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RESEARCH PROJECT:

CONTRIBUTION OF MAKHALENG FARMERS ASSOCIATION TO FARMERS'
LIVELIHOODS AT HA TLALI, MASERU

BY

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A Dissertation submitted to the Department of Development Studies in Partial Fulfilment of
the Requirement for Masters of Arts in Development Studies

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Declaration

Hereby declare that the dissertation that I submit for the Masters of Arts in Development Studies at National University of Lesotho is my work. I have not submitted it before for a qualification at another university or any other institution of higher education. I affirm that the work of other people contained herein has been duly acknowledged.

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Abstract

This study was conducted at Ha Tlali in Maseru district focusing on the contribution of Makhaleng Farmers Association (MFA) to farmers' livelihoods. The objectives were to examine the impact of technology, climate change, stakeholders support and availability of markets to the farmers' livelihoods. Qualitative approach was used to conduct the study where data was initially collected through one-on-one interviews with key informants and later using focus group discussions with members of MFA.

The findings through thematic analysis revealed that the use of old and modern technology and stakeholders support contributed significantly to their livelihoods by improving food security, increasing income, improving well-being and reducing vulnerability though the use of old technology had some weaknesses. The data revealed that farmers were vulnerable to climate change; very low and high temperatures, heavy rainfall and drought which were increasing crop failure, loss of properties, introducing new pests that destroy the crops as a result the production was decreased. The findings also revealed that the potato market was very high in urban areas though farmers faced obstacles like. Lack of knowledge, lack of access to information, transport, storage and advanced technology are factors that enable the farmer to access the market.

The study recommended that Makhaleng Farmers Association should be supported with training programmes every season of potato farming, advanced technology that will help them to increase production so that they can improve food security and income that will be used to attain human needs and reduce vulnerability.

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List of Abbreviations

MFA	Makhaleng Farmers Association
NGOs	Non-Governmental Organisations
WB	World Bank
IMF	International Monetary Fund
LZHSR	Lesotho Zero Hunger Strategic Review
SADP	Smallholder Agricultural Development Project
LENAFU	Lesotho National Farmers Union
SLF	Sustainable Livelihoods Framework
ICT	Information and Communication Technology
ISSD	Integrated Seed Sector Development
FSP	Farmers Support Programme
GDP	Gross Domestic Products
ACF	Agricultural Credit Facility
FAO	Food and Agricultural Organisation
IFAD	International Fund for Agricultural Development
RSDA	Rural Self-Help Development Association
GoL	Government of Lesotho

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Chapter one: Introduction and background to the study

1.1 Introduction and Background

In the developing world, where there is a dearth of food and a high cost of food, many people find it difficult to get healthy meals. Rural households have resorted to agriculture to sustain their livelihoods. Lesotho is not an exception in this regard, as rural households struggle for sustenance though using agriculture to enhance livelihoods. The World Bank (2017) claims that there is a decline in agriculture production, which negatively affects the livelihoods of rural dwellers. Nhemachena et al., (2017) reveal that Lesotho's land area only has 15% arable land; the rest is made up of rocky terrain and steep mountains. From 2012–2016, agriculture's contribution to GDP was six percent relatively small given the size of the land used for cultivation (World Bank, 2017).

Rural dwellers in most African countries have resorted to communal farming to lessen the burden on families due to unemployment. However, their efforts on these projects are met with challenges. Mohamed (2022) states that in Egypt, farmers are faced with high costs of imported agricultural inputs such as seeds, fertilisers as well as equipment to plough and irrigate. In affirmation, Allagbe et al., (2014) posits that rural area households' access to food can be limited by financial constraints that force farmers to buy agricultural inputs necessary for production over immediate household food needs. This means that families are forced to make tough choices to continue with their agriculture business.

Rural areas lack viable agribusiness firms which guarantee readily available and affordable inputs to farmers without travelling long distances (Paudel et al., (2019). Muroyiwa & Ts'elisang (2021) state that access to market information could increase farmer's participation in the markets and it could boost income as well as to increase productivity, but farmers lack such crucial information. Additionally, there are challenges related to lack of fair markets to rural farmers and access to technical knowledge (Mohamed, 2022).

Muroyiwa and Ts'elisang (2021) indicate that unsustainable farming methods, the effects of climate change, deteriorating soil, rising water scarcity, and unexpected extreme weather occurrences all add to rural farmers' already difficult circumstances. Climate change poses a major risk to food security globally hence a need for awareness and capacity building among farms (Mohamed, 2022).

In order to address challenges faced by rural farmers, the Lesotho government together with Non-Governmental Organisations (NGOs) and international agencies such as The World Bank, International Monetary Fund and World Food Programme contribute significantly to improve agricultural production by supporting farmers (Government of Lesotho, 2003). The Lesotho government has developed policies and programmes to support farmers, these include the Lesotho Food and Nutrition Policy and Lesotho Zero Hunger Strategic Review (LZHSR) developed to scale up climate-smart practices, increased food security as well as to improve income (Government of Lesotho, 2003).

Furthermore, the Lesotho government introduced the block farming policy as one of the initiatives to ensure food security. Rantso and Seboka (2019) conducted a study which revealed that block farming had a positive impact on farmers' livelihoods, because for fields that were barren, the farmers had a chance to cultivate them. The success could be attributed to the government's commitment to assist farmers with inputs (Rantso & Seboka, 2019) study findings on block farming which revealed that the government gave farmers 100 percent input. The main purpose of these initiatives was to promote agriculture in rural areas and improve livelihoods. Therefore, the goal of this study is to examine how the Makhalleng Farmers Association affects the livelihoods of farmers in Ha Tlali, Maseru.

In Lesotho, farmers in rural areas are encouraged to form cooperatives to ease the burden on farmers when it comes to access to agricultural input and markets (International Development Association (IDA), 2019). The establishment of cooperatives is strongly supported by the World Food Programme (WFP). WFP (2012) defines cooperatives as an autonomous group of men and women who come together voluntarily to work towards the same economic, social, and cultural goals through a jointly owned and democratically run business. In addition, agricultural cooperatives are crucial for assisting underprivileged populations including women and young people as well as small-scale farmers (WFP, 2012). This therefore applies to cooperatives established in Lesotho as they empower their members' greater economic, social, and labour opportunities in rural areas.

As a step further to encourage cooperatives survival, Charles et al., (2016) explains that the World Bank provided financial support for Lesotho's agriculture sector to implement the Smallholder Agricultural Development Project (SADP). For improving marketable surplus in numerous value chains, such as horticulture, fruit and vegetable production, poultry, piggery, and dairy, SADP offers training and competitive funding to smallholder rural farmers. In

addition, Government of Lesotho (2003) asserts that NGOs such as Lesotho National Farmers Union (LENAFU), Send a Cow Lesotho, and International Fund for Agriculture Development have come on-board to supplement government efforts and improve agriculture in rural areas. For example, LENAFU supports its members by giving them hybrid seeds, and special training on latest agriculture practices.

Despite efforts by the government, development partners and NGOs to improve agricultural production, potato cooperative projects seem to have challenges in achieving the intended purpose. There are some studies on cooperative farming in Lesotho and the contribution they provide to increasing agricultural output for rural communities have been done such as Khoabane (2022) about the contribution of poultry, but there is no literature that supports the contribution of potato farming and livelihoods through cooperatives in Lesotho. Therefore, this study seeks to establish the contribution of the Makhaleng Farmers Association to farmers' livelihoods at Ha Tlali, Maseru.

All initiatives by the government, development partners and NGOs to improve agriculture productivity have caught the attention of the Ha Tlali community. This is one of the worst hit areas by poor agricultural output, which has negatively affected farmers' livelihoods. Ha Tlali is amongst the poorest communities in rural Lesotho where high unemployment, theft, poor infrastructure such as irrigation system, health services, and food insecurity are rife. Daemane (2014) findings confirm challenges faced by Ha Tlali community cooperatives stating that cooperatives in rural communities are battling with theft which has a negative impact on projects' sustainability.

1.2 Statement of the problem

The government of Lesotho works together with Non-governmental organisations to help farmers to improve agriculture for better outcomes by subsidising the agricultural inputs and providing training programmers. However there are still some agricultural cooperatives that fail, delay or struggle to the intended results particularly in rural areas. So the potato project at Ha Tlali is amongst those projects which struggle to improve farmers' livelihoods. Some of the projects which fail or struggle to do the intended results are Masianokeng Asparagus Production Project, Seaka, Khomo-Khoana and Thaba- Tseka to fail (Ferguson & Lohman, 1994).

Ferguson & Lohman (1994) revealed that the Thaba-Tseka project which was dedicated to improve agricultural production particularly in the area of livestock failed because farmers resorted to building houses and constructing inroads while neglecting their core mandate. Masianokeng Asparagus Production Project was meant to cultivate asparagus that was meant to attract the international markets. The project failed due to poor production management, processing and marketing services (Daemane, 2014). Khomo-Khoana project was initiated to improve agriculture productivity and conserve the environment. But the project failed due lack of involvement in planning and implementation of the project (Saunders et al., 2017).

1.3 Purpose of the study

The purpose of the study is to investigate the contribution of Makhaleng Potato Farmers' Association to members' livelihoods and factors that make potato cooperative projects struggle to improve the farmers' livelihoods at Ha Tlali.

1.4 Research Questions

1. How does the use of technology affect potato production and farmers' livelihoods?
2. What are the impacts of climate change on potato cooperative farmers' livelihoods at Ha Tlali?
3. How has the stakeholders' support affected potato cooperative farmers' livelihoods at Ha Tlali?
4. How does the availability or lack of market affect Ha Tlali's Potato Cooperative to improve members' livelihoods?

1.5 Objectives of the study

1. To examine the impact of technology on potato cooperative farmers' livelihoods at Ha Tlali.
2. To investigate the impacts of climate change on potato cooperative farmers' livelihoods at Ha Tlali.
3. To establish how the stakeholders' support affected potato cooperative farmers' livelihoods at Ha Tlali.
4. To establish how the availability or lack of the market has affected Ha Tlali's Potato Cooperative to improve members' livelihoods.

