Role of Non-Governmental Organizations (NGOs) in Climate Change Adaptation and Mitigation Strategies:

A Case Study on Leribe District, Lesotho

By

Mokhabelane Morahanye

A mini-dissertation submitted to the Department of Development Studies, Faculty of Economics and Management Sciences, University of the Free State, in Partial Fulfilment of the Requirements for the Award of the Degree of Master of Arts in Development Studies (MDS).

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CERTIFICATION OF APPROVAL

This is to certify that this dissertation titled: *Role of Non-Governmental Organizations (NGOs) in Climate Change Adaptation and Mitigation Strategies:*

A Case Study on Leribe District, Lesotho

has been read and approved as having met the requirements of the Faculty of Economics and Management Sciences, University of the Free State for the award of the degree of Masters in Development Studies.

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Supervisor

Dr Weldemichael A. Tesfuhuney

……

Head of Department

…….

Dean of Faculty of Economics and Management Sciences

……..

External Examiner

DECLARATION

I declare that this mini-dissertation titled: *Role of Non-Governmental Organizations (NGOs) in Climate Change Adaptation and Mitigation Strategies:*

A Case Study on Leribe District, Lesotho

except where otherwise indicated, is my original work and its materials have not been submitted before in full or in part, for the award of any academic qualifications at any other university. Any work from the other authors that has been made use of, have been acknowledged.

Mokhabelane Morahanye

DEDICATION

"My humble dedication of this mini-dissertation to the Lord God Almighty, my wife, children, family and friends. I adore you all limitlessly."

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ABBREVIATION / ACRONYMS

ASAP	African Solutions to African Problems
CAN	Climate Action Network
CFC	Chlorofluorocarbon
EDF	Environmental Defence Fund
FAO	Food and Agricultural organization
GHG	Greenhouse Gas
IFAD	International Food and Agricultural Development
IFRCRCS	International Federation of Red Cross and Red Crescent Society
IPCC	Intergovernmental Panel on Climate Change
LVAC	Lesotho Vulnerability Assessment Committee
MDAT	Malawian Development Assessment Tool
NASA	National Aeronautics and Space Administration
NGO	Non-governmental Organisation
OCHA	Office for the Coordination of Humanitarian Affairs
RSDA	Rural Self-help Development Association
TOPS	Technical and Operational Performance Support
UCAR	University Corporation for Atmospheric Research
UNDP	United Nations Development Programme
UNESCO	United Nations Development Programme

UNFCCC	United Nations Framework Convention on Climate Change

ABSTRACT

Climate change and its impact have become of great concern as they threaten the production capacities of farmers throughout the world and worse in the developing world. The global warming that leads to climate change has an influence on the natural systems with changes in rainfall patterns and increasing frequencies of natural climate-induced disasters. The ever increasing greenhouse gas (GHG) emissions are the main sources of imminent global warming that put society at stake. In Africa farmers are highly vulnerable to the impact of climate change. The adaptive capacity is the main area of focus for every country while avoidance, mitigation and protection measures need to go beyond those that already exist as essential to support farmers already faced with impacts of climate change.

This study assesses the role of NGOs in support of adaptation and mitigation strategies of climate change in rural communities of Leribe district. In Leribe district a large proportion of rural households who are farmers have access to agricultural land. Climate change impact is disturbing the farmers since there is late onset of rains and farmers' productivity has greatly diminished. It is therefore significant to assess the role of NGOs during climate change impact to assist farmers adapt to and mitigate effects of climate change.

In this study data was collected using quantitative and qualitative methods through interview questionnaires, key informant interviews and focus group discussions. A descriptive nature of analysis was used. The descriptive analysis was useful in the sense that the researcher found absolute numbers to summarise individual variables and find patterns. The nature of analysis characterised farmers in relation to their demographic and socio-economic data, livelihood strategies, adaptation and mitigation strategies. Results showed that Leribe farmers' crop production was affected by climate change impact through yield loss, change of farming method, food shortages and depleted water sources and abandonment of engagement in agriculture for some farmers. The impacts saw farmers losing livelihoods, income generation, and inability to provide food for their families. Farmers seemed to have been surviving through crop production before climate change impacted on their rain fed agriculture and their livestock had endured the impact of climate change and the new methods in agriculture had helped them to continue to grow crops. In order for the farmers in Leribe adapt and mitigate, it is essential for NGOs to adequately capacitate the staff so that they (staff) inculcate knowledge to farmers

for efficient implementation of adaptation and mitigation strategies which will assist in dealing with impact of climate change. It is recommended that there should be shift in focus and support efforts to come up with a new plan of action that will see adaptive capacity of farmers improved when climate change impact on the farmers' capacity to grow crops. More understanding and increased knowledge of adaptation and mitigation will see more production and food insecurity will not be a threat. More funding by government will help NGOs build more capacity to farmers, diversification of farming methods and providing farmers with tools for accountability will help farmers scale up their production.

Keywords: climate change, impact, livelihoods, production, capacitate, adaptation and mitigation.

CHAPTER 1

INTRODUCTION

1.1 Background

Climate change is a complex issue that has an impact on global issues including poverty, economic development, population growth, sustainable development and resource management (NG0-UNESCO 2017). Climate change impact has given more work to agencies and organisations to deal with its impacts than before. The agencies and organisations are engaged in assisting global communities survive the life threatening impacts of the climate change. According to Martens (2017) communities, governments and non-governmental organisations employ adaptation and mitigation strategies to respond to climate change risks, to limit future negative impacts and to enable communities to cope with adverse effects. This means climate crisis is an existing phenomenon and has put people at risk around the world. NASA (2019) also puts forward that it is global conundrum experienced on local scales and will be around for decades and centuries to come. Climate change is visible through weather patterns, across farmland and as well as through animal and plant habitat around the globe. Among many other effects there are increasing temperatures, decreasing rainfall in the continental interiors, drought desert encroachment, melting ice, extreme weather, floods, sea level rise, sinking of islands, water scarcity, health and agricultural problems (Odjugo 2009).

These effects have called for interventions by Non-governmental Organisations (NGOs) to save communities from being outsmarted by climate change and in the end suffer in dire situations. The welfare of people and societies is primarily associated with their ability to manage risks related to a changing climate (Herwitt, Mason and Walland 2012). The NGOs have the capacity to educate and facilitate in the training and imparting knowledge of coping mechanisms by members of communities. NGOs are perceived as private organisations seen basically by humanitarian or cooperative, instead of business objectives that aim to relief suffering, promote interests of the poor, protect environment, provide basic services or do community development in developing countries (Werker and Ahmed 2007). The developing countries are at high risks of effects of climate change. For these developing countries to mitigate the effects of climate change, they require NGOs to assist. The primary objective of

NGOs is to provide assistance to individuals or developing communities in order to promote sustainable development at grassroots (Davids and Theron 2014). NGOs with their knowledge and expertise in different areas of development are tasked and making contribution with helping the communities meet the challenges they face.

In the advent of unprecedented climate change Africa has experienced a lot of changes in weather patterns and this has had a negative effect in the production of resources such as food that assist human beings to be able survive on earth. According to Ziervogel (2019) climate and food are closely related and require us to keep a careful eye on how climatic change is affecting food and livelihood security. Africa has much at stake. Hugely changed weather patterns and climate extremes threaten agricultural production and food security, health, water and energy security that therefore undermine Africa's ability to grow and develop (Besada & Sewankambo 2009). Even with external support, to construct climate resilience in Africa calls for a major political will and resources and intent from populations that see the need to prioritise climate action (Serlomey and Logan 2019).

However, in the largest survey conducted in 34 African countries between 2012 and late 2018 it has been found that there is inadequate popular knowledge alongside widespread perceptions that climate change is making life worse (Serlomey & Logan 2019). The study also revealed those working in the agricultural sector in the rural areas, the poor and the less educated as people who are not aware of climate change. Although in some hard hit countries like Uganda, Malawi and Cape Verde people were aware of climate change, in Nigeria and South Africa, 50% and 40 % respectively, climate change was not widely known. (Selormey and Logan 2019).

Southern Africa needs aid to salvage plunging food security and save the lives of millions of climate-shocked people across the region (Sunday Express 2019). Countries within the region have seen poor agricultural seasons one after the other (Oxfam International 2019). According to Oxfam International (2019) in some countries national grain supplies are depleted, and governments and their development partners are viewing to external sources to add on the shortages.

1.2 Problem Statement

Lesotho is among the nine countries severely hit by low levels of food insecurity. The country has been experiencing a serious food crisis since 2012 (Rant'so & Seboka 2019). According Rant'so & Seboka (2019) this was caused by poor farming methods and continuous drought conditions. About 79% of Lesotho reported that climatic condition for agricultural production had seriously deteriorated over the past decade (Selormey & Logan 2019). The climatic conditions that led to deterioration are the long-term increase of temperatures, heat waves fluctuations of rainfall amount and long dry spells. According to UNFCCC (2006), countries that are still developing mostly suffer consequences of climate change since they have inadequate resources to adapt socially, technologically and financially. This lack of advanced technology is a limitation to mitigation and adaptation strategies. Developed countries have used NGOs for relief and rehabilitation when negative impacts have occurred so in this regard developing countries need to highly consider the efficiency of NGOs for them to reduce calamities of all forms including climate change impacts. Makoba (2002) propounds that NGOs can help meet a number of needs for people, which include empowerment, promotion of equity, self-help, participation and mutual assistance.

It is therefore crucial to assess the role of NGOs in climate change mitigation and adaptation strategies in Lesotho as one of the developing countries.

1.3 Research Questions

- To what extent are the awareness and perceptions of smallholder farmers on the effect of climate change on their livelihood?
- What are the adaptations and mitigation strategies practised by the rural community in the study area?
- How the knowledge and intervention of NGOs assist smallholder farmers in promoting the mitigation and adaptation strategies to the effect of climate change?

1.4 Hypothesis

The study hypothesises that the state-based Non-Governmental Organisations have intervened to enhance and motivate positive perceptions on the impact of climate change in rural communities of Leribe district in Lesotho and make a positive contribution in mitigating the effects of climate change.

1.5 Aim of the study

The overall aim of the study is to ascertain knowledge and perceived roles of state-based Non-Governmental Organisations in climate change adaptation and mitigation strategies in rural communities of Leribe district, Lesotho.

1.6 Specified objectives

- To assess the contribution of NGOs in prompting the awareness and perception of the climate change impact on rural communities' livelihood.
- To explore the role of NGOs interventions in the adaptation and mitigation strategies as coping mechanisms to the effect of climate change.
- To investigate challenges NGOs encounter when assisting rural communities to cope with the effect of climate change on their livelihoods.
- To provide recommendations to address the problems NGOs encounter in assisting rural communities during implementation processes.

1.7 Significance of the study

The outcome of this study on the role of NGOs on climate change mitigation and adaptation rural communities have provided useful information that would inform the government of Lesotho on whether the state-based NGOs have been achieving their objectives or not. It will also enable the Ministry of Agriculture to design policies and strategies that are geared towards agricultural practices that are climate smart and increase the Lesotho farmers' resilience and adaptive capacity to the impacts of climate change. The Ministry of Energy and Meteorology

will also be furnished with appropriate information when mainstreaming climate change adaptation into national development policies and strategies.

In September 2015, Lesotho presented to the United Nations Framework Convention on Climate Change (UNFCC) an improved version of the Intended Nationally Determined Contribution (INDC). This study will make an input into the formulation and adoption of a two-fold strategy against climate change since Lesotho's focus is on activities which increase the country's resilience and adaptive capacity to the impacts of climate change. The study will also provide useful knowledge as Lesotho is transitioning to low-carbon and more climate resilient development pathways.

1.7 Conceptual Framework

This study was based on the concept of the empowerment framework approach. The objectives of the study were constructed and achieved through an empowerment framework. The notion of empowerment is defined as follows:

Empowerment is the expansion of assets and capabilities of poor people to take part in, negotiate with, influence, control and hold responsible institutions that affect their life (World Bank 2002).

The empowerment framework approach seeks to establish the need to empower subordinates when they feel powerless due to lack of assets. The International Fund for Agricultural Development incorporates access to productive resources and the capacity to participate in decisions that affect the least privileged. Assets are financial and physical materials such as land, housing, livestock and savings that allow people to resist shocks and to increase their choices (World Bank 2002). For the purpose of this study the empowerment approach was used (Figure 1.1).

1. The smallholder rural farmers in their study area were interviewed in order to find out about their understanding of climate change which they are faced with and its impact. The impact was low production in both crop and livestock farming as a result of low rainfall and lack of water (drought).

2. Information on their age, household position, head of family, marital status and employment status. These are the conditions that likely make farmers/dependents feel powerless and they built the initial stage of empowerment process.

3. The study analysed the livelihood strategies of farmers and what was their production status during the impact of climate change.

4. The study identified adaptation and mitigation strategies available in Leribe district that can assist farmers/dependents survive climate change impact to their production.

5. Recommendations on certain decisions by authorities, empowerment strategies and interventions that can influence efficiency of farmers or dependents and facilitate high productivity of crops and livestock were made in this study.

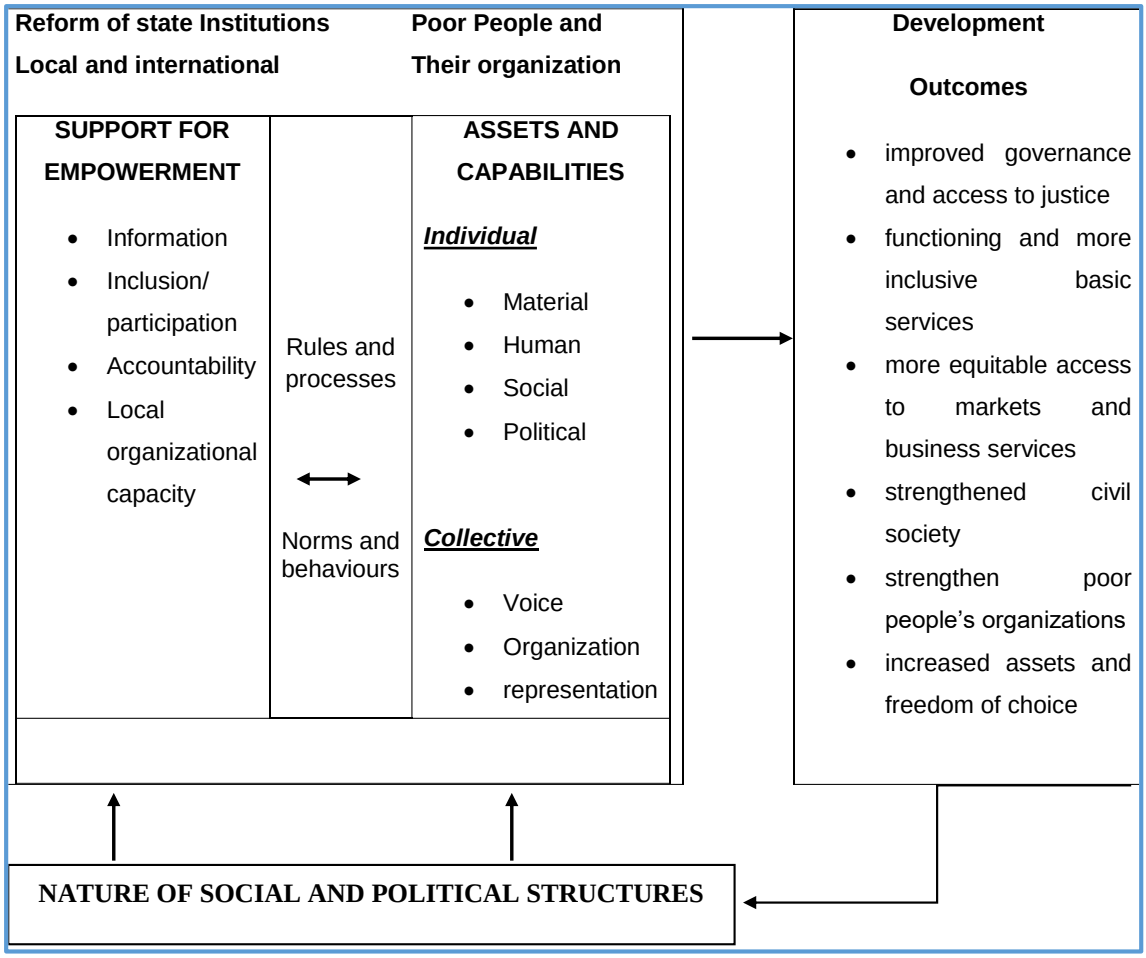


Figure 1.1: The Empowerment Framework for poor rural communities with less power of access to resource and funding opportunity (World Bank 2002).

