= LAN; 3= CAN; 4=none*	
Did you use **organic** fertilizer? *1=Yes, 2=No*	
If yes, what type of organic fertilizer? *1=compost manure; 2= animal manure; 3= green manure; 4= others (specify)…….*	
Pest and Disease Management What methods did you use for pest and disease control? *1=chemical control; 2= biological control; 3= resistant varieties; 4= others (specify)…….*	
What is the Quantity harvested or expected (kg)	
When did you harvest? (month)	
How do you rate the harvest or the stand of your harvest prospects if not harvested yet? *1=Good; 2=Fair; 3=Poor*	

5. . How long have you been producing seed potatoes?

Responses	**Codes**
One year	1
Two years	2
Three years	3
Four years and above	4

6. . What were the three main sources of your basic seed potato in 2024/2025 agricultural year?

Seed potato Sources	Codes
Own saved seed	1
Formal Market ***(abroad)***	2
Formal Markets ***(local)***	3
Informal Market ***(abroad)***	4
Informal Market ***(local)***	5
Government subsidy	6
Research Institution	7
Seed aid (UN,NGO,LENAFU,CBO)	8
Other (specify)	9

7. Please give the name of the seed potato you planted.

Seed potato name	Code
Panamera	1
Mondial	2
BP1	3
Allison	4
Valor	5
Sifra	6
Avalanche	7
Other (specify)	8

8. What type of potato did you plant?

Seed potato type	Code
Certified seed	1
Quality declared seed	2
Farm – saved seed	3

9. During a good normal agricultural season, how much do you normally harvest?
10. How much are you expected/harvested this year, in kgs?
11. How do you store your seed potato?

Seed potato storage method (s)	Code
Traditional Storage	1
Diffused light storage	2
Cold storage	3
Other (specify)	4

Section 5: Seed Potato Marketing

1. Where do you normally sell your seed potato produce?

Selling Areas	Codes
Government subsidy programme	1
Local seed traders shops (formal)	2
Informal markets	3
Local and communities	4
To individuals from outside Semonkong	5
Other (specify)	6

2. What size of seed do your customers prefer?

Seed potato size	Code
Small	1
Medium	2
Large	3
Other (specify)	4

3. How is the size of seed potato determined?
4. What marketing techniques do you use?

Seed potato storage technique (s)	Code
Radio	1
Internet (phone)	2
Internet page platforms (e.g. Facebook)	3
Newspaper	4
Other (specify)	5

5. How much do you normally sell a 25kg seed potato bag in the market?

6. How many bags of 25kg seed potato are you going to sell this coming agricultural season (2025/2026)?

7. What is the mode of transport to the market (s)?

Seed potato Transport Mode to the market (s)	Code
Animal (donkey/horse/mule	1
Van	2
Truck	3
Car	4
Other (specify)	5

Section 6: Seed Potato Farming Training

1. Did you get training support to produce seed potato this year (2024/2025)?

☐yes (1) ☐no (2)

2. 6.2. If you received training support from the extension services, how many times were you trained?

Number of times	Codes
Once	1
Twice	2
Thrice	3
Four	4
Five and above	5
Do not remember	6

3. Who provided training?

Institution Name	Codes
MAFSN	1
LENAFU (PLA)	2
UN (FAO, UNDP)	3
NGOs (Serumula, RSDA,	4

Lead farmer	5
Other (specify)	6

4. What was the training all about? Mention three topics you liked most.

Seed potato identification in the market	**Codes**
Soil preparation	1
Soil fertilization for seed potato	2
Type of basal used for seed potato production	3
Records keeping	4
Market identification	5
Type of storage to use	6
Other (specify)	7

Section 7: Seed Potato Farming Financial Support

1. As a seed potato producer, are you able to get any financial assistance for improving seed potato farming in the country?

2. ☐yes (1) ☐no (2)

3. From which financial institutions?

Financial Institutions	**Codes**
Local banks	1
Cooperatives	2
Local projects (SADP 11)	3
Community societies	4
Other (specify)	5
None	6

4. Did you get any other support from the development partners? ☐yes (1) ☐no (2)

If yes, from which development partners/government projects?

Development partner/government project Names	**Codes**

FAO	1
UNDP	2
SADP 11	3
LNDC	4
Other (specify)	5

5. What did the support entail?

Support	**Codes**
Training materials	1
Seed Potato equipment for planting	2
Seed Potato equipment for harvesting	3
Fungicides	4
Other (specify)	5
N/A	

Section 8: Seed Potato Farming contribution to the Farm Livelihoods

1. . Why are you interested in seed potato farming?

Reasons for producing seed potato	**Codes**
Generating income that can sustain the households for other bigger projects.	1
Create more job opportunities in the area	2
Food security improvement	3
Increasing seed potato availability and accessibility in the area/nationally.	4
Have enough land to produce seed potato.	5
Other (specify)	6

2. Is seed potato farming the/your main source of livelihood?

3. What have you been able to do with the income generated from seed potato farming in your household?

Livelihood Improvement	**Codes**

Bought more female livestock (sheep, goats, cow)	1
Bought more agricultural land	2
Food security improved	3
Bought productive assets (wheelbarrow, hoe, planter, scotch cart)	4
Paid children school fees	5
Paid health related fees	6
Extended/improved the house	7
Build a seed potato store	8
Bought a car/truck for transporting seed potato	9
Other (specify)	10