1.6 Significance of the study

There are some studies about potatoes in Lesotho such as Potato Crop Response to Genotype and Environment in a Subtropical Highland Agro-ecology by Molahlehi & Steyn and the study about Possible Predictors Determining the Adoption of Potatoes (*Solanum Tuberosum*) into a Wheat- (*Triticum Aestivum*) Based Cropping System in Mokhotlong by Serage et al., (2002) those are not focusing on the contribution of potato cooperatives on farmers' livelihoods. Therefore, this study may contribute towards adding to the wealth of knowledge, and increase literature on contribution of potato cooperative projects on farmers' livelihoods.

The study may create awareness among the government officials to realise the importance of cooperative projects especially for rural development so they will make policies that will protect, support and empower not only potato cooperative projects but all cooperative projects in the country.

Furthermore, the NGOs and other development agencies may realise the role potato cooperatives have in sustaining livelihoods leading to sustainable development from the income that will be generated from the output.

Lastly the study may be an eye opener for the farmers and stakeholders from communities that potato cooperative projects play a crucial role for socio-economic development while they also explore and adapt to climate smart agriculture to ensure resilience in production. In addition, the use of technology and access to markets are important, hence this study may shed more light on technological innovations rural farmers can use to improve productivity, while at the same time using the same technology to promote their produce in both local and international markets.

1.7 Limitations of the study

The study's limitations are those aspects of technique or design that had an impact on or influenced how the research results were interpreted. Those characteristics will make restrictions on the methodology of the researcher and conclusions, (Scott & Miles, 2017). Additionally, Theofanidis & Fountouki (2017) and Wiersma (2000) explain that the study's potential flaws, which are outside the researcher's control, include but are not limited to its design, funding restrictions, statistical model limitations, and a host of other research-related factors.

As a result, the study will be constrained by some farmers who decline to participate, preventing data saturation. Also, some participants might be biased when responding to some of the questions therefore that will affect the validity and reliability of data collected. Time is a factor that may limit a study by distorting results. For example, participants may not have enough time for the researcher's interviews and financial constraints on the researcher's part.

1.8 Structure of the study

The study will be divided into 4 chapters, the first of which is an introduction outlining the purpose of the study. The literature review, which is presented in Chapter 2, is a compilation of many viewpoints from various academics regarding the socio-economic effects of agricultural cooperative projects on community members' livelihoods and the theoretical framework that guides the study. The technique is described in Chapter 3 and details how the study was carried out. Chapter 4 is the research findings and their analysis. Lastly is conclusion and recommendations about potato cooperative projects on the livelihoods of the people at Ha Tlali.

1.8 Summary

Subsistence farming is dominant in the rural areas of Lesotho; however the production is very poor because of different factors such as climate change, lack of modern technology, access to affordable agricultural inputs and markets. Despite low productivity, agriculture is very important to the rural farmer's livelihoods. Community projects have been one of the strategies used by the government to improve the lives of the people in rural areas even though it seems most are failing to achieve the desired results. For instance, the potato cooperative project was formed to improve the livelihoods of the farmers at Ha Tlali, so the problem is that the project has more than five years but there is no progress in changing the livelihoods of the farmers compared to the community members who are not members of the project.

Chapter two: Theoretical framework and Literature Review

2.1 Introduction

This chapter firstly presents the Sustainable Livelihood Framework as a theoretical framework that underpins the study. The second part of the article presents the literature focusing on what different scholars have discussed concerning the effects of technology, climate change, stakeholder support, and market access on smallholder farmers which are the issues related to the focus of this study. Finally, it provides a chapter summary.

2.2 Theoretical framework

This study adopted the Sustainable Livelihood Framework (SLF) which is an instrument used to investigate poor people's livelihoods, while closely linking them with main factors that contribute to their poverty (Kollmair & Juli, 2002). The framework was developed from the works of Robert Chambers in the mid-1980 whose intention was to enhance the efficiency of development cooperation after realising humankind continued to face serious challenges despite interventions brought to change their livelihoods (Mohammadi et al. 2022).

The framework has six elements as shown in figure 2.1 which are: vulnerability, Capital assets namely: Social, Natural, Physical, Financial and Human (UNDP, 2017). Majale (2002) postulated that vulnerability context in SLF refers to strategy to protect livelihoods from external factors such as natural disasters, climate change and economic shocks amongst others. In addition, Li et al., (2020) write that capital assets such as human, social, financial, physical and natural assets are important elements that have to be considered, because labour, cooperation and association, natural resources such as land and water, basic infrastructure and sanitation as well as financial resources to secure agricultural input are main ingredients that support and sustains rural farmers' livelihoods.

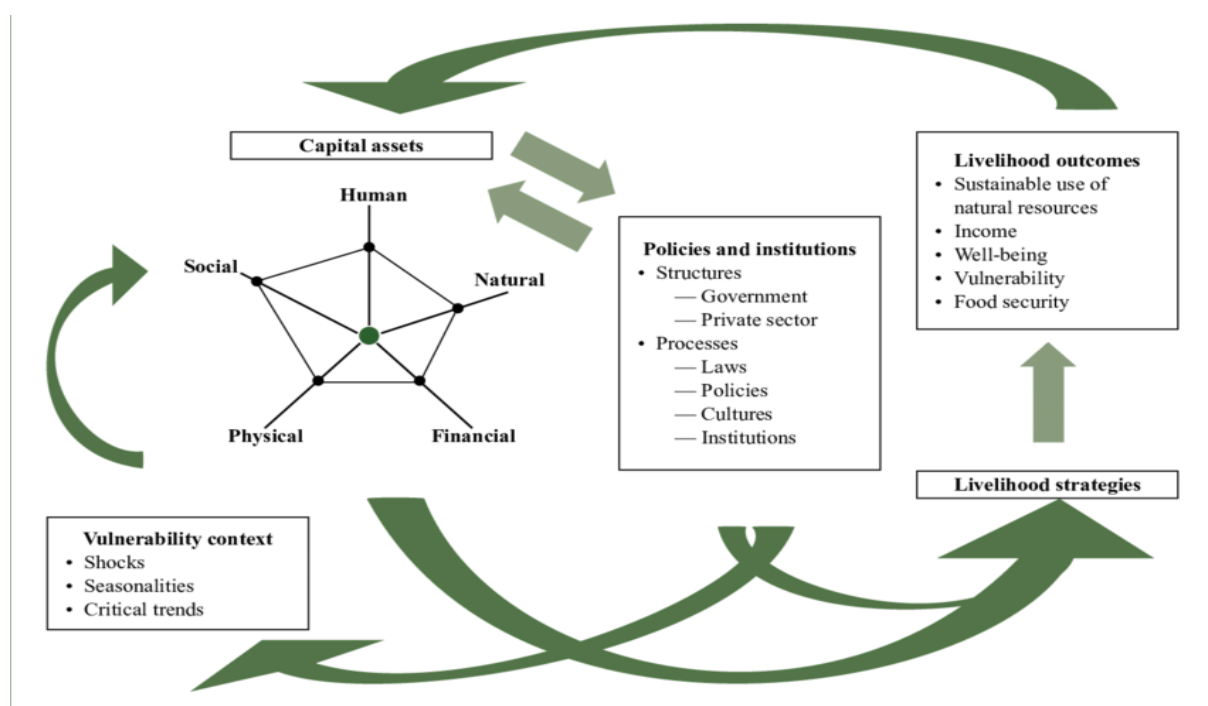
A number of scholars have used the SLF to understand how agriculture has improved rural farmers' livelihoods. For example, Mohammadi et al. (2022) study on a comprehensive sustainable development framework; community capitals and village-cooperative initiative, explored the role of cooperatives in sustainable farming and livelihoods. The findings of the study revealed that interventions made on farming reduced poverty. Fitawek (2016) investigated the impact of Cooperatives' Quality Potato Seed Production Project on the Livelihoods of Rural Households in Haramaya and Kersa Districts, East Hararghe, Ethiopia.

The study findings revealed a huge positive impact of the project on the livelihoods of the rural farmers.

Therefore, this study, using the SLF five capital assets and vulnerability context endeavoured to understand the contribution of the potato cooperative project on the Ha Tlali community. Through the use of technology as a physical asset helps farmers to increase production in order to improve their livelihoods. Effects of climate change on farmers' livelihoods, is linked to the vulnerability context of the Framework (Fitawek, 2016). So, to combat climate change, farmers have to employ all capital assets for good livelihood outcomes.

The success of agriculture production in rural areas is dependent on both government and NGOs support (Serat, 2017). Therefore, the social capital element which deals with support which can be in terms of finance, physical capital and training programmes helps the farmers to generate income and improve farmers' livelihoods. Availability and access to markets for rural farmers is critical to farmers' livelihoods, therefore, human capital is needed for the farmers to have knowledge about the market, physical capital and natural capital also needed for the farmers to produce high quantity and good quality for the market. The SLF informed this study because it makes reference to all the elements enabling the study to investigate how each contributes to farmer's production, thus improving their livelihoods.

Fig 2.1 Sustainable Livelihoods Framework



Source: Department for International Development of the United Kingdom.

Capital Assets

2.3 Contribution of Agricultural technology on rural livelihoods

Literature shows that agricultural technology as one of the capitals in Sustainable Livelihoods Approach (SLA) has significantly improved people's lives around the world today, both economically and socially (Buluswar, 2014), though some scholars have found out that it has its shortcomings depending on the type of technology used. The application of technology boosts production (De Janvry & Sadoulet, 2010). Lesotho also promoted an irrigation system in order to increase productivity. Despite having a relatively low adoption of technology in agricultural production in Lesotho, technology seemed to increase the availability of food in farmers' households (Sissay & Motlatsi, 2012).

There are many scholars who have revealed that the use of technology in agriculture increases farmers' household income (Huang & Luo, 2020). Abdulai (2019) argues that the use of integrated pest management technology significantly enhanced net revenue, and agricultural income in a survey of 481 Chinese apple growers. Similarly, Huang & Luo (2020) found in a study of rice farmers in the provinces of Hubei, Jiangxi, and Zhejiang that the soil testing formula fertilisation technique assisted farmers in increasing their average annual agricultural income by eight percent. Additionally, Molefi & Smallwood (2016) argue that technology has the essential advantages for risk management since it allows people to expedite fieldwork at all levels.