Rural farmers are mainly poor people who lack assets and capabilities to be able to produce even in the event of climate change effect. They may be affected by climate change as individuals or as a collective. Either way they need to be given access to increased assets such as land and water as a resource. When NGOs avail water to poor farmers in the rural communities it means farmers will be capable of producing more crops and vegetables. Empowering poor farmers removes the informal institutions that inhibit farmers from making better their well-being (World Bank 2002). These informal institutions include corruption, norms and social exclusion. Corruption inhibits the well-being of the poor farmers in the rural communities as governments' officials divert any form of assistance by government for their own selfish interest. These results in farmers becoming poorer but NGOs represent accountability and efficiency.

In relation to norms NGOs help improve standards by promoting quality of produce by farmers. Farmers are trained in improved ways of farming and that changes what they have always perceived to be a standard of farming. Many farmers have changed to new ways and have improved their quality and level of production after the intervention of NGOs. NGOs have empowered farmers by organising them into cooperatives and sharing ideas. In this way farmers function in a more organised and inclusive way. Empowerment helps people to participate and hold responsible institutions that have an influences on their lives (World Bank 2002).

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This literature review expounds on the NGOs and their role in climate change adaptation and mitigation. The relevant literature to this study directly hinges the relationship between NGOs and their roles in adaption and mitigation of climate change effects programmes in Lesotho. The first section of the chapter broadly defines various meanings of role and organisation. In the following section, climate change is discussed and third section NGOs roles is explored and discussed with regard to what NGOs have done in adaptation and mitigation to assist farmers survive the impact of climate change. The fourth and the fifth section of the chapter discusses the NGO role with the focus on empowering the farmers in addressing the impact of climate change. The sixth section dwells o NGOs role in global adaptation and mitigation to climate change. The seventh section furnishes specific information on specific roles and activities of NGOs in global climate change adaptation and mitigation programmes. Finally, the chapter concludes with the aim of the study with regard to NGO role in climate change adaptation and mitigation programmes in Lesotho.

2.2 Various Meanings of Roles

As Stryker (2007) put it, a role is conventionally defined as a set of behavioural expectations attached to a position in an organised set of social relationship. Role can be viewed from a wide array of meaning with regard to the context it is applied to. The word can be applied to either an organisation or a person. According to House and Rizzo (1972) an organisational role is a position within an organisational arrangement that brings about a specified set of tasks or responsibilities. The set of tasks and responsibilities are mandatory and the organisation's mission and vision stipulates it. In an organisation roles are termed as socially constructed (Ilgen and Hollenbeck 1990). As a social construct roles are agreed upon by people or organisations living within one specific milieu. Like in human interactions or in an organised setting, a person who occupies a particular role is expected to appropriately do the related set of tasks and make decisions that are fitting to that role (Rogers and Molnar 1976). Roles are of different types and can be set in relation to the environment in which an organisation or a

person operates in. They change over time and reconstructed top-down by managers or employers to deal with changing circumstances (Ebbers & Wijnberg 2017).

There are two important theories attached to role. The first one is that the role is attached to structural position while the role identity is how the individual makes sense of that role (Ashforth 2001). The theories give an outlook of what makes a role. A structurally based role perceives stability in behavioural expectations defined by institutional pressures while role identity is a mental outline that organises and keeps the information and meaning attached to the role (Sluss, Van Dick & Thomson 2011). Roles are both behavioural and psychological in nature. Apparently individuals as well as organisations are unable to operate without roles (Stryker and Burk 2000). From these roles there is a network of intertwining tasks and responsibilities within the structures of organisations that ensure that organisations achieve their set goals.

For organisations there are multiples roles they play. These roles are protection, prevention, promotion and transformation. Zaei (2016) explains protection role as giving relief to victims of disaster and helping the poor, prevention as lessening people's vulnerability through income diversification and savings, promotion as providing more opportunities and change as remedying social, political and economic exclusions. Like humans, organisations have their roles attached to certain structural positions. That is, they are either governmental or non-governmental organisations. Their roles should be clearly defined and operate within particular expectations defined by institutional framework. Cambridge dictionary suggests that role is a position or purpose that someone or something has in a situation, organisation, society or relationship. It is from this notion that the meaning of organisation is key in this study to comprehend.

2.3 Organisation Meaning and Structure

Organisations are entities that help states deal with issues that the governments within the states are unable to deal with. In the proper perspective, organisations are there to assist people to realise their potentials particularly where governments are unable to cater for services. In simplified terms organisation is a group of people who work hand in hand to achieve some purpose and their expectation is that working together will help complete certain tasks in an

organised way (Frederick 2014). From the explanation of Frederick, it draws attention to the formality of the organisation. Many organisations that are active around the globe are formal in nature and operate under well organised management system. As Tanija (2019) submits that a formal organisation is a well-defined structure of authority and responsibility that defines delegation of authority and relationships amongst the organisational members. There structure of the organisation is in such a way that individuals have particular roles they play. The members know their roles and are given tasks that they ought to complete within a specific time frame.

Organisation works along already set of policies, plans, procedures, schedules and development programmes and majority of decisions are based on pre-determined policies Tanija (2019). These policies are driven within a management system that Tanija has stated that it is a defined structure of authority. Mintzberg's theory on organisations breaks down the organisation into five components. These components are strategic apex, middle line, operating core, technostructure and support staff.

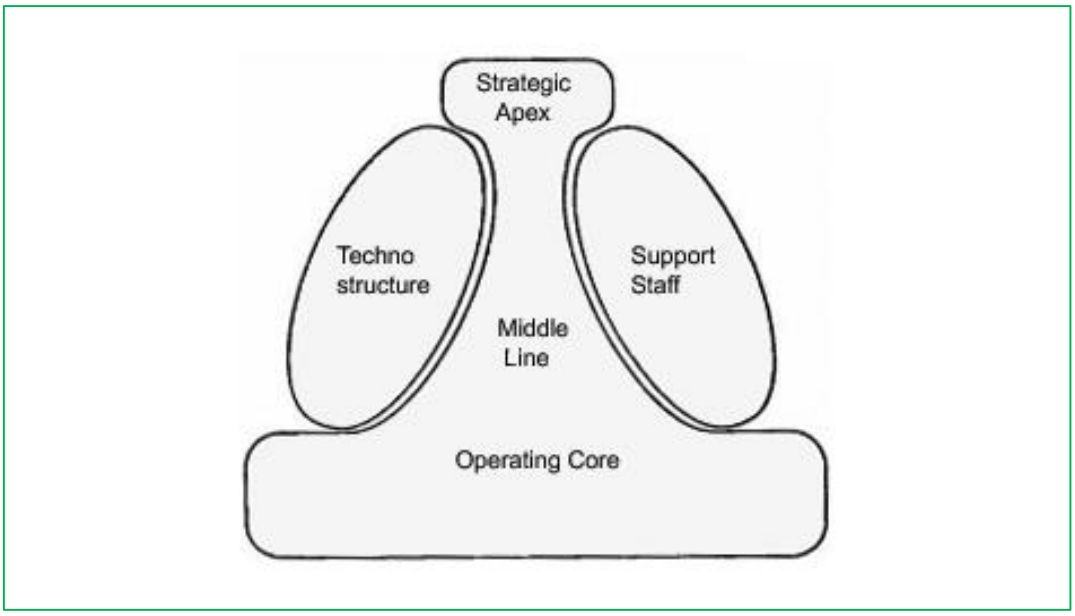


Figure 2.1: Structure of theoretical organizational set-up, a*dapted from* Mintzberg model of organisation, 2019

The Strategic apex in the above figure is composed of directors and senior executives. Their role in the organisation is to interpret and define the mission of the organisation and work

towards making objectives meet the mission of the organisation. It is also incumbent upon the strategic apex to manage the organisational relationship with the macro environment. On the part of operating core in relation to Mintzberg model of organisation every activity within the organisation is entirely driven by this section of the organisation. It is argued that once the operating core is bottlenecked the output will never be delivered. This is the mainstay of the organisation and without it the organisation is good as nothing.

The middle line is one of the most significant aspects of organisation. It gives the link between the strategic apex and the operating core. It is basically a part of interpretations since the role of the operating core has to be in line with the expectations of and plans of strategic apex. As the organisation is a unit of individuals working as a unit to attain objectives of an organisation, the techno structure comprises of key individuals and teams working into the functions like human resources, training, finance and planning. In this part there are analysers who decide on the best ways in which to execute jobs and find out how to standardise skills. Planners in this part decide on output and define quality requirements.

Another key aspect in the organisation according to Mintzberg is support staff. These staff work in functions as research and development, public relations and legal services. Their outputs do not have a direct impact on the core purposes of the organisation but their activities contribute to the efficiency and effectiveness of the strategic apex, middle line and operating core. When all these key elements are functional and work together they have a significant impact on the nature organisation. However, Tanija (2019) argues that formal organisation is a defined system of jobs, each with its definite measure of authority, responsibility and accountability, the whole clearly made to enable employees to well to attain set goals. This therefore says not only the activities as Mintzberg say contribute to the efficiency and effectiveness of the strategic apex, middle line and operating core but also defined system of jobs with definite measure of authority, responsibility and accountability help achieve set goals.

The formal organisations according to Tanija (2019) have features which are deliberately created structure, job-oriented, division of work, departmentation, formal authority, delegation, and coordination. Deliberately created structure is done to define official relationship amongst people working in an organisation. This is to avoid double tasking whereby two employees do the same task. The job oriented dwells on work than people by giving work to people and

defining the structure of relationship to achieve the objectives of the organisation. Tanija (2019) further says in organsations work is divided into smaller units and given to individuals on the basis of their skills and abilities. This is division of work. Tanisha (2019) alludes to the fact that there are slim chances of doing the same task. Another prominent feature in this scenario is departmentation. This is the foundation of organisation structure as it refers to the division of work into smaller units and their re-grouping into bigger units on the basis of similarity of activities (Tanija 2019). In organisations the operational departments are production, finance, human resources to name a few.

The formal authority is another important feature in a formal organisation. People in this scenario exercise their power in respect to the hierarchy in the organisational structure. Tanisha (2019) terms it the chain of command. Authority is linked to position and through it, is the person occupying the position. It involves the right to command, to perform, to make decisions and use resources. Delegation also defines what a formal organisation is. In the formal organisation work is officially delegated to lower positions. In this case the work load is divided into units, a part assigned to subordinates with authority to carry out the assigned task. The concept of division of work and its assignment to people, down the scalar chain is termed as delegation. Tanisha (2019) defines delegation as the process by which a manager gives tasks and authority to subordinates who accept responsibility for those tasks. The last important feature of formal organisations is coordination. In this scenario the manager of the organisation integrates activities of every single employee and the units into one single threat so that departments and individuals work towards a common goal. Managers have to coordinate activities of organisations by communicating organisational goals to all departments (Tanisha 2019). They must set goals and link the performance of each department with others in order that all departments in unison contribute to the organisational goals.

On the other hand, there are five categories of organisation structure put forth by Mintzberg. A category is synonymous to class (Hornby 2015). In this regard Mintzberg says one organisation category is simple structure. In the simple structure power comes from the strategic apex. The control of the organisation is exercised by the chief executive. The structure is also flexible and at times informal with unrelenting sense of mission. Mintzberg however tips that simple structure is vulnerable and anything wrong can affect the coordination mechanism of the

organisation. Another category or class of an organisation is machine bureaucracy. In this category. In this category as Mintzberg puts the structure relies heavily on techno structure. The strategic planners and financial controllers are highly influential and this results in the establishment of multiple layers of management, formal procedures and standardised production processes. It is further given that due to high degree of tasks performed the operating core can be inflexible and allows a little decision making to individuals in the organisation. It is difficult therefore to motivate workers and the organisation is likely to reject the needed change if any. The professional bureaucracy, like the machinery bureaucracy is based on the clear lines of authority and standard administrative practices. The practices may be premised on standards set by law, regulations or independent external bodies, including professional bodies. According Mintzberg schools, hospitals and other professional practices as good examples of professional bureaucracy. He suggests that it is more democratic than its predecessor, machine bureaucracy. It allows for motivation of people and the operating core is the main coordinating influence.

The divisionalised stands out as one other class or category for organisation structure. In this case, a small middle core provides guidelines for business units that need a high degree of autonomy. Mintzberg states that this is an extension of the machine bureaucracy. It is the centre line that forms a strong coordinating influence as its main role is to turn the demands of the small central core into the objectives of the operating core. Multinational companies have mostly adopted this structure. Adhocracy is the last class of organisational structure. This is project based and needs to answer quickly and flexibly to the changing demands. The demands are often driven by changing markets or innovation. In adhocracy there is less formality and as a result direct supervision and defined processes are of no importance than in other organisational structures.

The formal organisations have their own merits. They clearly define objectives of the organisation and authority. They attain responsibility relationship among the people to achieve those objectives. They also help in optimum use of the few resources available in the organisation. Again the division of work and relationship between the people develops effective system of communication in the organisation. Also the organisational hierarchy helps deal with overlapping activities between two people or two departments. The formal

organisations help the people in career advancement and promotional avenues are clearly defined in the formal structure of organisation. As Tanija (2019) says the rate of absenteeism and labour turnover remain low in the formal organisation because very clear objectives, policies and strategies. It is a rare practice for people to disappear and their whereabouts unknown in formal organisations. Another important view is that the formal organisations merge their goals with those of the individuals working in the organisation. There is an interrelation between the goals of the individual, group and organisational goals.

Tanija (2019) has identified two limitations of formal organisations. Firstly, too many stress is placed upon formal rules and regulations, workers do not use their creative and innovative skills to perform organisational tasks. This means there is a loss of creativity and innovative abilities in the name of strict adherence to rules. Secondly, there is no care for social needs. In the formally worked out organisation structure, the social needs are often neglected although people are related to each other through formal chain of command to discuss only official matters with one another. Social interactions have suffered in formal organisations.

2.4 Non-Governmental Organisations (NGOs)

The NGOs are independent entities that operate within a state. Willets (2002) defines NGOs as independent voluntary associations of people acting together on a continuous basis for some common purpose apart from individuals achieving personal gains. This definition coincides with the common understanding that NGOs should be independent by virtue of them being termed as non-governmental. Willets (2002) further provides three characteristics of NGOs as not being premised on political parties, non-profit making and not being criminal groups. Although NGOs may have different objectives and functions, there are international umbrella NGOs that provide an institutional structure for various NGOs that do have a common identity.

There are two types of NGOs which are operational NGOs and campaigning NGOs. Operational NGOs are those that mobilise resources in the form of financial donations, materials or volunteer labour in order to sustain their projects and programmes while the campaigning NGOs have the same functions but do fundraising on a smaller scale. (Willets 2002). The information related to the definition of the NGOs and their composition is necessary to assess the role they are playing in climate change and to find out whether their nature can be

impactful when dealing with the risks of climate change. Burrell and Morgan in Bryman, Bell, Hirsrchsohn, Dos Santos, Du Toit, Masenge, Van Aardt and Wagner (2014) view organisations as objectivist in that they have actual processes and structures that can be seen from external point of view. They further view organisations as subjectivist in that they are socially constructed by members of society to make sense of their experience and therefore organisations can be comprehended from the perspective of individuals directly involved in their activities. These two paradigms are essential in understanding the roles organisations play in climate change.