4. Is seed potato farming the main source of livelihood? ☐yes (1) ☐no (2)

5. If no, which are the other sources of livelihood? Mention the three main sources.

Income sources: ***(tick up to 3)***

☐Crop sales (cereals) (1)	☐ Vegetable sales (2)	☐ Livestock sale (3)
☐On-farm daily labor (4)	☐Livestock products (5)	☐Gathering wild vegetables (6)
☐Off-farm daily labor (7)	☐Remittances (8)	☐Petty trade –non agric (9)
☐Old age pension (10)	☐Salary (11)	☐Pension (12)
☐Seed potato sales (13)	☐ Fishing (14)	☐ Sale of charcoal/fuel wood (15)
☐Child grant programme (16)	☐Public Assistance (17)	☐ Emergency cash transfer (18)
☐Others(specify)……(19)		

Section 9: Seed Potato Farming Challenges and Threats

1. Are there major challenges faced during seed potato farming?

   ☐yes (1) ☐no (2)

2. If yes, which are the three main challenges/threats you normally encounter during seed potato farming?

Seed Potato Farming Challenges/threats	Codes
Limited access to quality seed potato (with more diseases incidence, low germination	1
Seed Availability (unreliable supply of quality seed potatoes)	2
Lack of access to the agricultural inputs used for seed potato farming e.g, fertilizers, pesticides.	3
Lack/limited Access to secure Markets (formal/informal)	4
Financial Constraints	5
Lack of knowledge and information about seed potato farming.	6
Climate change related impacts (changes in rainfall patterns, increased hot temperatures, drought, heavy rains)	7
High agricultural inputs prices	8
Lack of transport to and from the markets	9
High transport cost to and from the markets	10
Lack of seed potato storage	11
Lack of land	12
Lack of labour force	13
Lack of basic seed potato	14
Informal seed potato access prone to diseases	15
Decrease of seed potato produce price	16
Lack of seed potato planting tools and equipment	17
Lack of seed potato harvesting tools and equipment	18
Replanting seed potato due to poor germination	19
Better yields (limited markets and storage)	20
Other (specify)	21

3. How do you normally tackle them?

Section 10: Seed Potato Farming Encouragement

1. Would you encourage some farmers to produce seed potato in the country?

   ☐yes (1) ☐no (2)

2. If yes, why, give the two main reasons?

3. . If no, give two main reasons.

4. Do you have any special requests from the government?

   ☐yes (1) ☐no (2)

5. If yes, what are your requests from the government to ensure that seed potato farming improves?

APPENDIX 2:

Qualitative Questions

1. Seed Sources and Acquisition:

1. Where do seed potato farmers typically obtain their basic seed potatoes?
2. What are the advantages and disadvantages of each source from the farmer's perspective?
3. How satisfied are farmers with the quality of seed potatoes obtained from different sources?
4. What factors influence farmers' decisions about where to source their seed?

5. What factors influence the farmers' decision to purchase certified seed potatoes versus using farm-saved seed?

2. Knowledge and Practices:

1. What is the level of farmers' knowledge regarding seed potato selection and management?
2. How do farmers select seed potatoes for planting?
3. What are the common seed potato production practices used by farmers and why (e.g., planting density, fertilizer application, irrigation)?
4. What are the common storage methods used by farmers for seed potatoes?
5. How do farmers assess the quality of seed potatoes before planting?
6. What training or support do farmers receive regarding seed potato production and management?

3. Seed Potato Quality and Storage:

1. What are the farmers' perceptions of seed potato quality they produce?
2. How do storage conditions affect seed potato quality produced by the farmers looking at temperature, humidity, ventilation?
3. What are the common post-harvest losses of seed potatoes and their causes?
4. What are the farmers' experiences with seed potato certification and quality control?

4. Market and Socioeconomic Factors:

1. "How does the price of seed potatoes affect your planting decisions?"
2. "What are your experiences with accessing markets for your potato harvest?"
3. How do gender roles influence seed potato selection and farming practices in seed potato farm households?
4. How do household resources (e.g., land, labor, capital) affect seed potato farming?
5. What are your expectations and aspirations related to potato farming?

5. Innovation and Adoption:

1. What are the perceptions of new seed potato varieties or farming technologies?

2. What encourages seed potato farmers to adopt new practices or technologies in seed potato farming?
3. How do the seed potato farmers learn about new seed potato varieties or farming techniques?
4. What are the barriers to adopting new technologies in seed potato farming?

6. Impact on Livelihoods:

1. How has the use of improved seed potatoes impacted seed potato farmers and yields?
2. In your view, has the use of improved seed potatoes affected the income of seed potato farmers and how?
3. In what ways has seed potato farming contributed to the family's food security?
4. Do you think seed potato farming has improved the overall standard of living of the farm households and in what way?
5. What are the specific ways in which seed quality impacts the household's financial situation?
6. What are the gender dynamics in terms of access to and control over seed potatoes within the seed potato farm household?

7. Impact of Interventions:

1. What is the impact of farmer training and extension services on seed potato production practices?
2. How do farmers perceive the effectiveness of different interventions aimed at improving seed potato quality?
3. What are the farmers' suggestions for improving the seed potato system in Lesotho?

8. Challenges and Constraints/threats:

1. What are the major challenges farmers face in producing high-quality seed potatoes?
2. How do diseases like bacterial wilt affect seed potato production and quality?
3. How do farmers cope with these challenges?
4. What are the constraints/threats related to seed potato marketing and distribution?
5. What are the perceived impacts of climate change on seed potato production?