Technology simplifies work, saves energy and time for the farmers hence significantly increasing food production (Sanjay, 2021). For instance, in South and East Asia as well as in Sub-Saharan Africa where the development of combination harvesters and planters, which carry out two distinct duties at once, increased food over the past 20 years from 88 to 111 times (Sanjay, 2021). This observation is confirmed by international organisations like Food and Agriculture Organisation (FAO), et al., (2015) adding that new technologies can reduce biotic and abiotic stresses increasing crop and livestock production.

Farmers use technology to manage risks in agricultural production and manage the potential hazards (Abebaw & Haile, 2018). As for Shakuntala & Anil (2015), greenhouses are one of the technologies used to protect crops. In addition, data from the Ministry of Finance Nepal (2011) revealed that hybrid seeds, fertiliser and pesticides significantly increased agricultural productivity by creating favourable conditions for crops to germinate. On this point, Abebaw & Haile (2018) emphasised that the adoption of this technology assisted in Nepal, changed

their agricultural activities to commercialisation because their output was of high quality and good for the market.

Technology helps to educate farmers by providing them with new information about crops, production methods, agricultural inputs and professional advice on crop maintenance thus improves farmer's efficiency in production, (Slavoljub, 2014). Cropin (2017) states that the information and communication technologies (ICTs) feed farmers with information on latest weather, strategies to cope as they engage in climate-smart farming for better yield.

Recently some studies have credited technology for widening the horizon in the lives of rural farmers maintaining that technology use could also be extended to a tool that keeps farmers' connections as they are able to interact and engage with others about agricultural production in the comfort of their home without going out of their homes (Melo, 2018; Singh et al., 2017). On the same note, El Bilali & Allahyari (2018) show that ICTs provide farmers with many channels to communicate with their customers and suppliers to facilitate their production needs.

Using the internet as a rich source of information can stimulate a beneficial impact of technology and remove hazards in the agricultural industry (Anantatmula & Fan, 2013). Abdul et al., (2016) indicate that there is a new trend among farmers to install cameras all throughout the farm; this form of surveillance protects farmers against theft and vandalism.

Again, although technology has great benefits for farmers, Uphoff (2012) cautions that farmers run a risk of being misinformed or are being deliberately given false information because the information on the internet is not vetted for quality control. This means that as much as farmers have access to ICT, they are also prone to misinformation that can affect their production resulting in low output (Uphoff, 2012).

The use of modern agricultural technologies has a negative impact on the farmers' livelihoods by polluting the environment, air and water as a result puts farmers' health at risk, (Michalak et al., 2013). Barbash & Thelin (2008) postulate that the overuse and misuse of those agricultural inputs such as chemicals can highly pollute the water. As a result, they affect aquatic ecosystems, human health. For instance, the chemicals that are eroded into the dam may be harmful to people's health when drinking it and cause methemoglobinemia, which is a fatal disease in infants (World Health Organisation (WHO), 2012).

In sub-Saharan Africa, technology adoption trickled, as evidenced by Ayim et al., (2022) study on Adoption of ICT innovations in the agriculture sector in Africa: a review of the literature revealed that ICTs helped farmers in Kenya and Uganda to communicate effectively thus participation increased leading to sufficient increase in agriculture output. Fox & Signé1 (2022) in their study on Overcoming the Barriers to Technology Adoption on African Farms showed that Adoption of advanced agriculture technology was evident in Kenya with the establishment of the Hello Tractor project, which is a platform where farmers share tractors. Also in Nigeria, the project title Zenvus, which focused on soil mapping was established to help start-up farmers to improve agriculture output.

Despite having a relatively low adoption of technology in agricultural production in Lesotho, technology increases availability of food in farmers' households (Versteeg et al., 2011). Block farming, mono-cropping (traditional farming), conservation farming, keyhole gardens, double digging [a 24 inch (610 mm) deep trench], and the Machobane Farming techniques are the six agricultural techniques or technologies being used in Lesotho (Sissay & Motlatsi, 2012). Keyhole gardening is one of the techniques that Lesotho employs to increase food security, primarily in rural regions. A keyhole garden is affordable, simple to maintain, and accessible to all demographics, including the old and the ill. The usage of keyhole gardens boosts output and improves food security in areas such as Semonkong, and Mokhotlong (Machobane & Robert, 2004).

In addition, block farming which was highly supported by the Lesotho Government at Mokena and Ha Tololone improved food security in farmers' households through the use of technological inputs such as fertilisers, insecticides and tractors (Rants'o & Seboka, 2019). However, these technologies have not been tested on a large scale especially on their impacts on potato production in Lesotho.

2.4 How Climate Change Affects Rural Livelihoods

Studies reveal that climate change has far reaching consequences on human life especially on agriculture in modern day (Pendino, 2017). Gupta et al., (2020) conducted the study on the Effects of Climate Change on Agriculture which showed that the adverse effects are felt by farmers as they face challenges such as soil fertility deterioration, poor water sources for irrigation, defiance pesticides and herbicides amongst others.

Climate change affects farmers' livelihoods by increasing crop failure, (Arifah et al., 2021). Arifah et al., (2021) conducted a study on farmers' perception of climate change and its impacts on their livelihoods in South Sulawesi and indicated that farmers are having a difficult time figuring out when to start planting, prepare a seedbed, or harvest crops because of the change in seasons. Additionally, Elum & Modise (2017) showed that South Africa farmers experienced crop failure due to drought and rising temperatures brought on by varying weather patterns. It is therefore evident that unpredictable weather patterns have a direct bearing on agricultural output.

Unpredictable weather conditions lead to increased food insecurity (Hussain et al., 2018). Suryanto et al., (2022) study on the impact of climate change to livelihood vulnerability for smallholders farmers in Wonogiri, Indonesia revealed that farmers abandon their farms due to poor weather conditions, this results in increased food prices leaving rural households vulnerable to hunger.

Climate change has negative effects on farmers' health and sanitation (Přivara & Magdaléna, 2019). As temperatures rise, pathogens can flourish for a longer period of time, floods can contaminate water, and droughts can make it difficult for farmers to access safe drinking water, this increases the danger of water-borne diseases (Anwar et al., 2019). Aluisio et al., (2015) assert that due to flooding and frequent rains, Afghanistan has the fourth-highest rate of diarrheal mortality among children under the age of five in the entire globe. Similar to this, the Makassar city drought has brought chaos, as farmers are running out of clean water in Ujung, Tanah, Bontoala, Wajo, and Panakkukang (Aluisio et al. 2015).

Besides that, WFP (2017) reported that there are many lives and livelihoods that have been impacted by climate change. As a result, they react to the effects of climate change differently. According to Agaja (2013), a research carried out in Nigeria revealed that agriculture is impacted by climate change, placing rural women in Nigeria at risk because of their roles in the household which subject them to walking long distances to draw water for household consumption as well as for irrigation during drought.

Studies reveal that the extreme weather patterns due to climate change causes farmers to lose agricultural properties (UNDP, 2017). In rural areas, flooding cause's relocation and the loss of crops, cattle, and equipment, which has an impact on agriculture and livelihood activities, (World Bank, 2018). The World Bank (2018) also explains that in Afghanistan, frequent

flooding and landslides in 2005 and 2006 caused thousands of people to be displaced and resulted in the loss of homes, land, crops, cattle, and machinery.

Farmers depend on the soil for their livelihoods, however climate change harms those livelihoods by ruining the land, (NEPA, 2017). NEPA (2017) reveals that due to degradation and desertification brought on by catastrophic flood occurrences, wind erosion, deforestation, heavy impromptu rainfall, rising temperatures, and a decrease in soil moisture, 60% of agricultural land has been reduced since 1978. Similarly, Zeleya (2017) using the same lens, reveals that land degradation puts farmers at higher risk because of loss income, insufficient food, energy and housing, adding that this puts pressure on farming land resulting in desertification.

WFP (2017) and NEPA (2009) indicate that conflict may be increased by climate change due to competing land uses, dwindling natural resources, and water scarcity. This is because when farmers are stranded, they may eventually resort to conflicts over access to arable land and irrigation systems (Aich et al., 2017). In addition, Aich et al., (2017) demonstrates that disputes between the people were brought on by the uneven distribution of water throughout the regions as a result of the water crisis. WFP (2016) and Ahmed (2001) reported that there are many lives and livelihoods that have been impacted by climate change, but women and children are disproportionately affected in Nigeria. In support, Agaja (2013) revealed that during the dry season, women travel great distances on foot in search of water for irrigation and household use.

International Federation of Red Cross (IFRC) (2020) asserts that droughts, floods, tornadoes, cyclones, cold waves, and other sorts of extreme weather and climatic phenomena occur frequently in Lesotho. Ministry of Energy Lesotho et al., (2013) revealed that flooding, river bank overflow, and flash flooding are all at higher danger due to the increased frequency of heavy precipitation events. Additionally, this leads to soil erosion and crop waterlogging, which reduce yields and have the potential to worsen food insecurity, especially for small-scale farmers who primarily grow crops for subsistence. Furthermore, the lives of the rural poor are further impacted by land degradation and soil erosion, which are made worse by frequent floods and droughts (Ministry of Energy Lesotho et al., 2013).

IFRC (2011) article on Climate change hits farmers revealed that farmers are feeling the brunt of climate change, stating that heavy rains hit potato dominant districts such as Semonkong,

Maseru, Mafeteng and Mohale's Hoek a week after potato seeds were planted. This shocked the farmers because this was no longer a trend as evidenced by the previous seasons, and as a result affected the potato production badly because potatoes are not resilient to extreme wet conditions (IFRC, 2011).

2.5 Stakeholders' support on farmers' livelihoods

Stakeholders contribute significantly to improve agricultural production in order to increase the country's economy as well as improve farmers' livelihoods, (Christy et al., 2009). Fisher & Mckee (2016) study on the Impact of Cooperative in Ethiopia showed that in response to poor potato seed production, the collaboration between Ethiopian Ministry of Agriculture, Food and Agricultural Organization, Ethiopian Institute of Agriculture, and the Royal Netherlands Embassy in Addis Ababa established the Integrated Seed Sector Development (ISSD) programme in 2009 to address the challenges for farmers' livelihoods. The study revealed that the programme was implemented on 34 seed producers' cooperatives. These groups were supported to be autonomous in their seed production and also technically equipped to enhance the quality of the produce. Furthermore, the stakeholders play a crucial role on agriculture production as they empower farmers with training on agriculture productivity through programmes (Sikwela & Mushunje, 2013). Examining whether a training course is sufficient to increase the productivity of the smallholder farmer? According to empirical data from a Chinese agricultural technology demonstration centre in Tanzania, trained farmers who had access to water for irrigation had a yield increase of more than two times that of untrained farmers (Mgendi et al., 2021).