2.5 Climate Change and its impact

The Intergovernmental Panel on Climate Change (IPCC) and United Nations Framework Convention on Climate Change (UNCCC) have different definitions of Climate Change. According to United Nations Framework Convention on Climate Change (2011) climate change refers to a change of climate that is caused by human activity that changes the pattern of the global atmosphere. The human activity could be anything that human beings do that produces gases such as carbon dioxide, methane, nitrous oxide and Chloroflorocarbons (CFCs). The increase of these gases into atmosphere boosts the greenhouse effect bringing on average an additional warming of Earth's surface (IPCC 1991). The greenhouse gas, which is water vapour will also increase in reply to global warming and exacerbates it. Climate change in IPCC refers to an alteration in the state of climate that can be seen by changes in the mean and or variability of its properties and that continues for a lengthy period normally decades or longer. IPPC further refers to any change in climate over time, whether due to natural variability or as a result of human.

The IPCC differs from UNFCCC in that climate change in UNFCC refers to a change of climate that is attributed directly or indirectly to human activity that changes the composition of the world's atmosphere and that is addition to natural climate variability observed over comparable periods (UNFCC 2011). From this difference it could be drawn that the activities that IPCC puts less emphasis on the contribution of human beings in climate change but on the variability of its properties which goes on for a lengthy period while UNFCC puts emphasis on human induced change. Lobo (2018) alludes to the fact that it is already being experienced all over the world in varying degrees as judged by the frequency, length and severity of extreme events

occurring. Climate change is the condition whereby a significant change is seen in the normal weather patterns in any given place, country or region.

UNFCCC (2011) through its working group 1: The physical science has observed that:

- Warming of the climate is clear and is caused by human activity
- Protracted greenhouse gas emissions at or above current rates would cause further warming and induce several changes in the global system during the 21st century that would definitely be more than those observed during the 20th century.
- Many long-term changes in climate have been seen at continental and regional with aspects of extreme weather including droughts, heavy precipitation, heat waves and the intensity of tropical cyclones.

Two of the southern hemisphere's deadliest cyclones in living memory, Idai and Kenneth displaced more than two million people between March and April (Sunday Express 2019). The force of cyclones is likely to have more devastation among millions of severely food insecure people already caught in climate chaos. It is also projected that hot extremes, heat waves and heavy precipitations events are very likely to continue to become more frequent. Climate-related natural disasters are becoming more frequent, more deadly, more destructive (Gutterres 2019). This concern was transmitted by the UN Secretary General during the 2019 UN Climate Change Conference held in Madrid.

The UNFCC (2011) through its working group II: climate change impacts, adaptation and vulnerability observed that many natural systems on all continents will be affected by regional climate change more especially temperature increases. The observed impacts are:

- Effects on hydrological systems
- Inclination towards earlier greening of vegetation and longer warm air growing seasons.

The UNFCC (2011) has as well given projected future impacts which include the fact that there will be a decrease of water availability over much of the mid-latitudes and dry tropics and some of are already water stressed areas. The report further states that hundreds of millions of people

are projected to be exposed to increased water stress. All the more, drought affected areas will increase and extreme precipitation events will amplify floods. One of the offices in the UN, Office for the Co-ordination of Humanitarian Affairs (OCHA) shows concern on numbers. According to OCHA (2019) over the past decade the frequency of has increased from one drought every six years and now we are seeing consecutive droughts and more unreliable rainfall patterns where dry spells are followed by flash floods. The flash floods have led to loss of human life, destruction of social and economic infrastructure and degradation of already fragile ecosystems and social structures. The flash floods have also let to destruction of crops in the farmland and left farmers without anything to harvest. The increases in the frequency of drought and floods are seen to affect local crop production negatively especially in subsistence sectors at low latitudes. Devereux (2007) indicates that droughts and floods undermine farm yields and the national harvest reducing household and national food availability and agricultural income that comes from the crop sales.

Climate change has very severe impact on the farmers. According to OCHA (2019) communities watering points for livestock and agriculture have dried up in many places while pastures have been depleted resulting in increased movement of livestock and people in search of water and grazing land. Climate change poses a risk to farmers as they become afraid to plough for fear of either drought or flash floods that sweep away seeds or growing crops. Dorward and Kydd (2002) suggest that the presence of risk degrades productivity of rural economies. The three ways in which he says the productivity is lowered are (1) reducing return on investment, (2) distorting investment away from income maximising toward risk reducing activities and (3) discouraging investment altogether because returns are low and investors are risk hostile. Ziervogel (2019) indicates that extreme floods and drought have disrupted people's livelihoods and incomes include those of small businesses, farmers and entrepreneurs. It is arguable that extreme weather has led to low interest in agriculture. Weather risks play a significant part to underinvestment and consequently the reason for prolonged agricultural stagnation and rural poverty in countries that are dependent on rain fed agriculture (Devereux 2007). The climate crisis threatened to derail 50 years of progress in development, global health and poverty reduction and millions faced malnutrition in the trenches of drought (Alston 2019). Enzler (2019) says climate change influences many other environmental issues such as air quality, water quality, desertification, biodiversity, forestation and stratospheric depletion.

The global rise for climate action has become the main focus of the world. The EDF (2018) reports that the cryosphere is affected by climate change. According to the report the frozen water on Earth is melting. The snow packs, glaciers, and sea and freshwater ice are melting rapidly and this result in unexpected sea level rise. Furthermore, the oceans are getting hotter, expanding and becoming more acidic. The carbon dioxide emissions end in oceans and trigger a chemistry change that makes water more acidic and this dissolves the shells of sea creatures. There are also heat waves. According to the report, the increased evaporation of water acts as a catalyst for storms and puts more energy in the extreme weather events such as hurricanes. In more areas that are arid droughts and wildfires are intensifying.

The EDF (2018) adds that human life and prosperity suffer a great deal as where, how and when people grow food is significantly connected to the climate's normal patterns. It further denotes that around the world farmers are battling to keep up with shifting weather patterns and increasingly unpredictable water supplies. In this regard, farms are more likely to face attacks from weeds, diseases and pests, which affect yield.

2.6 NGO Role in Adaptation and Mitigation.

Mitigation is an important knowledge which the smallholder farmers need to have in order to address risks brought about by climate change. UCAR (2011) defines mitigation as attempts to slow the processes of global climate change, usually by lowering the level greenhouse gases in the atmosphere. The Lesotho Meteorological Services (2017) says the plan to mitigate GHG emissions is built on improving crop and livestock practices for food security while lowering emissions; protecting and re-establishing forests for their economic and ecosystem services.

UCAR (2011) defines adaptation as developing ways to protect people and places by reducing their vulnerability to climate impacts. Climate change major impacts have thus far affected many people particularly those in countries in tropics and subtropics. Recent scientific studies show that countries in the tropics and subtropics face the most severe impacts in terms of declines in water availability and agricultural production (World Bank 2002). This shows how crucial it is for adaptation to be put in place as studies have shown that in future most people will be at risk of water shortage while poor harvest in the agricultural sector will increase

vulnerability of people, particularly the poor. Combating these risks are the central concerns for many of the world's poorest countries and this is done through the assistance of NGOs.

In 2015, the international community came to a conclusion in Paris during the 21st Conference of the parties (Cop 21) to the United Nations Frame Work Convention on Climate Change UNFCC). It was in that year when governments adopted the 2030 Agenda for Sustainable Development alongside 17 Sustainable Development Goals (SDGs) and among the SDGs 13 called for Member States to take drastic measures to combat climate change and its impacts. This new plan gave a momentum for the international community to take action with the inclusion of NGOs. The question that arises is how NGOs help in mitigation and adaptation to combat climate change and its impact.

Biswas (2017) indicates that mitigation is for preventing greenhouse gases to build in the atmosphere by curbing it at the source and also by improving GHG sink. In order to achieve this goal there has to be an agreement between stakeholders. By stakeholders one refers to civil society, government, private sector, politicians and everyone who has a stake in emitting greenhouse gases. Srivastava (2017) further illustrates that reducing climate change involves cutting the flow of heat-trapping greenhouse gases into the atmosphere through cutting the burning of fossil fuels for electricity, heat or transport as well as improving sinks such as seas, forests and soils that gather and store these gases. In this way the involvement of all stakeholders is crucial in order to achieve the end goal of mitigation.

In the 8th international forum of NGOs in official partnership with UNESCO held in Paris in 2017, the idea of involving new associations to accommodate diverse views located in the regions of the world was implemented. The role of this partnership between UNESCO and NGOs was to organise international forums for priority issue. According to NGOs-UNESCO (2017) addressing climate change was one of the key issues to attain sustainable development. Sustainable development simply means using the available resources in a manner that would not threaten their future use. Under the theme of climate change in Paris forum, it was concluded that there was a need to redirect technologies, sciences, finances and key among them was to redirect mentalities to change the economies and ensure a sustainable future for everyone. This provided energy for international community to implement Paris agreement.

UNESCO provided an overarching response to climate change through a number of programmes.

An updated UNESCO Strategy for action on climate change was adopted to allow member states to take urgent action to fight climate change and its impact through education, sciences, culture and information and communication. Among the key thematic focus areas in the strategy were:

1. Supporting member states to come up with and implement climate change education and public awareness programmes and policies.

2. Promoting cultural diversity and cultural heritage safeguarding for climate mitigation and adaptation

3. Supporting all-encompassing social development, encouraging intercultural dialogue and fostering ethical and gender equality principles with regard to climate change mitigation and climate change.

The NGO officials working together with UNESCO have an important role they play in ensuring that the UNESCO strategy in addressing climate change issues. Apart from UNESCO leading the pack in climate change, many NGOs have participated in climate change mitigation and adaptation activities. It would also be proper to highlight by way of definition what an NGO is. It is a non-governmental organisation that is legally constituted, a voluntary association of individuals or groups that is neither government agency nor profit (World Bank 2002). NGOs are driven towards relieving suffering, protecting environment and promoting interests of the have-nots among the services they provide. There is a network of NGOs in the world that have joint effort to combat impact of climate change. The Climate Action Network (CAN) is a world-wide network of over 430 NGOs working to promote government and individual action to lessen human-induced climate change to acceptable levels (Iwuchukwu, Nwankwo & Ogbonna 2014). Not only are these NGOs concerned with cutting the greenhouse gases but they also help communities adapt. Adaptation is adjusting or changing to expected future climate (Srivastava 2017). The changing or adjusting will come to existence through the creation of awareness on climate change education and public awareness programmes and

policies. NGOs are entrusted to implement climate change education and promote the awareness programmes and policies.

2.7 Climate Change Impact on Smallholder farmers

Smallholder farmers are one of the most vulnerable groups to climate change yet efforts to support farmer adaptation are obstructed by lack of information on how they are experiencing and responding to climate change. Harvey, Saborio-Rodriguez, Martinez-Rodriguez, Viguera, Chain-Guadarama, Vigola & Alpizar (2018). It is noted therefore that smallholder farmers are at higher risk than other sectors and need more engagement in climate change education. Harvey et al., (2018) further propounds that more information is needed on how different types of smallholder farmers vary in their perceptions and responses to climate change and how to tailor adaptation programs to different smallholder farmers' contexts. Climate crisis has brought about a need for governments to step up and disseminate information for assisting farmers. The climate crisis affects the subsistence farming, subsistence and food security (Sayed 2019).

2.8 NGOs role in empowering farmers

Climate change induced stress becomes more complex by lack of sufficient knowledge, infrastructure, organisation and resources that local populations and national governments need to cope with and adapt to climate change (FAO 2012). This shows that there is a need for urgent action to save millions of people around the globe who will be affected by impact of climate change. Knowledge is key in addressing climate change therefore NGOs role is to help farmers to have knowledge on climate change and how to address the impacts imposed by climate change to farmers. The ability to generate and use knowledge is one of the most important indicators of adaptive capacity as rich and diverse knowledge is expected to improve the robustness of decision (William, Fenton & Huq 2015). Knowledge also serves as springboard to successful implementation of adaptation and mitigation on the side of the NGO. Lack of facts on climate change and poor understanding of adaptation and mitigation strategies would put farmers in jeopardy and they will continue to be hard hit by adverse effects of climate change. NGOs are obliged to share knowledge on climate change with farmers. In some instances, knowledge is in the hands of people with vested interest who are not inclined to share

it (Olabuzal, Chiabai, Faudi & Neumann 2018). This act would become a major blow to farmers whose hopes are vested in the NGOs.

Infrastructure is one other important element in empowering farmers. Nijkamp (2008) defines infrastructure as immaterial public capital that includes knowledge networks, communication, education and culture. This does not disregard the physical infrastructure such as roads but for the purpose of this study the definition fits well into context. Farmers need the knowledge network in order to share how their fellow farmers elsewhere address the impacts of climate change.

Communication is also key as part of infrastructure because when it is effective farmers are able to give signals and warnings to their counter parts. Velentzas & Broni (2014) find communication as the act of delivering information with the spirit of building a shared understanding. In this instance farmers need to share understanding of climate change and its effects.

On the other hand, education is seen as a key player in empowering the farmers. It is through trainings and workshops when farmers acquire new knowledge on climate change. It is the transference of skills, knowledge and ideas on individuals, people or organisations for the purpose of equipping them to confront the challenges life presents (Anabaraonye, Okafor & Hope 2018). Poor access to material that would teach farmers about the causes of climate change seem to be rife.

Farmers are sometimes not aware what causes of climate change are. The natural causes and human causes. The natural causes of climate change come from variations in earth's orbit, variation in ocean circulation, variation in albedo of the continents, as well as variation in solar radiation. The human causes are results of deforestation, air pollution and poor agricultural practices such as bush burning, excess and wrong application of organic fertiliser, burning of fossil fuels, urbanisation, industrialisation and inefficient transport (Olufemi 2018). Farmers' education on the causes is very crucial as it gives them ammunition to fight against challenges such as climate change.

It is also important for farmers to rethink culture. Climate change in some way affects the cultural practices. It is also said that culture is dynamic and changes with time. The culture of

bush burning is an example of outdated cultural practices. Frese (2015) submits that cultural practices are shared ways seeing of how people usually behave in a culture. In other nations the bush is burned as a sign of new cropping season. This cultural practice is obsolete today as it is one way in which human beings induce climate change. By changing cultural practices farmers would be able to adapt to new methods of farming. In other to entirely empower farmers, organisation and resources have a significant role they play. Organisations that help farmers to cope with climate hazards are able to provide farmers with resources. Resource is something that can be used to help achieve an aim (Hornby 2015). Resources can range from physical, human to knowledge resources.

2.9 NGOs Role in Global Adaptation and Mitigation Programme

The TOPS (2017) program highlights key resources for farming practitioners. Although this programme is led by Save the Children's Fund, there are other NGOs such as CORE group (knowledge management), Food for the Hungry (social and behavioural change), Mercy Corps (agriculture and natural resources management) and TANGO International (monitoring and evaluation) that have been co-opted in TOPS program to assist farming practitioners.

The key resources that have been selected in this study are technology to enhance agro-ecological resilience and technical extension services. Under these key resource farming practitioners are given knowledge of key elements of resilient integrated seed system, understanding of technologies for more efficient and sustainable soil and water management and water shed management practices. Again the farming practitioners under this resource are given knowledge on practices of conservation agriculture which is the techniques that can be used by resource poor farmers to sustainably increase food production without further destroying soil and water resources. The farmers are also given knowledge on how to mitigate and adapt to climate change, with the inclusion of techniques for increasing farmers' and farming systems' resilience to climate change and approaches to improve capacity of systems to eliminate carbon.