Apart from the government, NGOs programmes support agricultural cooperative farmers to improve agricultural production. Mgendi et al., (2021) showed that in Tanzania, collaboration between government and NGOs improved farmer's production. Still on the same issue, Dhingra et al., (2018) study on the Role of NGOs in the Promotion of Agriculture, revealed that in most cases, NGOs assist on instances where the government is lagging behind. NGOs provide a solid support system to the government in implementation of programmes toward sustainable development. To emphasise on the importance of training, Whitehead (2015) indicates that agricultural education would help farmers to be resilient and savvy to avoid risks.

Preißel and Reckling (2010) research on Smallholder group certification in Uganda - Analysis of internal control systems in two organic export companies, revealed that the Government of

Uganda (GoU) established the Agricultural Credit Facility (ACF) to offer medium- to long-term loans to farmers and agro processors at favourable terms in an effort to close the financing gap in agriculture and improve agricultural productivity. In addition, Pender et al., (2003) explain that ACF was created to encourage the commercialization of agriculture in areas including the purchase of irrigation systems, storage facilities, agricultural supplies, and technology and equipment.

In Lesotho, the government in collaboration with institutions and international agencies such as World Bank, IFAD, and FAO, support the agriculture sector by helping the farmers to improve the production particularly in rural areas where agriculture is taken seriously (Government of Lesotho (GoL), 2018). To support agriculture production, government introduced policies such as Lesotho Food Security Policy (2005), National Seed Policy, Subsidy Policy (2003) and Plant Protection Policy (2021) to protect plants against pests, National Irrigation master plan and investment framework, and National Climate Change Policy (Government of Lesotho, 2012). Additionally, Gwimbi et al., (2014) indicate that Lesotho established a centre of excellence within the Department of Agricultural Research (DAR) charged with technical implementation of the rural development sub-projects.

Farmers also received support from NGOs such as Send-a-Cow, Rural Self-Help Development Association (RSDA), Lesotho National Farmers Union (LENAFU) that intervened with agricultural inputs and special training to improve food security and increase income (Twala, 2012). For instance, LENAFU showed support to the farmers by giving 400 farming households from Semonkong, Moits'upeli, Tlali and Matelile 16 x 25 kg pockets of potato seed (Lesotho National Farmers Union, 2021). Despite this support on agriculture in Lesotho, scholars have not focused on its effect on cooperatives, especially potato cooperatives.

There are some scholars who criticise what has been done by government, non-governmental organisations, and institutions together with international agencies by showing that they contribute to low and poor agricultural production (Rodney, 2002). Hill (2002) indicates that NGOs and the government are frequently attacked for their poor service delivery, especially in rural areas. On the same note, Hill (2002) reveals that there is a comparatively greater potential for corruption because governments are more involved in purchasing, manufacturing, and marketing. For instance, the Egyptian Minister of Agriculture and Chairman of the Agricultural Development Bank was recently detained on suspicion of accepting bribes from a business to which he granted permission to import pesticides (Hill, 2002).

2.6 Impact of market to rural livelihoods

Access to markets for rural farmers has been hailed for many years as vital as it enhances their knowledge base on the market requirements (Dixon et al., (2001). Corse & Marchisio (2019) conducted a study which revealed that knowledgeable farmers with relevant skills, become productive and this improves their livelihoods. In addition, Usman & Haile (2019) revealed that not only access, but avail households with a variety of foods, thus increasing consumption for much healthier food. Emphasising on this point, Abay & Hirvonen (2017) write that farmer's access to markets boost household income, thus improving their food consumption.

Another study by Hlatshwayo et al., (2022: 37) focusing on the “*Determinants of Market Participation and Its Effect on Food Security of the Rural Smallholder Farmers in Limpopo and Mpumalanga Provinces, South Africa*” showed that Availability of markets help farmers to better sell their produce thus increasing households. In support, Chebo et al., (2018) in their study on “*Farmers market access and cash crop adoption: Evidence from North Shoa Zone Ethiopia*” revealed that Small rural farmers' lives could be improved by market-oriented agriculture. Market access helps alleviate extreme poverty and reduces food insecurity for smallholder farmers in emerging nations (Usman & Haile, 2019).

Studies reveal that there is a lack of market accessibility in developing countries. Magingxa & Kamara (2003:56) study on “*Institutional perspectives of enhancing smallholder market access in South Africa*” revealed that lack of access to roads restricts farmer's access to markets and services. This finding is supported by Diao et al., (2011) stating that farmers in developing countries face serious challenges to deliver their produce to the market, due to bad infrastructure, vehicles or money. Stifel & Minten (2017) findings in their study on “*Market access, well-being, and nutrition: evidence from Ethiopia*” show that markets also have their own flaws as they determine prices for agricultural produce, which could also put a strain on the tight household budget. Also, the study findings further reveal that in Ethiopia, farmers are detached from the markets and this results in high transaction costs when buying and selling agricultural produce.

In the Chinamora District of Zimbabwe, Zivenge & Karavina (2012) performed research on the variables affecting communal horticulture producers' access to market channels. The findings of their investigation showed that one difficulty prevented farmers from producing what the markets needed and made it difficult for them to access the correct marketplaces to sell their farm products. For instance, farmers who produce vegetables must locate markets fast

because they degrade quickly (Jorine et al., 2013). Malatji (2023) supports this stating that due to lack of information, the majority of the farmers, especially, in remote areas do not understand how the market works and how prices of the produce are determined.

Jorine et al., (2013) indicates that lack of knowledge on agriculture business and marketing, hinders smallholder farmers to compete with large-scale producers in the market. Still on the same issue, Grayson (2020) and Isham (2023) emphasise that competition is not only among smallholder farmers in the markets, but also the conventional farmers with huge financial muscle, as they are able to sway the prices on the market, making it difficult for smallholder farmers to succeed. To counter this problem, Mochebelele et al., (1992) posits that Lesotho smallholder farmers depend on farm gate sales, while the sale of the produce is rarely extended to retailers and wholesalers where urban consumers could be reached.

Lesotho's food market is dominated by imports from Republic of South Africa (RSA) because farmers in rural areas where agriculture is taken seriously face difficulties such as a lack of networks of information regarding markets and competing production, a lack of networks of communication for business transactions, a lack of networks of transport and handling for the movement of inputs and produce, and a lack of storage, processing, and outlet and facilities (FAO, 2006). Production for the market is also impaired by the number and quality of agricultural machinery and equipment in the hands of farmers, largely due to problems related to acquisition of spare parts and maintenance services. Finally, lack of access to credit is a major constraint for small farmers as financial services are mainly directed to organised business and industry (Government of Lesotho, 2005). Even though Lesotho scholars have not focused specifically on potato production.

2.7 Summary

This chapter discussed the identified SFL as the theoretical framework that informed the study. It also discussed relevant literature focusing on use of technology, impact of climate change, stakeholder support to farmers as well as access to markets.

Chapter 3: Methodology

3.1 Introduction

The general analysis of the study is presented in this chapter. Thus, the chapter includes the demographic, study region, study design, sampling methods, sample size, and research approach. Additionally, data collection techniques, data processing, ethical issues, and study constraints will be discussed. A summary of each chapter follows.

3.2 Research approach

Because every research project requires an explicit, disciplined, systematic strategy to determine the most relevant outcomes, the study employed a qualitative methodology. According to (Beverley et al., 2009), the goal of qualitative research is to create explanations for social phenomena. It tries to support a researcher's comprehension of the social environment in which individuals live and the underlying causes of events. Creswell (2009) adds that this approach is used to gather data, comprehend underlying causes and motives, as well as offer insights into the context of a problem. The qualitative approach is also useful for uncovering less evident intangible aspects including societal norms, socioeconomic position, gender roles, ethnicity, and religion. As stated, the main objective of this study and the approach is to characterise and explain the phenomenon in its natural environment (Babbie and Mouton, 2004).

The study investigated the contribution of the potato cooperative projects on the farmer's livelihoods at Ha Tlali. Therefore, a qualitative research approach was selected to help the

study's objectives be met. As this investigation proceeds, the approach was used to let the researcher comprehend detailed social and individual information on the contribution of potato cooperative ventures on the livelihoods of the farmers in Ha Tlali. The researcher was able to describe and analyse the data received from the potato farmers about the impact potato cooperative programmes have on their livelihoods using the qualitative approach.

3.3 Research design

McMillan and Schumacher (2001) indicate that a research design is a plan and framework for the inquiry that is utilised to gather data in order to address the research questions and also the precise and comprehensive arrangement of a piece of research. Levitt et al.'s (2017) adds to the definition that a research design specifies the type of evidence that will be gathered for the study, where it will come from, and how it will be interpreted in order to provide sound responses to the predetermined research questions. According to Saunders et al. (2017), it is crucial to lay out a precise plan for how the researcher would approach addressing the research questions.

There are five qualitative research designs which are grounded theory, ethnographic, phenomenology, historical and case study. Creswell (2014) and Strauss & Corbin (2008) state that a case study is a style of research design where a researcher examines one or more bounded cases by gathering in-depth data from a range of sources, including observations, interviews, questionnaires, audio-visual material, and documents, to create a case description and case-based themes. This study used a case study of a potato cooperative at Ha Tlali. This is because the results of the study were only generalised to this particular project. The case study enabled the researcher to go deeper and appreciate all of the project's unexpected consequences, which assisted the researcher better understand the influence of potato cooperative initiatives on improving farmers' livelihoods at Ha Tlali.

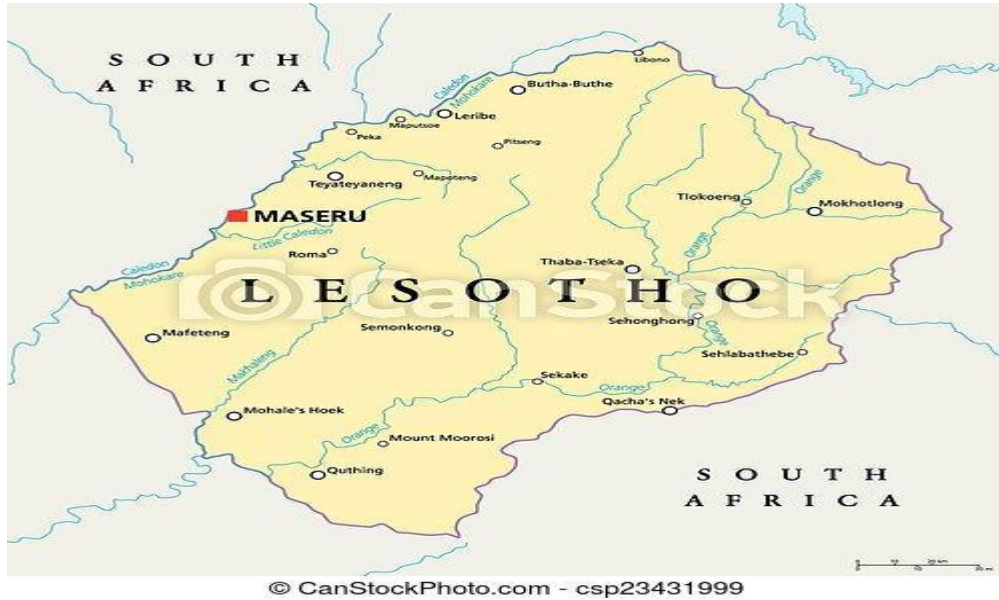
In this study, a case study is used to describe the phenomenon of the livelihoods of potato farmers in Ha Tlali. Sudhakar et al., (2010) explains that a case study may be exploratory or descriptive, and it may have a variety of objectives, including describing a phenomenon, testing a hypothesis, or developing a theory.

3.4 Area of the study

The study was carried out at Ha Tlali, Maseru, Lesotho. This village is in the Makhaleng constituency which has an estimated population of 21,822, (UNDP, 2016). Ha Tlali is found in

the rural areas of Lesotho in Maseru district. It is located in the south-west of Maseru district and lies about 54 kilometres away from the town of Maseru.

Fig 3.4.1 Map of Lesotho



3.5 Population of the study

Population is the total collection of elements, people, or objects that share specific attributes which are determined by sampling standards developed via study (Shukla & Satishprakash, 2020). Shukla & Satishprakash (2020) further continued that target population is defined as the entire set of units for which the survey data are to be used to make inferences. Therefore, the target population for this study was all members of this potato cooperative project.

3.6 Sample and sampling technique

Bhardwaj (2015) emphasises that sampling is a process or technique the researcher uses to choose a sample from the population. Taherdoost (2021) expands on the concept by stating that it is a scientific method used to choose units or components from the target population to participate in the study in order to represent the perspectives of the wider study population. As a result, population sampling is an important tool in research, when the population size is large (Bhardwaj, 2015). Walters (2021) posits that researchers depend on sampling to truly understand the characteristics of the population that gives conclusive results.

Determining the right sample of the study, the researcher took into account the sample size. Memon et al. (2020) state that a sample size is the number of participants who were chosen

and who can offer the data needed to draw conclusions. The sample size is determined by a number of variables, such as the study's objectives, the size of the population, and the amount of sampling error allowed (Hemanta, 2012). Therefore, point of saturation was used to estimate the sample size for this study. The sample for this study was selected from the 90 potato cooperative farmers at Ha Tlali.

This study used purposive or judgemental sampling methods under non-probability sampling because the participants (farmers) possess special knowledge to provide the information that the researcher seeks. The potato cooperative projects had 90 members, so the sample of 20 farmers who formed two focus groups of 10 members each were selected based on their long standing experience in the cooperative and their active participation, meaning members who have not skipped a ploughing season since the project's inception. The sample also included the key informants; the chief, the councillor, one official from the ministry of agriculture, the director of LENAFU and chairperson of MFA.

3.7 Methods of Data Collection

Methods of data collection refer to the tools, techniques, or procedures used to generate data, (Kabir, 2016). Karim (2017) explains that when conducting qualitative research, interview is a technique used to collect data from individuals or groups. Defining the interview, Taherdoost (2021) describes it as the method of engaging participants through asking questions in order to gain both qualitative and quantitative data. Again, the nature of the interview helps researchers to gather quality information due to the communication that is established between a researcher and the participant (Taherdoost, 2022). Therefore, in order to explore a modern phenomenon while focusing on the case's dynamics in the setting of actual life, interviews were conducted as part of the empirical research methodology.

In-depth interviews were used in this study's data collection. According to (Rutledge & Hogg, 2020), in-depth interviews are used in qualitative research to conduct in-depth interviews with a limited sample. Furthermore Taherdoost (2022) indicates that the in-depth interviews allow the participants to freely express their opinions in private settings. Structured, unstructured, and semi-structured interviews are the three categories into which interviews can be divided (Strauss & Corbin, 2008). The data was collected through semi-structured face to face interviews with key informants. This is because it helped the researcher to probe supplementary questions for clarification on the contribution of potato cooperative projects on farmers' livelihoods. The interviews were conducted face-to-face which enabled the researcher to detect

false information, and help the researcher to explain the question if it was not clear for the interviewee. And the researcher was able to make informed judgements based on the interviewees' facial expression (Syed & Sajjad, 2016). It also helps both interviewer and interviewee to capture non-verbal communication such as body language, (Kabir, 2016).

The focus group interviews were also used in this study as another technique to collect data. Ranjan (2022) emphasises that focus groups are group interviews where the researcher collected information from several individuals at the same time. In this type of interview, the interviewer invites people who share the same characteristics and are interested in a general topic of discussion to share their point of view. Focus group interviews have the advantage that participant interaction reveals more about the respondents' points of view than would be the case in an interview that was dominated by the interviewer. It allowed the researcher to observe how respondents structure their own understanding using other people's points of view. (Traynor, 2015).

Karim (2017) indicates that Focus groups also allow the participants to respond not only to the researcher but also to other participants. Therefore, focus groups saved time for the researcher and reduced expenses. The study participants (farmers) focus groups were composed of 10 members in two groups.

3.8 Methods of data analysis

After data collection through one-on-one interviews from key informants and focus group interviews from potato cooperative farmers, the researcher transcribed, classified and analysed data, using thematic data analysis. Braun & Clarke (2017) indicate that the methodical process of finding, examining, and interpreting meanings in quantitative data is known as theme analysis. A researcher employs qualitative data analysis (QDA) to transform data into a narrative and its interpretation. To put it another way, QDA refers to a variety of techniques and procedures through which the qualitative data that has been gathered is transformed into a sort of interpretation, explanation, or understanding of the individuals and circumstances that are being studied (LeCompete & Schensul, 1999). Consequently, the researcher followed the thematic analysis process which comprises five steps, namely: familiarisation, identification, indexing, charting, mapping and interpretation of patterns to arrive at the study conclusions.

This study employed thematic analysis for analysing collected data because it helped the research to identify, organise and interpret the data to form themes. The data analysis tool that

was used to generate initial coding, theme finding, theme review, theme definition and naming, and finally the production of the report was Atlas.ti. Although the researcher used this software to create themes, unfortunately the software could not capture other important and most relevant data from the participants collected in vernacular. As a result, the researcher could not solely rely on it, also used recurring words from the participants as themes.

3.9 Trustworthiness

One of the traits of a good researcher is trustworthiness which is defined as the credibility of the researcher's findings, through techniques of data collection to make the results credible (Nyirenda et al., 2020). Nowell et al., (2017) state the trustworthy criteria is based on precision, consistency and exhaustive manner employed by the qualitative researcher providing details on the methods used to ensure that the data is credible. There has to be harmony in the finding, and should be a true reflection of the reality (Nyirenda et al., 2020). In this study, the researcher employed triangulation, which involved leveraging several data sources and gathering the data over the course of several different time periods using various data collection techniques. Focus groups were held after the researcher had initially interviewed the primary informants.

The second perspective of trustworthiness is transferability. Shenton (2004) and Key (1997) assert that transferability refers to solid descriptions of processes and procedures employed in the study to try and answer the research question and how the findings can be applied in another study. Because of this, transferability was used by giving a thorough description of descriptive information about the context, setting, sample, sample size, and socioeconomic traits of participants.

Dependability is another perspective of trustworthiness. Key (1997) defines dependability as solid descriptions of research methods, triangulation, coding and re-coding procedures. Nowell et al. (2017) asserts that dependability could be achieved if the researcher ensures that there is proper documentation, the process is logical and it could be easily traceable. Therefore, the researcher demonstrated reliability by giving a thorough account of how data was gathered, categories were created, and conclusions were reached.

Confirmability as a part of Trustworthiness, deals with how the researcher reached a certain conclusion in the study (Stahl & King, 2020). The researcher has to clearly articulate how the finding is derived from the data presented (Nowell et al., 2017). In this case, the researcher remained neutral when interpreting the findings, meaning they had to eliminate personal biases

(Nyirenda et al., 2020). Audit Trail helped the researcher to establish confirmability in the study. Nyirenda et al. (2020) indicate that it gives readers proof of the decisions and choices the researcher made about theoretical and methodological issues throughout the investigation. Furthermore, Nyirenda et al. (2020) add that a study and its conclusions are auditable if another researcher can easily follow the decision chain when raw data, field notes, and transcripts are safely stored. In this instance, the researcher gave specifics regarding the gathering, analysing, and interpretation of the data. The researcher derived codes and themes from the Atlas using thematic analysis.

3.10 Ethical considerations

Neuman (2003) reveals that research ethics refers to the kinds of methods that are morally appropriate. This study observed ethical conduct such as voluntary participation, respect for persons, and informed consent. Participation in the study was voluntary and the participants were also informed that they could withdraw from the study if they felt uncomfortable answering all the questions in the study.

The researcher gave the participants informed consent forms and were signed in order for the participants to acknowledge that they are voluntarily participating in the study. On the interview and focus group dates, participants were also briefed on what the study was about. By keeping the participants' names and identities private during the data collection, analysis, and reporting of the study results, anonymity and confidentiality were maintained. For confidentiality, the participants in one-on-one interview were labelled P1, P2 and in focus group interview the researcher labelled the participants F1P2 and F2P6.