TOPS program (2017) again provides farming practitioners with technical extension services. It helps farmers to improve access to technical information by using several technologies transfer methods that include training, visit extension, agricultural cascade education,

embedded services, information and technology farmer field schools, on farm trials and knowledge of proper training techniques for farmer groups and implementing strategies to address gender equity. The TOPS program appears to be beneficial to resource poor farmers who face the scourge of climate more than it be envisaged in the world.

2.10 NGOs and African Climate Change

In Africa NGOs have always played an important role in assisting African countries during humanitarian crisis such as drought and floods. They have also been effective in advocacy on development issues, encourage dialogues during political impasse, assisted information dissemination and awareness campaigns to mention but a few. They are receiving increasing recognition for the role they play in enhancing people's capacity to address climate and weather extremes and the impacts of climate change (Zillman 2009). However, Kirbyshire & Wilkinson (2018) argue that NGOs are still in their infancy with additional staff and skills being brought on board to support delivery. What this implies is that although NGOs are receiving recognition there is a lot that they must improve on in service delivery.

Africa is already experiencing the brunt of the impacts of climate change. Climate change has increased agronomic complexity and increased risks of shocks at the farm and community levels and this implies additional changes in crops, cropping patterns, timing, agronomic practices and seed needs (Binswanger-Mkhize 2009). IFAD has supported African farmers. One of the reasons for IFAD to support African farmers was because of the increase in rainfall variability therefore IFAD trained farmers on water management skills. IFAD launched a programme called Adaptation for Smallholder Agricultural Programme (ASAP). More than 41 African countries received benefits from this program (IFAD 2017).

2.11 Climate Change in Southern Africa

The increase in the global concentrations of GHGs in the atmosphere has led to changes in climate in Southern Africa (Lesolle 2012). The southern African region is seen as the most vulnerable regions in Africa. (IPCC 2007). Southern Africa in the last decades has been experiencing a warming trend. Schulze (2011) indicates that temperature changes may lead to changing patterns of rainfall, the spatial and temporal distributions of run off, soil moisture and groundwater reserves and an increase in the number of times droughts and floods will occur.

Southern Africa's problem appears to be water availability. Hulme, Doherty, Ngara, New, & Lister (2001) found out that for southern Africa temperatures during 1990s were higher than they were earlier in the century and are currently between 0.2 and 0.3 degrees Celsius warmer than the 1961-1990 average. This shows that southern Africa will in the near future face severe consequences of high temperatures. Mazvimavi (2008) has shown that the likely impact of climate change in southern Africa will be on the quality of water resources and their quantity as well.

This is a clear indication that there will be an outbreak of diseases and low production of food in the farms. Food security will be compromised. Water stress is therefore likely to be the major problem to human beings, animals and plants. Water stress is the impact of high water use relative to water availability (Kummu, Guillaume, Moel, Eisner, Florke, Porkka, Siebert, Veldkamp & Ward (2016). In southern Africa many people's livelihoods are on livestock and crop farming. Farmers including individuals will have to practice new ways of minimising water use in southern Africa since even rainfall will have decreased due to climate change. Mazvimavi (2011) has projected a 3-23 % decrease in rainfall under climate change in southern Africa. This calls for southern Africa to be ready to take measure such as rolling out safety-net programmes in drought prone areas, climate-resilient water supply projects; and monitoring household water insecurity in high risk locations.

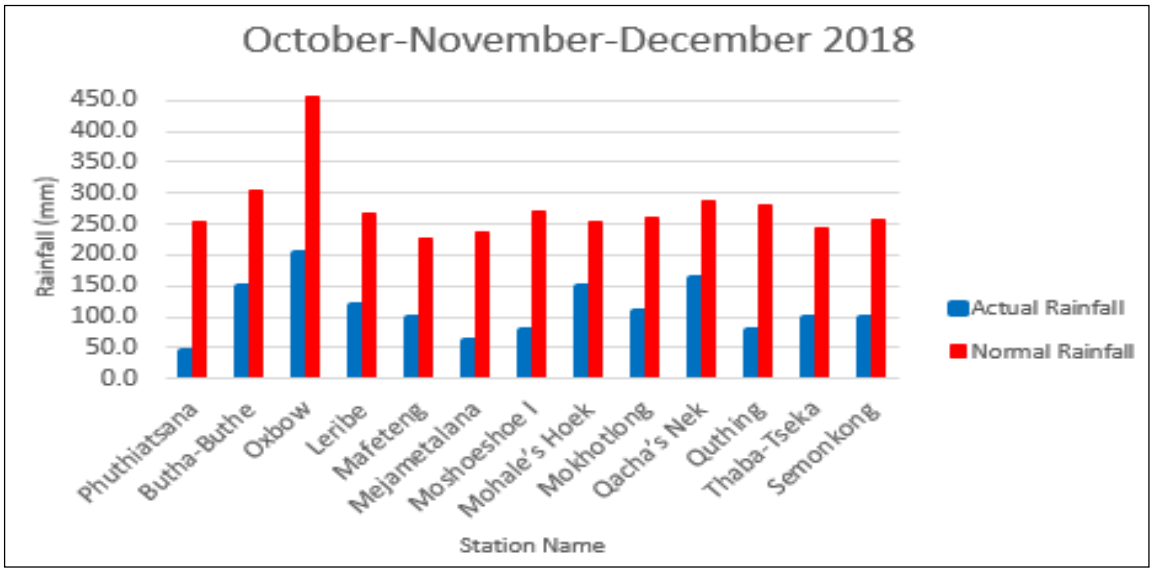
2.12 Agriculture and climate in Lesotho

Lesotho is a landlocked country that is entirely by South Africa with a population estimated to be 2 million. The impact of climate change is already felt in the country. The country is divided into 4 ecological zones which are the lowlands (17%), the foothills (15%), the mountains (59%) and the Senqu River Valley (9%). Lesotho is expected to experience a change in temperature and precipitation toward dryer and hotter conditions. Lesotho Climate Action (2015) reported that the water sector in Lesotho has already felt the impact of climate change since springs have become dry while subsistence farming dwindled owing to drought.

Thobei, Sutarno & Komariah (2014) show that climate in Lesotho is moderate with the average rainfall over the whole country ranges from 300mm to 1300 mm. However, Lesotho has been

experiencing high temperatures due to climate change that led to a serious decline late onset of rainfalls hence the decline in agricultural production.

Reizebos and Chakela (1985) had warned that the tempearture regime would be a hindrance for yearly crops particularly the frost that came early in the spring or in fall that formed significant climatic factors that determined agricultural potentials. Lesotho Meteorological Services (2018) reported that in October 2018 the whole country saw a poor start with a Southern and western lowlands seeing extremely minimal rainfall that is from Butha Buthe to Quthing with latter the worst. This means Leribe district, one of the districts that used to be the food basket of Lesotho suffered the decline of rainfall and this let to the district losing its status of being the "food basket".



Source: Lesotho Meteological Services 2019

Figure 2.2: The three months (October-Decmber) actual and normal rainfall at district level.

IPCC (2014) highlighted that the majority of the world would be likely to see negative impacts on food security as disrupted farming could result in decline of crop yields in many regions. Thobei, Surtano & Komariah (2014) spelt out that no region was ruled out of the impacts of climate change in particular poor countries like Lesotho whose people depended primarily on natural resources to survive and are the most likely to be hard hit by climate change. Figure 3

shows a serious decline to around 100 mm in the months that are termed as summer cropping months in Lesotho. Farmers have been disrupted by this decline in rainfall and have sort assistance from NGOs to guide the farmers on how to adapt to climate change.

2.13 FARMERS CLIMATE CHANGE ADAPTATION IN LESOTHO

As climate change has attracted the attention of the world, Lesotho has benefitted from the intervention by International Non Governmental Organisations to adapt to new methods of agriculture. As Obiaoha (2010) puts it, the country has witnessed elongated drought and irregular seasonal rainfall pattern. For a nation whose source of livelihood and income for poor people is agriculture this has been a serious threat to their lives. FAO (2009) has shown that climate change was now needed more than anything else. Not only did FAO expressed concern on Lesotho attitude towards climate but other international organisations such as International Federation of Red Cross and Red Crescent Society (IFRCRCS) showed that there has been evidence of environmental deterioration as a result of climate change over the years. This helped Lesotho to adopt adaptation strategies.

2.13.1 Conservation Agriculture and Agroforestry in Lesotho

Lesotho has ten districts that have received support from NGOs with regard to improved seeds, input subsidies, trainings, information and knowledge sharing. IFRCRCS (2006) gives as an example that in Mafeteng two agricultural systems dubbed as conservation agriculture and agroforestry appeared to be preferred adaptation strategies for climate change. Dumanski (2006) define conservation agriculture as advancing production, protecting and improving land resources while agroforestry gives value addition and helps control, protect and enriching biodiversity.

Although studies have shown the two systems there are other systems that are adopted in the other districts of Lesotho. Sekaleli and Sebusi (2012) further give details on conservation agriculture and agroforestry. They say zero tillage(not ploughing at all) with other soil conservation practices are the mainstays of conservation agric while agroforestry systems are a better way of sequestering carbon from atmosphere and depositing it in the reservoir. As this study looks into role of NGOs in mitigation and adaptation to climatic change, the two systems appear to be helpful to farmers who suffer because of negative impact of climate change. If

climate change is not addressed and ecosystems are endangered, farmers will bear the brunt and realise no returns in their agricultural investments.

2.13. 2 Crop Diversification, Keyhole and Trench Gardens

UNDP (2015) warned that the effects of endangered ecosystems in Lesotho encompasses loss of vegatative cover and serious soil erosion. In their study Sekaleli and Sebusi have given other adaptationn strategies that farmers use. They are crop-diversification, keyhole and trench gardens (Sekaleli and Sebusi 2012). Crop diversification appears to be liked by farmers as it offers crop diversity while mixed farming results in desired protection against farming risk that does not leave behind climate related risk(FAO 2012).

The keyhole and Trench Gardens were introduced by Care Lesotho (Sekaleli & Sebusi 2012). Care Lesotho is a local non-governmental organisation. However there are other NGOs such as Rural Self Help Organisation that assisted rural farmers to adapt to clamatic changes. As Lesotho's climate change has hit negatively on water availability, the keyhole and trench gardens have been able to help farmers grow vegetables all year round in semi-arid climate as they enrich the soil and keep mositure(Sekaleli & Sebusi 2012).

2.14 FARMERS IN CLIMATE CHANGE MITIGATION IN LESOTHO

Mitigation is dealing with the causes of the problem that includes lessening greenhouse gas concerntrations in the atmosphere(FAO 2012). Mitigation is the most important one to achieve as it is a proactive measure.

Kongsager (2018) argues that mitigation used to be a global concern to be dealt with by the international community. This makes mitigation a challenging task to be achived by local people, particularly farmers. It is also a question of whether proper knowlegde is inculcated to farmers about mitigation. FAO (2009) brings about some information that agriculture contributes 13.5 % of total global GHG emissions. These include nitrous oxide from soils, methane from ruminant livestock digestion and burning of living and vegetation.

This is what the farmers should know but adaptation was given more priority. Kongsager (2018) further propounds that mitigation has less complexities as it also looks at larger emitters namely transport , industry, waste and housing.

Lesotho's arable land is 9%(Lelala et al. 2008). However that does not stop Lesotho from addressing climate change. The Green Climate Fund was established in 2012 to support mitigating climate change by 2020(UNDP). Lesotho's mitigation projects that are already implemented in the sectors including renewable energy have shown the significance of improving livelihoods of communities.

2.15 CONCLUSION

In this study**,** the World Bank's Empowerment Framework was used to understand the findings of the provided by the respondents. The framework has assisted in the understanding of support for farmers by NGOs during climate change impact. Climate change is a world-wide challenge and as such the researcher was able to benefit knowledge from the framework how NGOs can assist farmers faced with climate change impact.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

3.1. Introduction

This chapter provides a description of the study area and research methodology used. It further discusses the data collection methods used as well as the analytical approach of the study. The chapter also gives the limitations of the study and ethical considerations.

3.2. Study Area

The study area is Leribe district and located in the northern region of Lesotho. The Leribe district is the second largest district in Lesotho and has both industrial and administrative towns and several rural communities clustered in villages.

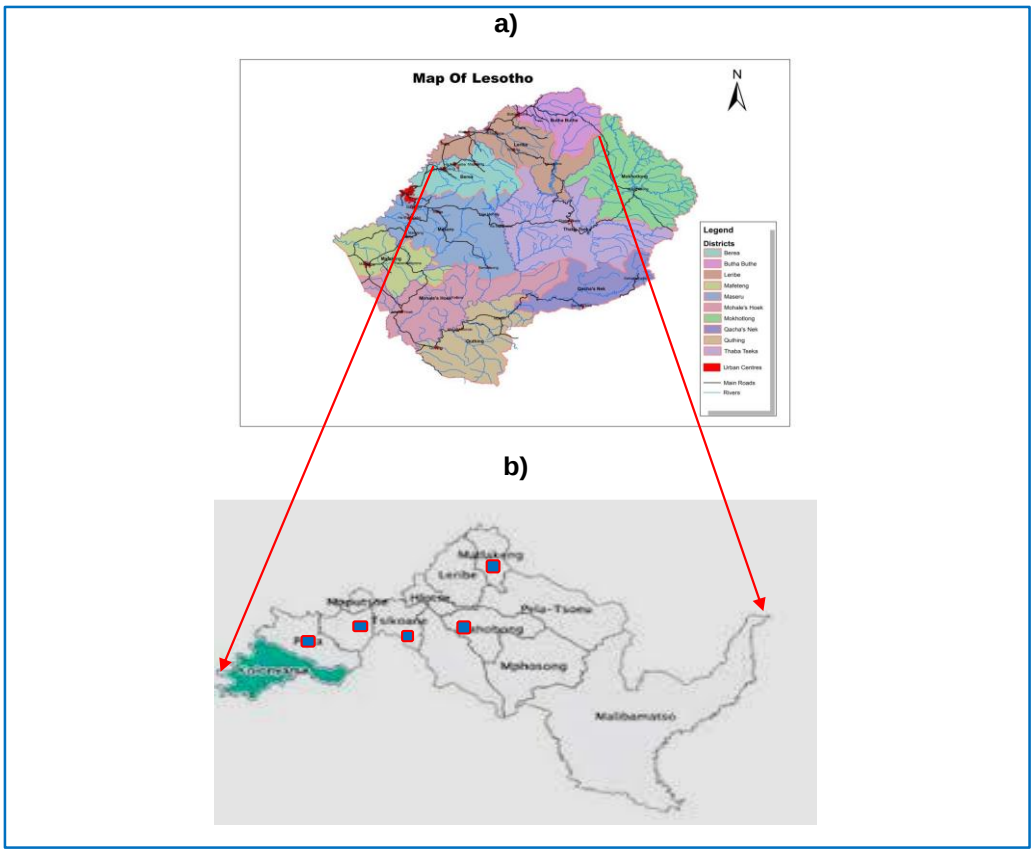


Figure 3.1: Study area showing: a) Lesotho map with districts, and b) Leribe district illustrating the 5 sampling villages ( ).

3.2.1. Location and Topography

The study focuses on Matlakeng, Mahobong, Peka, Tsikoane and Maputsoe constituencies in Leribe district. The Leribe district, which is one of the ten districts, and named as the food basket of the country due to its vast arable land potential. It is divided into 11 constituencies, which are also referred to as councils. Leribe has two urban councils (Hlotse and Maputsoe) and nine community councils, namely Tsikoane, Mahobong, Pela-Tsoeu, Likhetlane, Mphosong, Thaba-Phatsoa, Maliba-Mat'so, Leribe and Peka (Fig. 3.2b). Matlakeng, Leribe, Pela-Tsoeu, Mahobong and Mphosong Hlotse and Malibamat'so fall under one Principal Chief Joel Mot'soene while Maputsoe, Tsikoane, Peka, Likhetlane and Kolonyama fall under Principal Chief Pont'so Seoehla Mathealira. Rural communities under this study are Matlakeng, Tsikoane, Likhetlane, Mahobong and Peka. These rural communities share similar

characteristics as they are Basotho whose vernacular language is Sesotho and second language is English.