3.11. Inclusion and exclusion

Inclusion criteria are the factors or the key features of the population that are allowed to participate in a study, while exclusion criteria are factors that disqualify a person from participating (Patino & Ferreira, 2018). Therefore, this study only allowed all members of potato cooperative farmers to participate in the study because they have knowledge that the researcher seeks. All people who were not the farmers or either they were potato farmers but not members of Makhalleng Farmers Association will be excluded in this study.

3.12. Chapter Summary

The chapter has presented the methodology of the study, the research approach as well as the research design has been presented in this chapter. This chapter also covered the study area and the population of the study. The sample size and sampling techniques of the study were also clearly explained, including the methods of data collection and data analysis. Finally, the ethical considerations for the study have been presented and justified.

Chapter four: Data Presentation, Analysis and Interpretation

4.1 Introduction

This chapter presents data analysis of the qualitative data collected from members of Makhaleng Farmers Association (MFA) using two focus groups and five key participants. The chapter starts with the presentation of demographic information of the participants followed by presentation of themes and categories that were identified during data analysis. In each case, the findings were related to the literature and theoretical framework. Lastly, the summary of data analysis.

4.2 The participants

For confidentiality, the participants were labelled P1, P2, P3, P4 and P5 to show individuality. The age of the participants ranged from 35-60, and four out of five were male while one was female. All participants were married, with educational qualifications ranging from JC to bachelor's degree. Table 1 presents participants' demographic profiles.

Table 1. Demographic profile of the key participants

Particip ants	Position	Age	sex	Place	Marital status	Highest level of education
P1	Agric supervisor	35-40	male	Lithabaneng	Married	Degree
P2	Councillor	40-50	Male	Ha Bele	Married	Diploma
P3	LENAFU	35-40	Female	Ts'oeneng	Married	Degree
P4	Project Chairperson	55-65	Male	Ha Simieone	Married	COSC
P5	Chief	40-50	Male	Ha Tlali	Married	JC

Source: Interview data 2023

In addition to the important participants, the study gathered data from two focus group conversations with seven men and eleven women from various villages making up each group. For reasons of secrecy, the participants in the focus group talks were given labels with the number of the groups and the names of the people in each group. For instance, participant 1 in focus group discussion 1 was designated as (F1P1). Participants ranged in age from 35 to 75 years old. The participants' greatest level of education was a degree; the majority had completed high school and had a secondary degree; just a small number had only completed elementary school. The majority of participants were mature adults.

4.3 Themes and categories

Fig 4.1: Themes and categories

Technology	Climate change	Stakeholders support	Market
Types of technology	Loss of assets:	Kinds of support	Importance of market
Positive effects:	Health impacts:	Contributions	Ways of marketing
Negative effects:	Measures taken	No support	Access challenges:
Constraints to access		Lack of support	

4.4 Technological impact on potato farming and livelihoods

The analysis revealed that there were different opinions about the effects technology in enhancing farmers' livelihoods resulting in four main categories with subcategories in each in

which participants identified types of technologies used and narrated the positive and negative impacts of each technology used while other participants complained about constraints to access technology making access the fourth category.

The data showed that the participants were using different forms of technology, both old and modern technologies to produce potatoes. Among the old technologies they stated that they used cow manure and sleds. Some of the participants on the other hand used modern technology in their production that included fertiliser, plough and planter, Scotch cart drawn by oxen or horses, radio, television and mobile phones.

The participants showed that the use of traditional and modern technologies contributed significantly to their livelihoods. For example, the use of cow manure to maintain the soil and prevent millipedes from destroying the crops and the plough for loosening the soil helped to increase potato production.

Most participants revealed that technology contributed to increasing household income and food security. The increase of production gave farmers a chance to generate income selling surplus produce. That money helped them meet their needs such as food, clothes, shelters, pay bills and insurances.

The other view about the contribution of technology was that most participants emphasised that the use of technology improved farmers' knowledge, communication and access to information. Some participants explained that mobile phones played a vital role in farmer-to-farmer communication, marketing, accessing information, and advertising products. Radio and television are sources of information on climate change, market availability, and new technologies. Social media platforms like Facebook and WhatsApp are used for marketing and advertising purposes.

One of the participants stated:

Most of us use mobile phones to access information and advertise our product on Facebook and WhatsApp. Last year we heard from the radio and television that heavy rains were expected, and some of us did not plough, so we saved the seed for next season. (P4)

On the other hand, the data revealed that the outdated technology had negative effects on farmers' livelihoods. The participants asserted that because of lack of technology and harvesting machinery, farmers used the plough to harvest the potatoes which badly destroyed the potatoes. The sledge or scotch cart used to carry potatoes from the fields was not safe for potatoes as some got lost and that decreased the yield and income. On the same note, some participants revealed that the outdated technology did not simplify the work. The view was confirmed by one of the participants that *'I agree that this outdated technology aids us, but it gives us a lot of work and delays us to do the work'*. (FIP3)

There were some constraints to accessing the latest technology. The participants agreed that the Association had challenges accessing modern technology. They attributed this to lack of finance. One of the participants revealed that *'lack of finance is a big problem in MFA. The modern technological inputs and machinery are very expensive; therefore they cannot afford to purchase them all at the same time.'* (FIP7)

Some participants showed that one of the constraints to access technology was related to topography of the area. The fields were located where there were no roads, near big rivers which need bridges so it could be difficult for some machinery to work in such areas. For example some fields were the must to be planted by plough drawn by oxen because there was no way the tractor could pass.

The findings from the study revealed that farmers use outdated technology such as plough, planter, animal manure and sleds or scotch cart for potato production, but it contributed significantly to their livelihoods. These findings were similar to Buluswar, 2014; Huang and Luo, 2020; emphasising on the importance of technology to boost agriculture output. The results further showed that due to lack of technical knowhow on the technology they were using, they faced delays and some potatoes were damaged in the process. This finding was contrary to Abdul, (2016) and Barbash & Thelin (2008) where they argued that technology simplified the production process as it saves time and energy.

The results also showed that poor adoption of technology was due to lack of finance and poor knowledge as it was stated above that most farmers have high school and secondary qualifications and their ages shows that some farmers are too old to have many ways of generating income. The finding is supported by Foster & Rosenzweig (2010) stating that

financial muscle to purchase and knowledge to use the technology is a challenge facing rural farmers.

4.5 Climate change on potato farming and livelihoods

The data revealed that there are different opinions about the negative impacts of climate change on farmers' livelihoods based on three main categories with subcategories in each. The participants showed that farmers lost their assets and farmers' health also affected as they claimed that there was only one measure taken against climate change.

The participants showed that they lost their assets during different climate conditions such as heavy rainfall, drought, low and high temperatures. This view confirmed that *'From all past three years our members have lost so many animals which were taken by rivers during heavy rainfall, others lost their fields which were near the wetlands and some crops and equipment were eroded by water'*. (FIP6 and FIP7)

The participants indicated that climate change affected farmers' emotional well-being, caused stress and unrest due to the uncertain and challenging agricultural conditions. Also climate change exacerbated conflicts among farmers over scarce resources. In addition some participants stated that farmers' health is affected due to changes in eating patterns resulting from decreased production and food insecurity. One of the participants showed:

Climate change affects farmers' health emotionally, particularly those who are dependent on agriculture so when the production is not good due to different climate conditions they develop stress, there is no peace, and they are fighting for scarce resources to survive. (P3)

Majority of the participants revealed that measures to ward off climate change are limited, stating that they had used hybrid seeds that were resilient to climate change. The limited storage capacity sometimes forced farmers to protect their produce from climate-related damage by using plastic to cover potatoes during rainfall.

The findings showed that climate change has negative effects on farmer's livelihoods. This is in line with the SLF element on vulnerability. Where farmers are vulnerable to climate change by destroying physical capital and natural capital. The findings further revealed that climate change affected farmers' livelihoods by increasing food security, and negatively affected

farmers' well-being emotionally and physically. The findings were similar to Aluision et al., (2015); Hussain et al., (2018); WFP (2016) that climate change increases farmers' vulnerability. It was important for farmers to adopt climate smart practices to ensure resilience and sustainable agricultural practices to improve their livelihoods. Even though it might be difficult to adopt because of their age and low education qualifications.

4.6 Stakeholder support in Potato Farming

The analysis indicated that there were different views about the effects of stakeholders' support based on four categories with subcategories in each as the participants revealed that farmers receive different kinds of support from stakeholders and that contribute significantly in their livelihoods. While some participants emphasised that there was no support based on lack of resources.

The participants showed that there were different kinds of support that Makhaleng Farmers Association received. Some participants indicated they once received support from LENAFU. This was in the form of training, hybrid seeds resistant to climate change and fertilisers, though it was for a short time.

On the same note, some participants asserted that in order to give Basotho a platform to market their produce, the government seldom implemented its policy which forbidden the entry of potatoes into the country when there was a high production of potatoes and the market station where the government took 10% by taking farmers produce and found a market for them. The government support had also been extended to soil testing, to determine whether it is suitable for growing potatoes, external trainers to educate farmers about potato production and subsidies for fertiliser and seeds.

The participants asserted that the support from stakeholders contributed significantly to their livelihoods. Some participants revealed that the support they received such as the hybrid seeds resistant to climate change and fertilisers to maintain the soil helped them to increase the production thus resulting in food security, increased income to access better health services. One of the participants emphasised:

This support contributed significantly to our livelihoods by increasing the production to eat and sell to get the money. Money simplifies life, enhances my well-being as I

have access to medical aid, nutritious food. Also that money helps us to start or boost other businesses such as shops, selling clothes 'bommathoto. (P4)

Furthermore some participants reported that the training they received improved their understanding of every stage of the potato production, from planting to final packaging and sale.

On the contrary, few participants emphasised that there was no support from the stakeholders because firstly it was inconsistent or infrequent. Secondly, for example the government sometimes delayed distributing agricultural inputs to the extent they received them being expired and that brought bad outcomes. Lastly there was no support because it was insufficient for commercial production.