3.2.2. Demography

The total population of Leribe district is 337,521. Leribe district has the highest male population of the unemployed. It also has 16.4 percent of proportion to housing units and the average number of persons per room is 1.5. In the past ten years there were 145,024 males and 151, 649 female in the district. In Mahobong there were 9.448 males and 9, 758 females, Pela-Tsoeu 10, 637 males and 10, 783 females, Likhetlane 1, 818 males and 13, 962 females, Peka 10,221 males and 10, 472 females while Matlakeng was 10,397 males and 10, 697 females (MDAT, 2016). MDAT (2016) reports that in Leribe an estimated 8% of 21, 082 people (3.613 households) are at risk of not meeting their minimum food and non-food needs. It further shows that this population encompasses the very poor and poor population who represent about 49% of district population.

3.2.3. Climate

The study area has 1600 metres average elevation above the sea level. The summers are warm while the winters are short, cold and dry. The warm season only lasts for four months from November to March with high temperatures of 35^{o}C. Leribe receives major seasonal variation in monthly rainfall. The rainy period of the year only survives for 6 months from October to April. Most farmers own crop fields under rain-fed conditions and few farmers grow vegetables where irrigation is available. Leribe district is covered by croplands and the grassland used for communal grazing purposes. Lack of water is now a major challenge as farmers' mainly cultivated as dryland farming and hence the production level is very low, in particular during El Nino seasons.

3.2.4. Agriculture and Livestock Production

Leribe district's farming depends heavily on rainfall and currently there is limited irrigation practices by few semi-commercial farmers. Most of the irrigation schemes are no longer exist or operational as before. The farmers in the rural areas produce a variety of crops such as maize, wheat, sorghum, beans, green peas, cabbage as their main crops. There are however other crops

they grow such as rape, spinach, green pepper, carrots, beetroot, tomatoes, potatoes, radish, pumpkin, onion, chillies, watermelon and egg-plant as subsidiary crops. These are subsidiary because they are not necessarily meant to be primary source of food. LVAC indicated that there was a decline in cereal production in Leribe by 10%. Farmers in the rural area of Leribe keep livestock which comprise sheep, goats, donkeys, pigs, horses, poultry and traditional chickens. There were about 98564 cattle, 10670 sheep, 72468 goats, and 6750 pigs in 2004/05 agricultural year (Pheko 2004). The livestock census information show a 9% national decrease in number of goats and sheep and a 25% decrease in cattle (MDAT 2016). According Mekbib, Olaleye, Mokhothu, Johane, Tilai & Wondimu (2012) livestock in Lesotho are homestead for half of the year because of changes in seasons, management practices and risk of theft. They further say farmers have no of practice of fodder husbandry on arable land or conserving fodder as silage or hay.

The Ministry of Agriculture and Food Security in Lesotho is providing training to farmers through their District Agricultural Offices (DAO) on good care of livestock and crops. NGOs such as RSDA have formed forums in districts to form associations and collaborate with DAOs to give continuous support to farmers.

3.3 Research Design

The research methodology used in the study is a mixed approach. It allows for hypothesis testing and hypothesis generation in a single study. Data was collected using quantitative and quantitative approaches. In the constituencies, there are several villages that form a constituency and those villages are also referred to as electoral divisions. The study focused on five constituencies in Leribe district. The NGOs did food security intervention through improved seed distribution, afforestation, seedling distribution and also provided training on climate smart animal and crop farming for farmers as some of the activities of NGOs to assist farmers in mitigation of climate change impact. In this study, selected beneficiaries or farmers per village in each constituency participated and it was a total of sixty participants for all constituencies and five from NGO.

Since this study involved farmers, it was not easy to study the entire population of farmers in Lesotho. Only a sample of small holder farmers engaged in crop and animal farming was

selected to participate in this study. Again, supervisors from NGOs and their officials were interviewed. Also, questionnaires were given to farmers respond to research questions. All these respondents were selected from a sampling frame which is a list of population elements. The researcher will use quota sampling. The researcher purposely selected respondents from identified strata until the planned number of subjects was reached (Grey 2004). In this study, the researcher stratified the respondents according to landholding, status, and education until each stratum was filled to a chosen level. According to Grey (2004) this approach has an advantage of each group being of equal size hence important for certain inferential statistical tests.

3.4. Data Collection

Neuman (2011) explains data collection phase in research as the stage in which the researcher gathers information related to specific context. In this study the researcher collected both quantitative and qualitative data through questionnaires, semi structured interviews and focus group discussion in order to achieve the objectives of the study.

3.4.1 Semi-structured Interviews

As this is also a qualitative study, semi-interviews were applied. These type of interviews are not standardised (Grey 2004). The advantage of semi-structured interviews is that it permits for probing of views and opinions where the researcher wants the respondent to expand on their answers. In this study data from the key informants was collected through semi-structured interviews. The semi-structured interviews helped reveal the important underlying factors and helped to answer the research questions. The interviews significance enabled participants to discuss their interpretations of the world in which they live and express how they regard situations from their own point of view (Cohen, Manion & Morrison 2007). In this research, the participants such as the key informants who are the employees of the NGOs, NGO beneficiaries, and projects supervisors were interviewed to give their experience when working with the farmers in the rural areas. Although interviews maybe expensive in terms of time and open to interviewer bias they are a powerful tool for the researcher (Cohen et al. 2007).

3.4.2. Questionnaires

Another implement to use in data collection is the questionnaires which will help in finding statistical value. The researcher administered self-administered questionnaires. The researcher administered questionnaires for projects beneficiaries who might need further description where they struggle with understanding in the process. The self-administered questionnaires were given to NGOs beneficiaries. Questionnaires have several advantages for instance they are low cost on time and money and the inflow of data is quick and from many people. Another advantage is that data analysis of closed questions is fairly simple and questions can easily be coded (Grey 2004). These are a few reasons why in this study the researcher opted to collect data using this tool.

3.4.3. Focus Group Discussions

The focus group discussion was also used to collect data from farmers or beneficiaries of NGO. Focus groups are a form of group interviews (Cohen et al. 2007). Focus groups are discreetly planned discussions designed to obtain perceptions on a defined area of interest in a free, safe environment (Litosseli 2003). In this study, the researcher looked for knowledge and awareness participants have on the effects of climate change as well as how they perceive the intervention of the NGOs. The focus groups comprised of forum leaders. According to Cohen et al., (2007) focus groups bring together a specifically chosen sector of the population to discuss a particular given topic where the interaction with leads to data and outcomes. Focus groups are time-saving and bring about significant amount of data in short space of time. They are also important for gathering data on attitudes, values and opinions and empower participants to speak out and their own words (Cohen et al. 2007).

3.5. Data Analysis

The researcher used convergent parallel design which involves quantitative data collection and analysis followed by qualitative data collection and analysis and thereafter comparing and relating followed by interpretation. Analysis involved the process of breaking down data into smaller units to reveal their characteristic elements and structure (De Vos, Strydom, Fouche and Delport 2011).

3.5.1. Data Capturing and Analysis

Descriptive analysis was employed in this study. According to Sarantakos (2005), descriptive analysis is about counting the number of times certain elements of the research question and comparing with other elements. SPSS version 16.0 was used to analyse data collected. Descriptive, frequencies and cross tabulations were employed and the results were presented in the form of charts and tables. The qualitative data was collected through semi-structured interviews and focus group discussions were audio recorded and then transcribed. The transcriptions from the audio-recorded responses were also compared and analysed for patterns and themes which could emerge. The data was analysed using triangulation and the results were interpreted from the quantitative data as well.

3.6. Research Ethics

Ethics is an issue that must be considered at every step of research design and implementation process (Ogletree and Kawulich 2010). It was important for the researcher in this study to take into consideration ethical issues that affect the informants. Ethical aspects that the researcher observed included permission approval, informed consent, confidentiality, and honest publication of findings.

3.6.1 Permission Approval

The researcher sought permission approval from the authority at RSDA headquarters in Maseru to enable the researcher to conduct the study in Leribe district. The permission letter was also used to enable the researcher to meet associations.

3.6.2 Informed Consent

The respondents were informed of the purpose of the study before being requested to voluntarily participate in the study. The researcher of their right to refuse participation in the study or withdrawing any time they felt uncomfortable about their participation. Upon agreement consent forms to the participants to append their signatures to ensure compliance and full understanding of their anticipated participation in the study.

3.6.3. Confidentiality

The researcher assured the respondents that the information they have provided would not be used for any other purpose other than that of the study. Other people apart from the researcher had no access to the respondents' information. The audio tapes were clouded and kept in computer file. They will be destroyed later after the study is completed.

3.6.4 Honest Publication of Findings

Louw (2014) asserts that apart from observing ethical issues concerning the respondents, there are ethical issues that concern data analysis and reporting that the respondent should be cautious of. Falsifying information, distorting results and permitting bias to influence interpretation of results are examples of unethical issues. For the sake of this study the researcher presented the research findings in the manner that reflected the real responses of the respondents.

3.7 Scope and Limitations of the study

Several other villages apart from the ones selected for the study that have been affected by climate change in Leribe district benefitted from NGOs intervention but it would be expensive and time consuming for the researcher to conduct a study in all the villages in each constituency. The Leribe district has been supported by many NGOs as it is the food basket hence the study is focusing on this district. The other districts, although have experienced effects of climate, a number of NGOs such as World Vision, Action Lesotho and FAO have done interventions to mitigate the effects of climate change. The study has used RSDA as a single NGO and as such the study findings cannot be used to generalise the roles of NGOs in assisting rural communities' farmers in adaptation and mitigation of climate change.

The researcher has also chosen not to use open-ended interviews in order to avoid letting participants go astray when responding to questions and the researcher has not used face-to-face interviews for the farmers as they are too many in number and that would take a longer time to conclude the study. Again, in this study the literature the researcher has chosen to review is not about causes of climate change but the effects of climate as it is the main focus of the study.

3.8 Conclusion

This chapter outlined the research design which entailed the research methodology employed in data collection. Various data collection methods have been discussed and justified as an indication that their use in this study is appropriate to the study. Data processing and data analysis aspects were elaborated in this chapter. The ethical issues have been specifically addressed and the likely threats to the study were discussed.

CHAPTER 4

FINDINGS AND DISCUSSION

4.1 Introduction

The findings and analysis found in the data collected using key informants' interviews, NGO beneficiaries' questionnaires, and focus groups discussions will be presented in a detailed structure. The findings are presented in charts, graphs and tables while the synopsis of the results is given according to the objectives of the study. The study objectives are to explore the role of NGOs intervention in adaptation and mitigation of climate change in rural communities. The overall findings, challenges NGOs interventions face when assisting rural communities during the effect of climate change. Assessments are performed to study the contribution of NGOs in response to the impacts of climate change in rural communities.

The chapter consists of four sections. The first section focuses on demographic and socio-economic data and followed by the discussion of livelihood strategies and the third section presents adaptation strategies while fourth section looks into mitigation strategies and how they are used to avoid extremely negative impacts of the climate change on farmers' livelihood in the study area of Leribe district, Lesotho.

4.2 Demographic characteristics

In order to find out the real impact of climate change in the rural areas the demographics of the rural population play a significant role. The majority of the people in the rural areas are often poor farmers and need to be assisted as highly exposed to climate change effects. According to the empowerment framework people are generally left out from participating in institutions that make the decisions and run the resources that affect their lives (World Bank 2002). An analysis of the peoples' gender, age, and position in the household will assist in understanding them, what they want and how they can be assisted. The socio-economic data that include employment status and occupation of beneficiary will help as empowerment approach is often

on the side of those excluded to have equal access to resources during the time when climate change has negatively impacted on farmers lives. Rural communities' farmers' demographic and socio-economic data have a bearing on how impacts that are negative are addressed during climate shocks. The demographic characteristics and socio economic data are presented in Table 4.1.

Table 4.1: Demographic and socioeconomic profiles of the participants in the study area, in Leribe district

Household participant characteristics		**Frequency**	**Percentage**
Sex	Male	24	40.1%
	Female	36	59.9%
Marital status	Married	50	83%
	Single	4	7%
	Divorced	4	7%
	Never married	0	-
	Widowed	2	3%
Age groups	21-30	1	8.2%
	31-40	6	16.4%
	41-50	4	18.0%
	51-60	14	23.0%
	61 & above	23	37.8%

Position in HH	Father	22	83.6%
	Mather	33	54.1%
	Son	2	3.3%
	Daughter	3	4.9%
Head of household	Yes	38	52.3%
	No	22	36.1%
Household members			
	Live alone		
	1 to 2 people	7	14.6%
	2 to 4 people	10	20.8%
	4 to 6 people	21	43.8%
	6 & above	6	12.5%
Educational level	Primary	13	27.1%
	Higher	22	45.8%
	Diploma	8	16.7%
	Bachelor’s degree	5	10.4%
Employment status	Employed	4.9%	4.9%
	Self employed	59.0%	59.0%

	Not employed	27.9%	27.9%
	Retired	8.2%	8.2%
Occupation	Farmer	54	88.5%
	Civil servant	0	-
	Business man	6	9.8%

In Table 4.1, Leribe district shows a shift in the number of women who participate in the farming system in the 2018/2019 agricultural season. Women appear to be more active than men in agricultural practice. The 60% of women participating in farming in Leribe are able to assist their families to survive even in the advent of climate change. Women are actively involved in agriculture in Leribe because most men come home sick from the mines in South Africa and are unable to survive long hot and dry days in their agricultural fields. It could also be observed from Table 4.1 that women are breadwinners and ensure that food is put on the table. Although climate change negatively affects participation in agriculture, women are more resilient than men.

Table 4.1 shows the age of the farmers who are actively involved in agricultural practices in the Leribe district. The farmers who are above sixty years are the ones who endure the long hot days in the fields while it is only a few number of young generation who take part in agriculture. It can be observed from the figure above that the majority who are at the age of 60 have reached a retirement age. 8.2 % appears to be young energetic people who are less involved in farming. During climate change impacts, long hot days have health hazards and the retired people who have turned to farming are unable to continue with farming work due to fatigue. The farmers attributed lack of participation by young people to little or no motivation by the government to encourage young people to participate in agriculture. The only way for the retired to continue living after retirement is by farming.

Farmers were asked about their positions in the households. This was in line with their roles in the households to see where they are in terms of power relations in the households. The highest percentage that accounted for 54.1% appeared to be mothers. They were followed by fathers

who only accounted for 36.%. Between 3% and 5% is daughters and sons. This indicates that those who see to it that there is food on the table in the household is the mother and the father. The children in the household are less likely to take the role of winning the bread in the household. Even in the advent of negative impacts of climate change where there is food shortage sons and daughters perceive agricultural practice as the role of their parents. The results show that there is a responsibility gap between parents and children in the household on how as households they should join efforts to work in the fields and secure food for the household. Climate change again affects food security and as a result there should be more participation in agriculture than before.

In relation to the household position, 62% of the farmers appeared to be heads of households while 37 % showed that they were not heads of the household. The household head would be responsible for ensuring the survival of the family. The highest percentage of responses that they are heads of household shows that those who are engaged in farming are even accountable for meeting either food or non-food needs of the household.

In Table 4.1 83% shows that they are still living in matrimony. Only 7% indicated they are single with little or no responsibility to fend for children in the household. The 90% respondents are an indication that a lot of people who in farming have the responsibility to provide food for their households. Their participation in farming is a safety net particularly in the mist of lack of employment which would provide them with monthly income to buy food and other needs for their households.

4.3 Socio-economic data

The status of farmers in relation to employment in Table 4.1 shows that 59% of farmers are self-employed while 27.9% shows that they are absolutely unemployed. This indicates that farmers that are unemployed and self-employed will need to be given more assistance in order to have farming implements and access to information. They rely heavily on Ministry of Agriculture and Non-governmental organization to get information on climate smart agriculture. Those who are employed formally and retired have an opportunity to buy implements and can access information via mobile phones and satellite dishes in their households or pay for their transport fares to attend trainings and workshops. The disadvantage

is that they are few in number therefore have little or no effect in improving farming. The self-employed are the majority and they sometimes miss important trainings and workshops on climate smart agriculture when they are held far away from their places. In Leribe, workshops are held in Hlotse (the administrative town of Leribe) and that is where Agricultural offices are situated. Transport costs are heavy and inhibit farmers who come a few kilometres away to attend trainings and workshops. Unemployed and self-employed farmers get micro cash loans from friends while Non-governmental organizations that train, hold workshops and supply with farming implements refund them after meetings, trainings and workshops.

In Table 4.1 88% of those who benefitted from the assistance given by Non-governmental organizations are mostly farmers. The other beneficiaries include businessmen who only account 9% and not very serious farmers who only account for 1.6 %. Leribe is the food basket of Lesotho and there is good arable land as compared to other districts in Lesotho. The high percentage of occupation of the beneficiaries of Non-governmental organization as farmers is attributed to the good arable land found the study area. The farmers who benefit from NGOs are mostly subsistence farmers who do low scale commercial farming. The farmers who are assisted by NGOs farm with the aim of commercializing surplus produce but climate change has forced farmers to have little production that is only for household consumption. The businessmen who are also assisted by NGOs in farming also encounter the challenge of low production that is brought by climate change.

4.4 Livelihood Strategies

The farmers were asked whether their livelihood strategies were: livestock farming, crop farming, mixed farming and or business among many others. Livelihood strategies are perceived as sources of income that help farmers' households be able to sustain a living. If a farmer manages to go for mixed farming it is clear that the farmer will be able to sustain one strategy if the other one fails. It is a kind of fail-safe practice that allows the farmer to survive in the midst of climate change. In figure 4.1 49% of Leribe farmers practice mixed farming followed by crop farming. This shows farmers prefer to keep livestock as well as crops because that helps them to make silage and fodder for their livestock. Although livestock as a livelihood strategy accounts for only 11% it helps in transportation of goods, transportation of water and in other cultural practices. Sometimes farmers pay for their children's school fees by selling

livestock when crops have failed to give a good yield that can be sold for financial security. Due to the Leribe district's arable crop farming appears to be doing well than livestock. Assistance by NGOs through climate smart farming practices such as keyhole and conservation agriculture yields positive results. Through training and supervision by employees of NGOs farmers survive the impact of climate change. It indicates that farmers have not succumbed to climate hazards as NGOs equip them with ways to mitigate impacts of climate change.

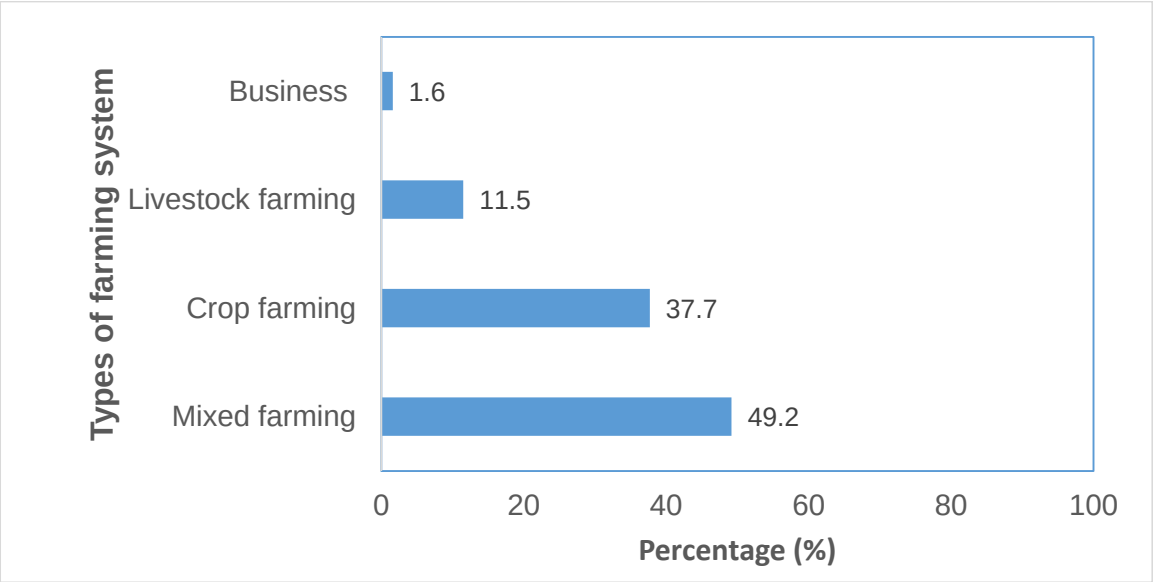


Figure 4.1: Livelihood strategies based on the framing systems

4.5 Livestock ownership

The results in Figure 4.2 show the number of livestock reared by farmers that range from pigs to donkey. The most common livestock among farmers in the Leribe district is cattle which accounts for 36 %. The least reared are layers that account for 2%. Cattle are important for ploughing in the fields and are used in marriage ceremonies, milk, meat and nowadays farmers sell them for cash. Cattle are easy to maintain and also able to resist impact of climate change impact more than other livestock. Poultry follows cattle in terms of being owned because farmers show that poultry is also not difficult to maintain. It is easy to feed when there is good maize production. As maize is the staple food, many farmers grow it and it is crushed and mixed for feeding poultry. Broilers and layers are indicated to be vulnerable to climate change and require a lot of care. When it is hot they require cooling system and when it is too cold they require warmth. With the climate variability farmers feel it is a problem and expensive to

manage broilers and layers. Cattle appear to be mostly favoured livestock for food and income generation.

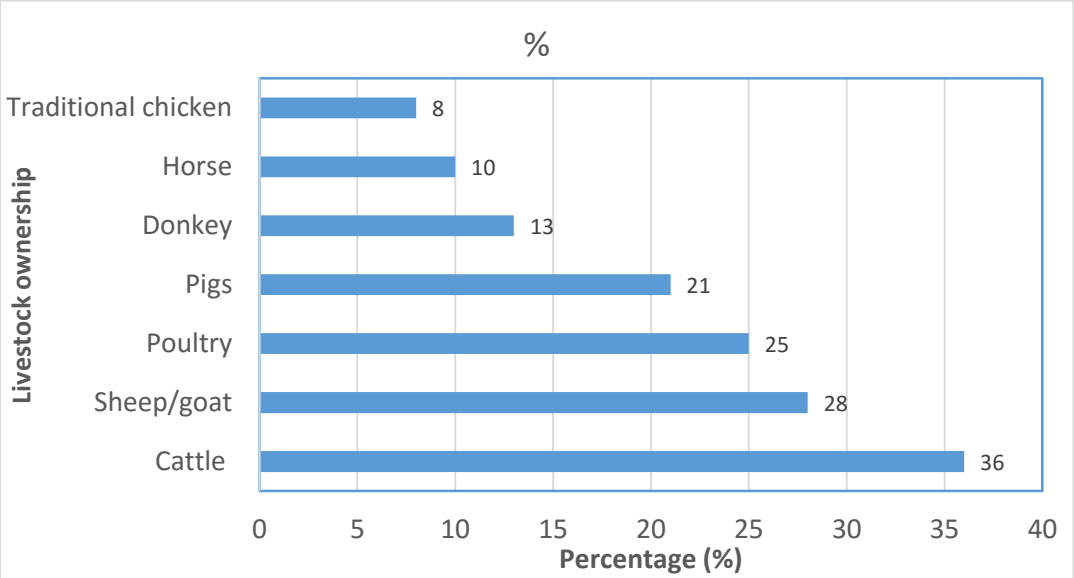


Figure 4.2 Number of livestock owned by the respondents

4.6 Types of crops grown

The results in figure 4.3 give a picture of the crops that the farmers grow in the study area. The top three crops that are grown by the farmers are maize (67%), cabbage (38%) and beans (48%). Maize is grown in high quantities because of fertile land and good rains in summer cropping. Farmers prefer maize to sorghum as maize is the staple food and make more money. Sorghum can still do well but maize by virtue of being staple food gets priority. Other crops that appear to be in competition with maize production in terms of production are spinach, cabbage and tomatoes. The introduction of climate smart agricultural systems by NGOs has improved the productive capacity of farmers. Farmers appear to be understanding the new agricultural technologies and produce in huge quantities. However, apples, peaches, watermelon are least grown farmers in Leribe.

Table 4.2: Different types of crops growing in the study area by respondents in percentile

Cereal crops	**%**	**Legume**	**%**	**vegetables**	**%**	**Root crops**	**%**	**Fruits/ Others**	**%**
Maize	67	Beans	48	Cabbage	38	Carrot	13	Apple	2
Sorghum	36	Peas	2	Spinach	44	Potato	7	Peach	2
Wheat	7	Green Beans	5	Mustard	5	Radish	10	Fodder	2
Millet	2	-	-	Rape seed	23	Beetroot	10	-	-
-	-	-	-	Pepper	18	-	-	-	-

4.7 Comparison of crop yield during growing seasons

The five-year period was used to make a linear comparison of yields per planting season. The farmers were asked to use records of their yield from 2015 in order to determine the success or failure in terms of output in their farming. The most common crops such as maize, sorghum and beans gave a steady increase in production in three consecutive years. In 2015/16 and 2016/17 cropping seasons Maize production eight farmers produced more than 800 kilograms. 2015/16 agriculture was a year when El Nino Southern Oscillation (ENSO) had hit Southern Africa and there was drought. This caused farmers a great deal as the output in the crop production was very low. The low rainfall and high temperatures had a negative impact on crop production and resulted in high food insecurity. However, in 2017 and 2018 there was a slight improvement in maize production as it increased by 61% and 54% when compared to 2015. Although there was late onset of rains farmers were able produce Maize with a slight improvement in their production. In this study it is evident that Sorghum and beans have proven to achieve better output albeit negative impact of climate change. In 2015/16 agricultural year sorghum maintained more or less similar output as the yield was good. This indicates that even in the midst of ENSO sorghum is a crop that can be drought resistant. Even in the following years 2017 and 2018 sorghum gave a higher production than before. The late

onset of rains and high temperatures have shown that framers are likely to switch from growing maize to sorghum. Wheat also gave good yield as in all the agricultural years from 2015 to 2018 it has been consistently giving good production. It gave 98%, 97%, 98% and 98% respectively. The main advantage of the two crops wheat and sorghum they do not require high quantities of water like maize. Farmers have resorted to producing wheat and beans more than maize as way of coping with climate change.

Bean production has shown a consistent increase in production. In 2015 they accounted for 66%, in 2016 for 67% and 2017 71%. Between 2017 and 2018 there was a slight decline as they dropped by 4 %. The slight drop is attributed to the high increase in sorghum and wheat as drought resistant crops. Farmers perceive maize as dropping out the league for staple food due to climate change.

Table 4.3: Comparison of crop and vegetables yield during the growing season 2015/16 – 2017/2018

a)

Cropping season (2015/16)	**Kg (I bag = 50kg)**							
	<50kg	**100-200**	**201-300**	**301-400**	**401-500**	**501-700**	**>800**	**Don't know**
Cereal crops								
- Maize	0	5	9	3	4	3	8	28
- Sorghum	0	3	3	5	1	0	2	46
- Wheat	0	0	0	1	0	0	0	59
- Millet	0	0	0	0	0	0	1	60
- Beans	6	0	5	3	0	1	6	39
Vegetables								
- Cabbage	1	5	4	2	0	0	9	39
- Spinach	5	8	0	1	0	0	2	44
- Carrots	5	2	1	0	0	0	0	52
- Beetroot	3	2	0	1	1	0	0	53
- Tomatoes	0	1	4	1	0	0	11	43

b)

Cropping season (2016/17)	Kg (I bag = 50kg)							
	<50kg	100-200	201-300	301-400	401-500	501-700	>800	Don't know
Cereal crops								
- Maize	1	4	5	6	1	0	7	37
- Sorghum	1	2	6	1	1	0	1	49
- Wheat	0	0	0	0	0	0	1	60
- Millet	5	3	4	1	2	1	2	43
- Beans	1	0	0	0	0	0	0	60
Vegetables								
- Cabbage	7	5	1	1	0	0	2	45
- Spinach	4	4	0	0	0	1	0	52
- Carrots	4	1	4	2	0	0	9	43
- Beetroot	2	0	0	0	0	0	0	60
- Tomatoes	1	1	1	0	0	0	0	58

c)

Cropping season (2017/18)	Kg (I bag = 50kg)							
	<50kg	100-200	201-300	301-400	401-500	501-700	>800	Don't know
Cereal crops								
- Maize	2	5	7	5	0	0	9	33
- Sorghum	2	1	3	1	0	1	0	53
- Wheat	0	0	0	0	0	0	1	60
- Millet	0	0	0	1	0	0	0	60
- Beans	5	5	2	2	0	0	7	40
Vegetables								
- Cabbage	5	5	2	1	0	2	1	45
- Spinach	5	7	0	1	0	0	3	45
- Carrots	2	4	1	0	0	0	0	54
- Beetroot	4	2	0	0	0	0	0	55
- Tomatoes	1	4	2	1	1	0	4	48

Farming in Leribe is rain-fed therefore lack of rain water and high temperatures put the future of maize production in a disadvantaged position. In some cases, farmers did not have proper records of their yields and this made most them guess how much yield they had on each crop. Again lack of knowledge of measurement of yield posed a major challenge in quantifying farmers produce. In crops such as cabbage, butternut, rape, beetroot, carrots and other the researcher and farmers could only imagine the kilograms of a bag of each crop and then use multiplication to give an approximate quantity of produce. For 2019 the study was conducted

before there could be any yield therefore it was difficult to give an estimation of yield. Growing crops for either subsistence or commercial purposes faces a major challenge posed by climate change. Table 4.3 shows that low rainfall affects the production of vegetables to a great extent. Farmers feel that low rainfall results in no water to water their vegetables. Their understanding is that climate change leads to low rainfall and low rainfall means little or no water for watering the plants. The farmers worry is that if it does not rain water sources such as dams, boreholes, rivers become dry and that negatively affects their production. Also the increase in temperature affects their vegetables as they dry up quickly and fail to grow. Other than climate change as a phenomenon, pests, weeds, inadequate resources and lack of market farmers indicate that those are not contributing factors to decrease in crop and vegetable production and shows that farmers do not connect lack of rainfall and high temperature to climate change. The respondents strongly showed concern about low rainfall and not necessarily climate change. However, Table 4.4 shows that temperature increase and low rainfall are connected and low of rainfall is attributed to increasing temperatures.

Flooding has not been viewed by the respondents as the main cause of low yield in crops. The climate change effect and inadequate resources affect the crop production in the study area. OCHA (2019) alluded to the fact that watering points for agriculture have tried up in many places. Climate change effect has therefore depleted water resources and a result production is faced with crisis. However, respondents showed that weed and no market have no impact on fluctuating crop production except for the resources that are essential for increasing production.