Majority of the participants revealed that what is lacking in their support is the advanced technology, fertilisers, chemicals of weeds and pests. On the same note, some participants indicated that they lack knowledge so the government should offer more external training officers. Lastly the participants showed that they lack storage to keep their products safe, transport to deliver their products to the markets, the office for the formal meetings and the electricity to ward off the thieves.

The findings of this study exposed that the MFA rarely got support from the external stakeholder (government and LENAFU). Farmers sometimes received support from the government and the non-governmental organisation. This finding concurs with the literature from Christy et al., (2009) stating external stakeholder support can improve farmer's livelihoods. The support was also evidenced where the government working with international donor agencies such as World Bank, IFAD, and FAO supported farmers (Government of Lesotho, 2003).

The results further showed that the Government contributed positively by banning imports of potatoes when the production was in ample. This corresponds with what has happened in Zambia, Dhingra et al., (2018) where agriculture has been given priority because it spurs economic growth and eliminates poverty. These initiatives brought about positive results to the project.

As per the results, confirmed lack of technology, infrastructure, transport and knowledge among rural farmers as most of them had COSC and JC qualifications, which compromised

quality of the produce, hence their low market share. This view was supported by GoL (2003), advocating for government infrastructure support to farmers.

Study results further exposed that insufficient training to farmers frustrated the project, hence the need for more training for farmers. In support of the importance of training, Mgendi et al., (2021) state that training empowers farmers to improve output. This finding also aligned with what SLF advocated for in development projects, as it stated that, in order for members to use the appropriate techniques in the pursuit of their livelihood objective, they should include some set of skills.

4.7 Impact of Market on potato farming

The analysis revealed that there were different opinions about effects of market availability on farmers' livelihoods based on three main categories with subcategories in each where the participants asserted the importance of market, desired limited ways of marketing and access challenges as the third category.

Majority of the participants showed that the availability of markets contributed significantly to their livelihoods as it empowered them to increase production to sell in ten districts of Lesotho.

Market availability also increased income by selling the surplus produce. So, that income was used to take care of the household needs such as clothes, paid bills, insurances and school fees.

Furthermore the participants asserted that market availability contributed to the overall well-being of farmers and their communities because it prevented product decay and ensured fresh food and nutrition for farmers and consumers.

Some participants emphasised that the availability of markets enhanced social cooperation, reduced conflict, and strengthened relationships within the community and released emotional issues such as stress and depression. This view was confirmed that "*availability of the market improved farmers' knowledge that was used to increase the production as to enhance social cooperation 'matsema' so conflict and crime will decrease within the community*". (P3 and FIP7)

The participants revealed that they used face to face and social media on Facebook and WhatsApp to market their products.

The participants showed that there were some challenges which enabled them to access the market. Most participants stated that in rural areas there was no market because most people in rural areas depend on agriculture so they also planted the potatoes.

Some of the participants claimed that one of the challenges hindered farmers' access to the market was lack of knowledge and access to information. Most farmers planted without considering the needs of the market. For example, participants claimed that many restaurants that serve potato chips need a certain quality, and if the farmer's quality does not adhere to the needs of the market, the produce will rot, leading to loss of income. Some participants explained that farmers who lack information may also violate market ethics. Their packaging and pricing were significantly dissimilar, which will obliterate the market. This was confirmed by one of the participants that *'some customers complain that they are afraid to buy because we put the good potatoes on top, the bad ones under, we even put the stones in the bag. Then realise that we as the farmers destroy the market'*. (F2P7)

Majority of the participants stated that lack of transport affects potatoes from the field to their storage because sleds or scotchcart are not safe, and they get damaged. It was also expensive to hire a van to deliver potatoes to the market and that caused them to spend more than what they were expecting in return.

The finding of this study emphasised that there was ample market for the potatoes in urban areas and that helped farmers to improve their livelihoods, as supported by Usman & Haile (2019) and Hill (2014). The availability of markets in urban areas contributed significantly to farmers' livelihoods as their potatoes were not stored for a long time to deteriorate and they can sell at a reasonable price.

On the same issue it was also found out that, in rural areas availability of markets was very low compared to urban areas because almost every household plants potatoes. There were some challenges that enabled the farmers to access available markets such as lack of marketing skills, information, advanced technology that could help farmers to meet market requirements, and transport to take their products from the fields to the consumer. In support, Magingxa & Kamara (2003) claimed that rural farmers without their own transport, run a risk of not finding the right market for their produce.

4.8 Chapter Summary

The study's conclusions came from focus groups and qualitative one-on-one interviews. Introductions and demographic profiles of the participants have been provided. The study's findings have been presented using the themes that emerged from the thematic data analysis. The data and participant extract categories support the themes, which have been used to highlight the responses to the study's questions. Findings indicated that the farmers used outdated technology however, contributed significantly in their livelihoods by increasing the production, and that helped them to generate income which helped them to acquire the household's needs such as shelter, food and reduce vulnerability. On one hand, because of lack of knowledge of how to use the planter, it cuts the potatoes during the harvesting and that decreases the yield. On the other hand, the theme showed that climate change was a major challenge to the farmers as it affected their production negatively. The third theme showed that stakeholders support was very helpful as they helped farmers to improve their food security, income, and their well-being. The last theme showed that the potato market was very high in urban areas however farmers are faced by challenges such as lack of knowledge, lack of access to information and infrastructure. It was therefore imperative to conclude that there was a potential in this project to change the lives of farmers at Ha Tlali as long as the identified challenges can be dealt with.

Chapter Five: Summary, Conclusions and Recommendations

5.1 Introduction

This chapter summaries the key findings, conclusions and recommendations based on the findings and objectives of the study as outlined in chapter one which was to:

- Impact of technology
- Impact of Climate change
- Impact of stakeholders
- Impact of availability of market

5.2 Summary of the key findings

The findings revealed MFA used old and new technology for potato production. Some participants indicated that technology has made an immense contribution to their livelihoods by increasing production to improve food security, income, wellbeing and reduce vulnerability. However most participants claimed that outdated technology destroys the potatoes by cutting them and that decreases generation of income for the household needs. Furthermore it has been revealed that MFA is in dire need of advanced technology, if they are to improve their agricultural output.

The data of this study confirmed that because of lack of precautions against climate change the participants revealed climate change adversely affected farmers' livelihoods by increasing food insecurity, vulnerability and low income generation, as evidenced by prolonged heavy rainfall and dry spells which resulted in unfavourable health conditions, loss of assets, crop failure, as farmers are hit by incessant pest and insects which affect quality and quantity of the produce.

The study further found out that MFA is a self-sustaining cooperative as it rarely received support from government and NGOs. The support according to participants, which came in form of fertiliser, hybrid seed and policies (subsidies and training programmes), contributed significantly to farmers' livelihoods. However, the participant criticised the timing of the support claiming it delays their production, thus leading to poor output. It was also revealed

that farmers lamented on proper storage, transport and training in every season to improve their skills.

The findings also exposed the abundance of potato markets countrywide, which is also backed by the government with a move to ban potato imports when the production is in excess. The study also revealed lack of markets in rural areas, which has forced farmers to seek solace in urban areas where potatoes are used for chips in restaurants and for urban dwellers who use them as both staple food and 'lijelello' (relish). However there are some factors which hindered their access to the market such as lack of knowledge, lack of access to information, transport and resources that helped them to meet market requirements.

5.3 Conclusion

The goal of the study was to ascertain how much MFA contributed to farmers' lives. The study found that MFA improved farmers' livelihoods. Many of the homes were able to take care of their families' basic needs, including purchasing food, clothing, paying for utilities, insurance, and children's school tuition. However, there were some factors which made the project struggle or delay to improve farmers' livelihoods. One of the factors was the use of outdated technology which sometimes destroys the production. Another factor was climate change because they had limited strategies against climate change so their production was destroyed. Insufficient stakeholders support was the factor which made MFA struggle or delay to improve farmers' livelihoods. Lack of knowledge about the market was also a factor for the project delay to improve farmers' livelihoods.

5.4 Recommendations

The recommendations of this study are as follows:

- Farmers should be supported with advanced machinery to simplify work and save time, which could result in quality produce required in the market. The machinery should be complemented with appropriate training.
- The government of Lesotho working together with NGOs should provide adequate and timely support to potato farmers with modern technical agricultural inputs such as hybrid seeds, fertiliser, herbicides and pesticides to produce quality products.

- They should also be supported with infrastructure such as storage to keep produce fresh, as well as transport to carry their produce from the farm to the markets where farmers produce would be sold.
- Farmers should receive frequent training on climate smart agriculture to be resilient to climate change shocks.
- The government should establish and control safe and sustainable markets for locally produced agricultural products, to relieve the burden on rural farmers.
- The government and NGOs should provide training courses for the farmers to have knowledge to fulfil the requirements of supermarkets and street vendors.

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Appendix

Appendix one

Interview guide: key informants and focus group discussion

1. Impacts of agricultural technology on farmers' livelihoods

- Do farmers use technology for potato production? If not, why? If yes, how does it help in production?
- What kind of technology do they use, advanced or indigenous technology?
- How does the use of technology in agricultural production help to improve farmers' livelihoods such as, income, food security, manage the risks, simplify the work, protection, enhance knowledge, market, financial services, decision making, and communication and raise awareness?
- Is there any negative effect of the use of technology, such as pollution, and human health?

2. Impact of climate change on farmers' livelihoods

- How climate change affects farmers' potato and livelihoods, based on production, income, food insecurity, vulnerability, conflicts, land and loss of assets?
- What are the positive effects of climate change on farmers' livelihoods?

3. Impact of stakeholders' support on farmers' livelihoods.

- Do the farmers receive the support from the government, local or international NGOs?
- If yes, what kind of support do they receive?
- How does that support help the farmer to improve their livelihoods, socially and economically?
- If not, what kind of support do potato farmers want to improve their livelihoods?
- What are the negative impacts of stakeholders on farmers' livelihoods?
- Corruption
- Delay to distribute

4. Impact of market on farmers' livelihoods

- What are the effects of availability or lack of market on farmers' livelihoods such as, knowledge, food security, income, and employment?
- What factors make farmers lack access to the market?
- What makes farmers markets in urban areas not at their places?