Table 4. 4: Reasons for fluctuating cultivated crops

Reasons fluctuating of cultivated crops	**Say- YES**	**Say-NO**	**No-Response**
Climate change Effect	9	47	5
Low rainfall	51	5	5
Flooding	0	56	5
Temperature Increase	17	39	5
Disease / Pests	4	52	5
Weeds / infestation	1	55	5
Inadequate resources	7	49	5
No market supply	1	55	5

4.8 Livestock owned currently and the last 5 years

Table 4.5 indicates the percentage increase or decrease of animals that are reared by farmers between 2015 and 2019. Leribe's abundant grazing land has helped farmers to keep livestock in the foothills. Climate change impact did not badly affect livestock farmers. There has been a trend of increase in animals although climate change impact was felt in 2015. The water sources for animals to drink went dry but farmers were able to maintain their livestock. Cattle in the past five have remained the same by 60.7 %. Sheep also remained in the same position of 82 %. Donkeys increased from 85% to 90 %. Donkeys are a good source of transport in the rural areas. Table 4.5 shows that Leribe did experience a heavy loss livestock when faced with negative impacts of climate change.

Table 4.5: Currently livestock owned by respondents in comparison with last years

Livestock owned by respondents	1 - 10		11 - 20		21 – 30		31 - 40		41 - 50		>50		No Information	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Pigs past 5 years.	11	18	3	4.9	2	3.3	0	0	0	0	1	1.6	44	72.1
Current pigs	14	23	1	2	0	0	0	0	0	0	1	1.6	45	73.8
Poultry past 5 years	1	1.6	0	0	1	1.6	0	0	1	1.6	8	13	50	82
Current no.	1	1.6	1	1.6	0	0	0	0	2	3.3	5	8.2	52	85.2
Cattle past 5 years	18	29.5	6	9.8	0	0	0	0	0	0	0	0	37	60.7
Current no.	22	36.1	2	3.3	0	0	0	0	0	0	0	0	37	60.7
Horses past 5 years	8	13.1	1	1.6	0	0	0	0	0	0	0	0	52	85.2
Current no.	8	13.1	0	0	0	0	0	0	0	0	0	0	53	86.9
Donkeys past 5 years	9	14.8	0	0	0	0	0	0	0	0	0	0	52	85.2
Current no.	6	9.8	0	0	0	0	0	0	0	0	0	0	55	90.2
Sheep past 5years	6	9.8	0	0	0	0	3	4.9	0	0	2	3.3	50	82
Current no.	5	8.2	2	3.3	2	3.3	1	1.6	1	1.6	0	0	50	82
Goats past 5 years	2	3.3	0	0	0	0	1	1.6	1	1.6	2	3.3	55	90.2
Current no.	2	3.3	1	1.6	0	0	0	0	1	1.6	2	3.3	55	90.2
Chickens past 5 years	0	0	2	3.3	4	6.6	0	0	0	0	2	3.3	53	86.9
Currents no.	2	3.3	2	3.3	1	1.6	0	0	2	3.3	1	1.6	53	86.9

Table 4.6 gives a range of reasons for the decrease and or increase of livestock when they are faced with negative impacts of climate change. Climate change has either positive or negative impacts. Many farmers gave a variety of reasons for either increase or decrease for their livestock. Amongst the reasons for the increase of livestock during climate change farmers attribute it to their good care of livestock. They showed that due to climate change they opted for growing fodder and silage to feed their livestock. Another reason for increase has been that farmers did not slaughter animals for eating and only a few reported thefts in Leribe district. For those who indicated decrease they attribute the decrease to selling them for reasons such as paying school fees and running family matters. They say even if the climate had not changed they would still sell livestock because they keep it for many purposes. Factors such as drought, low rainfall, hotness, no feeds and increased rainfall appear not be the main reasons for fluctuating numbers of livestock to majority of farmers. The main cause of increase is attributable to good care and for decrease is selling for domestic purposes. Climate change has not had a major contribution to the decrease of animals. Farmers' understanding of livestock is that it will increase or decrease because they are raised either for business or domestic purposes and based on that they will fluctuate depending on whether they have achieved what livestock is raised for or not.

Table 4.6: Reasons for fluctuating of animal numbers in the study area

Reasons fluctuating in Number of animal	**Say- YES**	**Say-NO**	**No-Response**
- Climate change effect	5	32	23
- Low Rainfall	2	36	23
- Flooding	0	38	23
- Heat Stress	2	36	23
- Drought	4	34	23
- Slaughtering	7	31	23
- Diseases /infections	7	31	23
- Ticks / worms	0	38	23
- Selling livestock	15	23	23
- Theft incidences	1	37	23
- Feed Shortage	1	37	23
- Lobola/burial	5	33	23

4.9 Climate Change Awareness and Knowledge

4.9.1 Farmers Awareness to climate change

The majority of the farmers who participated in the study have indicated seeing effects of climate change. 87% of farmers show that they can see that the climate has changed. It is only 11% that say they are not aware of the fact that the climate has changed. However, a small portion of farmers (2%) did not have answers to say whether they are aware or not. This shows that awareness has been raised on climate change in relation to responses of the farmers. Awareness is an important aspect as it makes a person account for their actions. Farmers who are aware but delay to act accordingly are not yet empowered. Awareness says people act in a manner that they are fully cognizant of the consequences of their actions. This study anticipates that when farmers are aware of climate change they have the capacity to survive negative impacts of climate change because their being aware helps them to practice agriculture in a manner that will not lower their productivity.

4.9.2 Knowledge of Climate Change

Figure 4.7 highlights that farmers knew about climate change in various ways that include meetings, experiential knowledge, media, own observation, natural events and through school. It is evident from the above figure that meetings and workshops have a major share in terms of imparting knowledge to farmers about climate change. These meetings and workshops are sources of information as they organized by Ministry of Agriculture and Non-governmental organizations. The meetings and workshops have been mentioned by majority of farmers as the source of information that helped farmers know about climate change. Some of the farmers have claimed that it is not only through the meetings and workshops but also through media. In addition, a few farmers attribute their knowledge to own experience which is what they see happening. They mention late onset of rains, high temperatures, early frost and storms that destroy what they have planted. School based knowledge dissemination on climate change is very minimal. This shows that the education sector's role in disseminating information on climate change is lagging behind. Although most farmers have passed school going years, such institutions have not sufficiently participated in educating farmers on climate change. The natural events to a certain limited level carry messages to farmers that the climate has changed.

They only assume that it is natural for an unfortunate event to happen when in essence it has been influenced by the change in the climate.

4.9.3 Climate change impact on Livelihood

Table 4.7 shows that with the advent of climate change farmers had varying responses in respect of climate change. 33% farmers show that climate change has decreased their production in crops. This is attributable to the fact that Leribe agriculture is rain-fed so little rain fall means scarcity of water for irrigation. Again high temperatures affected the water sources such as boreholes and springs as their levels dropped. The farmers who used boreholes waited for some days for water level to increase and this reduced the farmers' crop production. Another noteworthy impact of climate change was forcing farmers to alter their farming methods. Farmers also had to invest a lot of time to learn about unconventional ways such as conservation agriculture. This therefore did not have that much impact on food security in the farmers' households. The figure also indicates that climate change did not pose a major threat to health security and family resources. One out of seventy interviewed cited illness caused by climate change. Climate has reduced had a more impact on crop production and posed a threat to food security as well as reducing income for farmers who would sell the surplus they produced.

Table 4.7 Respondents awareness, knowledge and the impact of climate change

Response	Say- Yes	Say- No	No- Response
a) Awareness			
Is the farmer aware of Climate Change?	87%	11%	2%
b) Knowledge			
How do respondents know about CC?			
- Meetings/workshops	19%	34%	7%
- Experiential knowledge	12%	40%	7%
- Media	13%	39%	7%
- Own observation	6%	47%	6%
- Natural events	9%	44%	6%
- School	2%	51%	6%
c) Impact			
What is the Impact of Climate Change?			
- Resorting to Conversation agric.	4%	41%	15%
- Increased Crop production	2%	42%	15%
- Food Security	2%	42%	15%
- Reduced Crop production	33%	11%	15%
- Illness	1%	43%	15%
- Family Resources (Finances)	1%	43%	15%
- Not Affected	1%	43%	15%
- Produce for survival	1%	43%	15%
- Drought	1%	42%	15%

4.10 Adaptation and mitigation strategies

According to the respondents climate change forced them to alter their farming methods because their harvest for crops was poor and they became vulnerable. Climate change affected all types of farmers due its severity. Table 4.7 shows that 4% indicated that they were obliged to change farming methods while 21 % of livestock farmers had to sell their livestock. Farmer`s vulnerability is seen where some farmers Leribe failed to plant at all (8%) because they were not able to cope with the negative impacts of climate change. Farmers lacked assets and capabilities to adapt as they show from the table above. The assets include financial assets and material assets to adapt. Farmers however received assistance from NGOs. NGOs made

them feel more at ease as they gave them training on new methods of farming and capacitated the farmers with capital assets reduce vulnerability to shocks and hazards of climate change. However, farmers who sold their livestock indicate that NGOs are biased towards crop farming methods and do not holistically assist those in livestock to adapt. This results in loss of livelihood for others farmers as a result of climate change.

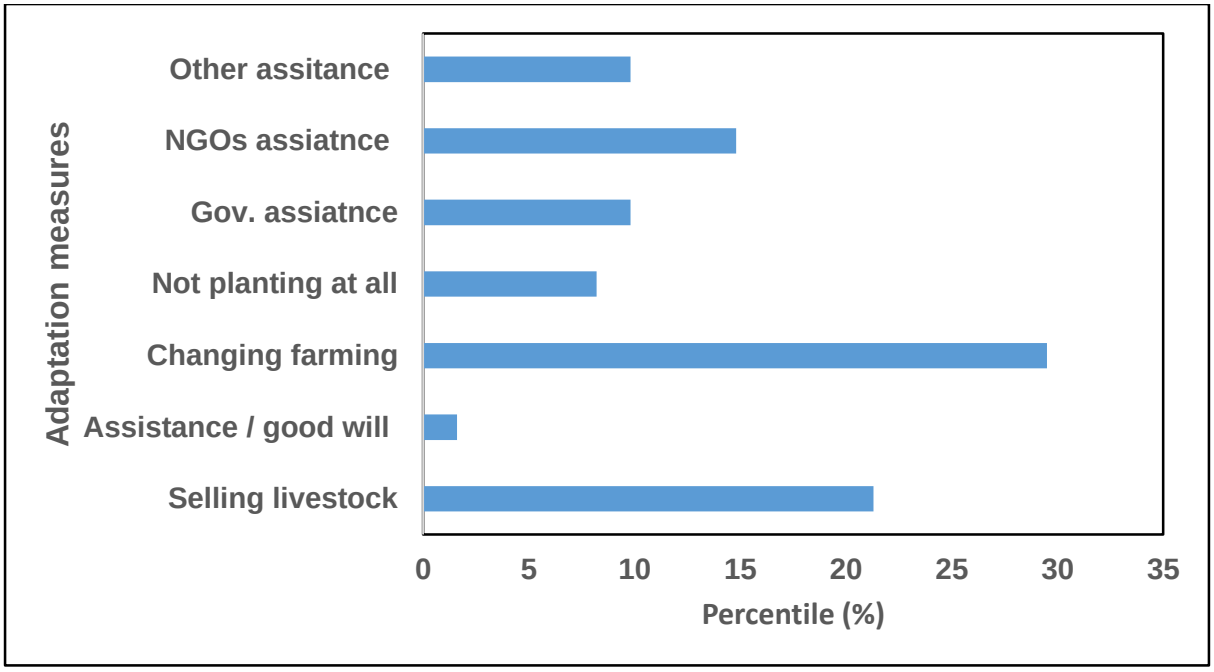


Figure 4.5: Farmers adaptation measures to cope with effect of climate change

Figure 4.5 illustrates the assistance given by NGO in Leribe district during climate change. Amongst the types of assistance NGOs gave respondents mentioned trainings, workshops, seedlings, water tanks, planters, greenhouses, solar dryers, fertilizers and conservation agriculture. Most of the farmers show that NGO has not given them the greenhouses as it is the highest number. The greenhouses are cited by farmers as the most efficient way to save crops from being affected by hot temperatures. Farmers also want the NGOs to assist with fertilizers as it follows greenhouses in terms the number of farmers who did not receive fertilizers. It is evident from the responses in figure 4.5 that farmers need farming implements more than training and workshops. Only a fewer number acknowledge that NGO has given them training on climate change. NGOs appears to have supplied many farmers with seedlings as compared to other needs for production. It is evident that although training and workshops are significant farmers require implements to be able to cope with the negative effects of climate change.

Trainings and workshops are not important when farmers are not fully equipped with implements.

Table 4.8: NGOs assistance interventions to mitigate climate change effects

NGOs assistance type	Say- YES	Say-NO	NO- Response
General Assistance by NGOs	**72%**	**5%**	**23%**
- Training/ workshops	15	25	20
- Provision of seeds	23	17	20
- Water Tanks	7	35	20
- Hiring Planters	4	36	20
- Built Shading nets	1	39	20
- Solar Drier	5	35	20
- Provision of Fertilized	2	38	20
- Introduce Conservation Agri.	4	36	20

Table 4.8 shows that 72% of the farmers received assistance from NGO during climate change and 5% did not receive assistance. 23% of the respondents were not sure and therefore did mention any assistance. With regard to the figure above the majority of the farmers acknowledge having been assisted by NGO. NGOs are contributing in assisting farmers survive the shocks of climate and reduce vulnerability. A bigger proportion of farmers who have benefitted from NGO assistance attributed their ability to produce to NGO. They believe that if the NGO did not come to their rescue they would not been able to produce anything from their framing yards. The information and guidance farmers received from NGO supervisors seem to have helped farmers produce crops that could be domestically used and those with surplus sold it to the community where they lived. When asked to respond to whether the NGO gave any additional assistance the respondents repeated that the NGO assisted with boreholes that came along with tanks. This assistance was given only where farmers had established a cooperative as opposed to where farmers produced alone. The NGO also gave shade nets to cooperatives and also supplied seedlings. In this way NGO used a strategy whereby such assistance is taken care of by a group not individuals. This promoted collective responsibility as all members of cooperative were accountable. The NGO also assisted with training

committees in the cooperatives on management of shade nets and other resources that were given to cooperatives. The shade nets help cooperatives to produce seedlings for members and this cut costs for members as farmers received seeds for free. The idea of cooperatives was helpful as farmers held regular meetings to share experiences as independent farmers. The farmers also received support from fellow farmers and supervisors at the cooperative meeting and this improved their production. Mitigation seem to be taking place in Leribe. 52% of farmers show that they are doing mitigation while 38% does not do any mitigation. Mitigation programs are implemented by NGO working with Ministry of Agriculture and Food Security as well as Ministry of Forestry and Land Reclamation.

Table 4.9: Climate change mitigation strategies implemented by NGOs

Mitigation Strategies	Say- YES	Say-NO	NO- Response
a) General Interventions- NGOs	32 (53)%	23 (38%)	6 (10%)
b) Specific Interventions- NGOs			
- Changing planting dates / Cul.	5	29	26
- Not burning grasses	25	10	26
- Enhance capacity building	4	31	26
- Diversifying farming	1	34	26
- Microclimate modification / Net shading	1	34	26
- Afforestation / tree planting	2	33	26
- Integrated Pest Management (IPM)	5	30	26
- Animal shade / ration adjusting	3	32	26
- Water Harvesting techniques	2	33	26
c) Perception of farmers on climate change mitigation interventions	37(61%)	4(6%)	19(32%)

Mitigation is an action that limits global climate change through the reduction of greenhouse gases emissions and increasing the sink of them. Most of the respondents seem to be confusing mitigation and adaptation. From Table 4.9 above, some of the programs that were given by the respondents fall under adaptation. Farmers mentioned that changing planting system is one of

the mitigation programs. They illustrate afforestation, greenhouses, animal shelters, net shading and water harvesting as interventions by NGOs to mitigate climate change effects. However, some farmers mentioned not burning grass and diversifying farming methods as the mitigation programs they are engaged in. This is an indication that climate change education is still a challenge. Farmers are more trained in adaptation programs than mitigation. Deeper knowledge on adaptation and mitigation practices is still a major challenge yet there are actions taken by NGOs to create awareness on climate change and its impact.