Appendix two

Atlas. ti Report created by Nthohatsi Makoetje on 11/06/2023

Code Report

○ **Impact of technology**

13 Quotations:

1:1 ¶ 2 – 3 in Agric supervisor

The majority of potato farmers still utilise traditional methods for planting and harvesting using simple technology such as using cows to plant and hoes to pull weeds. However, this technology is essential as it helps them by unloading the work and increasing production. When output rises, farmers will be able to provide for their families by selling their produce in order to make money for necessities like food, clothing, and the tuition for their children's schools. As they can buy food, health and nutrition will also be improved.

Technology also improves farmer-to-farmer communication and information availability. For instance, farmers can share or transmit information about their operations, the weather, and even the market using "masechocha." For instance, the Chinese may need 10 sacks of potatoes, and farmers can quickly respond to this request by using cell phones. So lack of technology particular the advance one and knowledge are factors that enable the potato to produce more. You could ask them what technologies they use most because I can see they have mentioned use of cellular phones. You could find more and how those technologies help in improving their livelihoods

2:4 ¶ 6 in Chairperson of MFA

For climate change the machinery we have is not useful at all, whether it is rainy or drought. To be fair the hybrid seeds are better as they are resistant to climate change but if we experience prolonged rainfall or drought that seed does not cope as a result production decreases.

2:6 ¶ 7 in Chairperson of MFA

The use of radio and television and mobile phones contribute significantly in our livelihoods because most of us use mobile phones for marketing, accessing information, and advertise our products so we get many buyers and cut the cost of delivering products to the market then did not bring. Information and communication technology simplify by enhancing ways of accessing information about climate change, market, and new technology. Later this year we heard from the radio and on television that there will be a lot of rain so we don't plough we save the seed for next season.

2:11 ¶ 15 in Chairperson of MFA

It is not enough, we need advanced technology. I told you that the planter cut our potatoes so we need tractors to plough, and the harvesting machine, hybrid seed, fertilisers

3:1 ¶ 2 – 5 in Chief (Ha Tlali)

They don't have enough equipment, such as ploughs, planters, even the cows. Those people like what they are doing, they have patience, and they help each other. They use old technology however it helps them a lot because their production is very good. Their production is just affected by climate change.

They are able to feed their family, they also sell potatoes to get money. That money helps them to improve their economic and social life. They are not useful only to them but also to the community in such a way that they offer people peace jobs, while harvesting those who help them will come home with nothing to eat.

They don't have technology which protects them from climate change, but what I heard is that they are given the strong seed which germinate in drought and rain seasons. They buy seed with the collection they made as cooperation, or funded by the

NGOs (LENAFU). Most of the time they use cow manure for soil preparation and prevent millipedes.

For the marketing they don't use technology. Information about the products passed by people face to face or through the phone, nothing else. So they need support about the technology but the advanced one. It will help them to save time, simplify the work and increase the production. That means generation of income will be high. That plough they use for harvesting cut their potatoes so it increases the loss.

3:7 ¶ 11 in Chief (Ha Tlali)

No one supports them with technology

3:10 ¶ 16 in Chief (Ha Tlali)

For marketing some use social media such as facebook whatsapp.

4:1 ¶ 2 – 6 in Councillor

Makhaleng Farmers Association is a powerful project that produces potatoes in this area. Their production is very good and high even though there are some challenges of climate change, lack of machinery, and lack of knowledge. Climate change destroys the production of potatoes as we know that potatoes do not need much water so prolonged heavy rainfall destroys them. Last year for example most farmers did not plant potatoes because of rain, those who planted the production were low, and that made life difficult as they depend on them by selling to get money which helped them to access food, household requirements.

The majority of potato farmers still use outdated equipment, with only a small number using tractors to plough, fertiliser, and hybrid seed. Despite this, they still benefit greatly from using outdated equipment because it allows them to increase production and feed their families while also earning money to buy things they need to improve their lives. This demonstrates that they can produce for both the local and global markets if they can obtain advanced technologies. Because of modern technology like greenhouses, fertiliser, and hybrid seeds that are resistant to pests and climate change

All in all the technology they have contributes significantly in their lives not only on food but also for their health as they afford the medical acid, and variety of nutritious food.

Even though not all of them have smartphones, they still use their cell phones to advertise their goods, and when others see them on Facebook, they buy what they're selling. Not only on the internet, but also over the phone. For instance, I just remembered that last month when we had a funeral in this village, those responsible for planning the service simply called one of the farmers and ordered three bags of potatoes. That money will be used to purchase meals so that kids won't go to bed hungry. Hence, technology is significant. You see cell phones come again? What other technologies do they use beside cell phones? How do they help farmers?

The negative effects of technology is that during harvesting, they use a planter, which destroys their product as they cut the potato and causes them to go out of business and earn low income. You see, planters are another technology they use? It destroys the harvest. Did you ask about its advantages?

5:1 ¶ 2 – 7 in LENAFU

The problem of the Potato farmers is that they do not have enough advanced technology to use manual planting. They don't even have a sorting machine; they use their eyes. So that lack of machinery makes it difficult to access the market particularly the formal market. The technology they have I can say it helps the farmers because the project grows. Last year we planted 200 hectares. This year they are planting 500 hectares, which is an achievement. They also have their own branded bags. It's not like past years where they are using a sack.

For their livelihoods, this old technology helps them as it increases production so they are able to improve food security, generate income that will help them to improve their lifestyle such as clothing, nutrition, pay insurances, electricity. The use of technology is not only helpful on farmers only but also to the community members because when the production increases they need external labour to help them during harvesting, sorting and packaging, then paid either with money or potatoes. Therefore their livelihoods will also improve as there will be income, food security, crime will

decrease and live in harmony. The community also has access to fresh food for good health.

Technology helps them to acquire knowledge and skills, for example do you ever use a planter? No, this means you don't have knowledge or skills of how to use it but those farmers do. Maybe you just know who to use the spade for sure.

The technology they have does not only help farmers for production but also helps to find a market by using their smartphone to advertise their products, while the radio and television get information about new technology and climate change. This helps in such a way that advertising attracts the customers so income will increase. Climate change helps to decrease vulnerability as they will find measures to protect their products. For example some farmers do not have enough storage you may find that some farmers after the harvest they put potatoes outside so during rainfall they will cover the potatoes with plastic so that they don't get water, so that potatoes reach the market in good state get the more money because if they are bad will force farmers to sell them at lower price.

Before I forget about climate change, hybrid seeds help because they are resilient to climate change. It can survive in drought and rain but not in prolonged ones.

I believe if they use advanced technology they might be amongst the successful projects compared to where they are now. As I have said that they lack technology, they use a planter for harvesting and that planter destroys the product by cutting the potatoes as result it decreases the yield, so when the yield is low there is a chance of food being insufficient for the household even if the generation of income will be low. This technology sometimes pulls them behind time in such a way that they take a long time for harvesting and cause them to be late to ploughing

5:5 ¶ 15 in LENAFU

They should be supported by advanced technological inputs that fasten the work

5:8 ¶ 21 in LENAFU

Lack of machinery which enables them to produce more for the customer, they are not reliable. Sometimes the machinery they use as the planter cuts the potatoes so they would not sell kind of that and also decreases the yield.

6:1 ¶ 3 – 7 in Focus Group 1

F1P1(Ha Tlali): We don't have enough technology to produce enough potatoes, so as farmers, we pray that the government and everyone else involved will cooperate with us to find technology that will enable us to expand production and combat climate change. Lack of knowledge is a big problem. What technology do they want? What kind of technology are they using already?

P2 (Moits'upeli): With technology that we have, it helps us as we are still producing with it. By the time you may find that we were not affected by this climate change, we are able to increase production to feed our family, and sell to get money to solve our family issues.

P3 (Moits'upeli) I agree that this outdated technology aids us, but it gives us a lot of work sometimes being behind on time because it is slow. For example we take a month to plant or harvest our field using cows but the tractor just takes a few days.

P4 (Nkoeng): The radio and mobile phones have a significant role in raising awareness of issues like climate change and market availability. We will learn and become more informed through listening. That helps us to find ways to protect our production in order to increase production, food security, income and our health. You see more technologies come by? You should ask them what technologies they use in the production of potatoes and how it helps in production hence livelihoods. How do they use such technologies? What are the advantages and disadvantages of such technologies?

P5 (Ha Tlali): The negative impact of this technology is that when we are in a hurry we use a planter to harvest so it cuts the potatoes so because of that we run lose, the generation of income will be low. So you understand that when there is no income life becomes a mess.

P7 (Ha mokheseng) lack of finance is a big problem in Makhaleng Farmers Association. The modern technological inputs and machinery are very expensive so they don't afford to purchase them all at the same time. It either hires the tractor or buys hybrid seeds, fertiliser, and chemicals.

7:1 ¶ 2 – 7 in Focus Group 2

F2PI (Ha Ramabanta)-Technology is there but it is not enough because there are some members who don't have it so we help each other. The technology we use is the plough, the planter, sledge, trailer 'sekosekara' using our animals such as horses, donkeys and cows. For soil maintenance and millipede we use cow manure.

F2P2 (Ha Mokheseng)-This technology helps us but not that much because 1 is better than 0. What I mean is that with advanced technology we can produce more to feed our household, community, and ten districts. The one we have helped us to increase the production to feed our family and the community. Some neighbours come and help us during the harvesting, then we thank them with a basin of potatoes.

F2P3 (Ha Tlali) When the production is good we are able to sell to get the money. That money helps us to buy food, electricity, pay school fees, insurances, access better medical aid and help for their investment, either in agriculture or starting other business.

F2P4 (Ha Tonosolo)-The information about agricultural production, weather focus we hear from the radio and television. Those who don't have radio and television we tell them through the phones.

F2P5(Ha Motjotji)-The radio, television, and mobile phones help us in such a way that if I heard that next week there will be a lot of rain, I will make sure to harvest my potatoes so that they cannot be destroyed. That helps us to feed my family and sell others to buy clothes for my children.

F2P3 (Ha Tlali)-The technology we used for marketing is mobile phones. I advertise my product on social media using Facebook and WhatsApp. When I did that I knew I would get many customers, so my potatoes did not take long. It helps to get money fast.

Appendix three



Data indicated that the farmers use old technology

Appendix four



Ready for the market both formal and informal

Appendix five



Loss of potato crops because of prolonged heavy rainfall