From Table 4.9 61% of farmers see their mitigation programs as effective. Farmers believe that when they are able to produce crops through the assistance of greenhouses and shade nets they have effectively stopped climate change while 39% showed that they did not understand mitigation at all. 7% of respondents said mitigation has not been effective as they are still suffering the consequences of climate change. This shows that there is still a knowledge gap on what adaptation and mitigation are. In farmers' view when even under dry and extremely hot conditions, destructive hail storms and late onset of rain they are able to produce crops that is mitigation. There is still a lot for NGOs to inculcate climate change knowledge in farmers because there was no mention of reforestation with indigenous trees and preserving natural forests. For replacement of emitting fossil fuels like coal, oil, and natural gas with clean renewable energies like solar a few farmers noted that it has been effective in reducing greenhouse gases. This is an indication that mitigation is still far behind in Leribe district.

4.11 NGO assistance to rural community small holder farmers during climate change

In order to find the role of NGOs in assisting rural community farmers the key informants interviews and focus groups discussions were conducted to explore how NGOs help farmers during climate change. The key informants and focus groups were interviewed to further highlight the knowledge and intervention of the NGOs in engaging adaptation and mitigation strategies when affected by climate change. In the interviews and focus group discussions it was found out that the NGO make farmers aware of the existence of climate change through workshops and trainings. One of the informants whose focus in NGO is raising awareness in the agricultural sector pointed out that:

"We are basically raising awareness of what climate change is to farmers

and also how they can live in times of climate change."

It is in these workshops and trainings farmers are given tips on how they should plough herbicides limes. What transpires in the trainings and workshops has been elucidated by the focus group discussion that comprised Leribe Agric Forum (LAF) rural community farmers' focal persons. The focus group discussion revealed that the NGO advises them to use conservation agriculture and encourages them to use drought tolerant seeds. They further indicated that NGO changes the farmers' mindset by encouraging to use machinery that does not do deep tillage on the land in order to mitigate climate change. Workshop program can it be in appendix?

Another key informant when explaining assistance pointed out that assistance can be in a form finding markets for the agricultural for agricultural produce. They also identify donors to provide for the farmers' agricultural activities. The key informant put it in this way:

> "*During this time of negative impacts of climate change the NGO looks for the donor assistance that can support farmers to be able to produce even when there are visible signs of poor or no harvest."*

The key informants also showed that as NGO they provide energy efficient items and renewable energy devices such as solar lights to the farmers to sell. The key informant said:

"Another thing is... we are selling energy efficient items like lamps and stoves for the farmers to adapt to climate change conditions."

On the same point another key informant stipulated that the sole purpose of issuing energy efficient items is to provide necessary services to rural communities:

> "*We are providing them the energy efficient items in the rural areas so that rural communities' farmers do not lack services that they are indeed such as electricity lighting and ways of charging."*

In as far as the documentation for records of yield was concerned, the key informants were unable to furnish the records of what they have been doing and giving when assisting rural community farmers. They cited inappropriate time and poor record keeping.

4.11.1 Perception on NGOs assistance to farmers

One of the key informants indicated that the assistance has been helpful because farmers have changed their farming methods as they have adopted conservation agriculture methods. Again farmers have knowledge of what to do in order to avoid the impacts of climate change. The key informant said:

> *"Most have changed farming methods and I think it has helped but because climate has changed the yield they get is just meant to make them survive. The planting season has changed"*

The focus group discussion indicated that the NGO has been very helpful by providing solar energy products. This has created business opportunities for farmers. Most of the farmers whose yield has not been good have resorted to selling solar energy products as a way of diversifying their income in order to survive the impact of climate change.

4.11.2 Challenges Faced by NGOs when assisting farmers in rural communities

Among the challenges indicated by the focus group, discussion is the seeds and fertilisers are inaccessible. That in itself denies the farmers to engage in planting on time. It was further said that NGO does not have adequate resources to assist them. It was further noted it was that of political factor. Many politicians use NGO to further their political interests and some farmers reject the NGO on such grounds.

The focus group discussion also mentioned that staff of NGO is not fully qualified and the changes they want to implement are not easily accepted. There is also a cultural challenge whereby in rural areas shepherds do not accept conservation agriculture so they destroy any agricultural practices related to new methods such as conservation agriculture.

The focus group discussion indicated that the government views NGO as opposition because it warns government on poor seeds given to farmers. Sometimes governments receive donated seeds from abroad and gives them to farmers and such seeds may have expired or inappropriate for the local farming. Another key informant, NGO manager, says the finances that are supposed to be used for strengthening NGO are controlled and misused by government officials for purposes other than those of agriculture. The focus group discussion recommended that the

rivers should be used for irrigation. There has a proper plan for assisting farmers. There should be strict laws for abolishing politicians to use NGO as campaigning tool so that NGO is autonomous from political control. There should be adequate training for supervisors to be able to give relevant and proper direction to farmers when dealing with climate change.

4.12. Concluding remarks

The chapter gave outcomes on the impact of climate change on rural small holder farmers in Leribe district. It also presented the adaptation and mitigation strategies that were employed by rural small holder farmers to address the negative impact of climate change. What is drawn from the outcome of the study is that rural small holder farmers overly depend on rain fed mixed agriculture. The farmers' source of food and income come from self-employment which they do through agriculture. Farming is their main employer that enables them to provide for their families. The impact of climate change on farmers is the decrease in crop production, high food insecurity, and dry water sources. Farmers showed that they were able to take climate change in a positive light in respect of livestock as it did not have a heavy impact on livestock. They grew fodder and silage to protect them. Climate change impact influenced them to adapt and also to mitigate risk of loss either crops or livestock through the assistance of NGO.

CHAPTER 5

CONCLUSIONS, RECOMMENDATIONS AND SUGGESTIONS

5.1 Introduction

The Lesotho agriculture is very significant as it accounts for 80 percent of livelihoods of the whole population. This sector which relies entirely on rain-fed agriculture poses a risk to farmers when the onset of rains is later in the season or when the rains are inconsistent. The sector has a strategy that focuses on development of productive capacities of farmers not only to tap in subsistence farming but also in agribusiness.

The Lesotho is divided into three agricultural regions, which are Mountain, Southern lowlands and Central lowlands where Leribe falls. Leribe is the highest producing district in Lesotho and has large areas that affected by late onset of rains. The foothills of Leribe are also affected by early frost which has threatened the agricultural production. This is a threat to food security in the district. There is also a report that below normal rainfall of 0.8 % was experienced in 2010 and the projection is that it will decrease by 20.5% in 2100. This decline in rainfall threatens farmers who rely mainly on agriculture. Due to climate change, food insecurity persisted from 2016.

The most affected are poor smallholder farmers who are heading the families. These farmers lack material assets, local organisational capacity, representation, voice and inclusion and this makes them to be more susceptible to negative impacts of climate change. In this regard, the study was conducted to ascertain the role of NGO in climate change adaptation and mitigation and identifying the adaptation and mitigation strategies that were used by the rural smallholder farmers in Leribe area. In this study the tools that were used to collect data were interview questionnaires, key informant interviews and focus group discussion. A descriptive analysis was conducted which characterised farmers according to their demographics, livelihood strategies, adaptation strategies and mitigation strategies they used when faced with negative impacts of climate change. This chapter then makes conclusions based on the findings of the study and puts forth recommendations for future policy.

5.2 Conclusions for each specific objective

The study hypothesises that the state-based Non-Governmental Organisations have intervened to enhance and motivate a positive perception on the impact of climate change in rural communities of Leribe district in Lesotho and make a positive contribution in mitigating the effects of climate change. The outcomes of the study show that farmers experienced negative impacts of climate change and they were assisted by the NGOs to employ adaptation and mitigation strategies to address climate change impacts.

Objective one: *To assess the contribution of NGOs in response to climate change in rural communities:*

The Leribe rural small holder farmers were adversely affected by climate change and this brought a serious decline in their crop production which affected their ability to provide income and food for their families. Most of the interviewed farmers showed a decline in crop production from 2015 to 2018. The main staple crop maize deteriorated immensely in 2015 when there was an ELNINO strike that brought drought that destroyed crops and dried water sources. Many families experienced food shortages in that year.

Although that did not have a major impact on livestock, many farmers' livestock was able to survive the climate change impact brought by ELNINO in 2015. Farmers were forced to opt for producing fodder for crops. This resulted in farmers seeing decline in maize production to produce fodder for livestock as most Leribe farmers practice mixed farming. Farmers sought assistance from NGO and one of them named RSDA was able to guide farmers for the next agricultural season 2016 and beyond. Due to its input in training on climate smart agricultural methods that included keyhole and conservation farming and supplying farmers with seeds rural small holder farmers saw an increase in crop production. Some farmers had good harvests that they could even sell but the challenge was the market and their crops ended up being rotten.

Objective 2 *To explore the role of NGOs interventions in adaptation and mitigation of climate change in rural communities:*

Farmers used adaptation and mitigation strategies to enable themselves to adjust to expected climate and its effects as well reducing the sources of climate change. Many farmers adopted

the farming systems that helped them to sustain their livelihoods. The role of the NGOs RSDA as example developed a programme of action that defined measures that were needed to protect the farmers and giving relief to those victimised by climate change. Another role the NGO played was preventing the farmers' vulnerability by expanding their income through providing the farmers with renewable energy solutions such as solar driers to preserve their harvest and fuel saving stoves. The farmers who have been hit hard by climate change were given these solutions not only to promote them but also to fortify their incomes. The government through SADP has also contributed by providing greenhouses to farmers. Although the greenhouses were not for individual farmers but for cooperatives they also helped in providing seedlings for farmers.

The NGOs role of training of farmers on keyhole gardening and conservation agriculture was reported to have been of importance to farmers. Farmers were now able to produce crops through-out the year through crop rotation. They key hole gardens were also reported to be easy to maintain and would keep moisture for a longer period of time. This has helped farmers be self-sufficient in food production. Had it not been by the new agricultural systems farmers would have at greater risk of climate change impacts.

The NGOs have brought an end to economic ills that would be brought about by climate change. The year 2015 was the most destructive year and many farmers had opted to suspend agriculture in the years that followed but the intervention of NGO played a key role in encouraging farmers. The trainings that were offered by the RSDA in collaboration with Ministry of Agriculture was important. The workshops promoted mitigation by training farmers how to incorporate crop residue into the soil to avoid burning that produced carbon emissions. The farmers were also taught how to engage sustainable farming practices that maintain soil quality and improve productivity per unit of output. These empowered farmers and those who had resigned to quitting came back. The challenge that remained was that some farmers needed more support after training and intervention and follow up by supervisors from NGO. It appeared that NGO raises farmers' interest and took a long time to follow up on their progress after intervention.

Objective 3 *To investigate challenges NGOs encounter when assisting rural communities:*

In order for NGO to implement the action plan for assisting rural small holder farmers there has to be commitment by the NGO employees and the beneficiaries of the intervention. Again between the NGO and the farmers there should be integrated plans and activities so that implementation does not meet opposing views. The proper structures help in implementation of activities that are geared towards assisting rural farmers sustain their production amidst climate change impact. Some farmers saw NGO staff as lacking adequate knowledge and professionalism. The negative perception of farmers on NGO staff has negatively impacted on the receiving of guidance and tips on how to go about farming when farmers are faced with impacts of climate change. Although many farmers have adapted to new ways of agriculture, others have been trained but had not transformed and practiced new methods. This was a waste of resources on the side of the NGO. Another challenge was that of NGOs not being able to adequately support farmers with farming inputs. Since most of the small holder farmers are too many in rural areas meagre resources fall in the hands of politicians who ill-advice NGO and divert resources to farmers who belong to a certain political party. This has made farmers lose confidence in NGO. It makes NGO lose credibility to farmers.

NGOs also rely on donor funding and sometimes government support state-based non-governmental organisations that do relief or humanitarian work. NGOs funds have been diverted by government and this has resulted in NGOs cutting the number of farmers to benefit from the NGOs intervention. In Leribe there were approximately five thousand practicing farmers but the NGO could only afford only half or below that number. This means organisational lack of capacity has not adequately helped many farmers to improve productivity and those dormant to re-engage in agriculture.

5.3 Recommendations and suggestions for future research

These recommendations are based on the opinions expressed in the findings of the present study. As a result of the focus of the study some areas were left unexplored resulting in gaps for conducting other study areas in the same discipline:

Prior to recommendations it is appropriate to laud the immense studies that have been undertaken on climate change and its impacts since it has begun and the literature that has been put together on adaptation and mitigation strategies. Even so, climate change and its impacts

pose a challenge to sustainable production in the agricultural sector and threatens the capacity of farmers to adapt, mitigate and or face the uncertainty due increased variability. The magnitude and multitude of climate change impacts culminate into a call for all stakeholders to shift their focus and support efforts to construct a new plan of action to addressing the issue of climate challenge. Climate change's first victim is a farmer. Farmers are more vulnerable because the impact of climate change is greatly felt in the field of agriculture. Climate change and its impact demand that everyone develops ability for adaptive and positive behaviour that will enable individuals to deal effectively with the challenges posed by climate change in every-day life.

In this study it was found out that climate change is a great force that required a change in farming methods. The farmers showed that their production had significantly dropped due to its impact. This was an indication that farmers alone cannot handle the impact of climate change. The study recommends the inclusive approach to adaptive capacity. It was revealed in this study that shepherds were against the use of conservation agriculture as they mentioned that it was not part of their culture in agricultural practices. They were used to feeding their animals with crop residue and did not want to incorporate crop residue into soil. Their exclusion in adaptation training programs means that it will a wasted time since shepherds are always the ones near the fields. The NGOs and government should draw adaptation and mitigation programmes that will include all stakeholders for them to gain more insight and knowledge in climate smart agriculture. Information is power and if a local organisational capacity is weak then to train one segment of community and leaving the other is equal to no action at all. The study has also shown that NGOs lack follow up after they have engaged with farmers on new agricultural systems which are brought about by negative impacts of climate change.

The NGO should have a working plan that will encourage farmers to have a full confidence in the NGO. NGOs are encouraged to device means of tracking the progress of farmers once they have been trained on adaptation and mitigation strategies. For example, NGOs can provide cell-phones to farmers that have a connection to the NGOs website where the farmers take pictures of their fields and plots. This will help cut transportation costs to the rural communities for inspection or progress check. This will also help NGOs to take action quickly if they realise a predicament with a certain farmer who cannot adapt. Providing the farmers not only with

knowledge but also tools for accountability will improve their commitment to scaling up production amidst climate change impact. There is also an important aspect where the source of funding for improving on adaptation and mitigation is diverted. Climate change is a serious and deadly phenomenon that requires political will. Representation should be given a priority. Farmers associations must not only be represented in the Disaster Risk Reduction Committees and local agricultural forums but due to seriousness of climate change, there must be a Ministry solely responsible for climate change. The issue of climate change is put somewhere under a certain agricultural department or meteorological services. This is underestimates the issue of climate change. In this regard Ministry of Agriculture and Food Security focuses on production while the Ministry of Climate Change will have a budget for adaptation and mitigation. To seal the deal, the Minister of Climate Change should be deployed through knowledge of climate issues and with a vast experience.

A knowledgeable Minister will steer the programs and design programs and interventions that will bring the desired results. This study has documented the demographic data, socio-economic data, livelihood strategies and adaptation and mitigation strategies used in time climate change impact. However, the study leaves a gap for further research in understanding the role which NGOs can play in these recommended strategies to help farmers deal with climate change impacts. Empowerment of farmers is still worthy of study for capacity building and advocacy support for sustainable climate smart agriculture, value addition and building climate smart farmers.

Future studies could incorporate the following convergent concurrent mixed-method design in which a researcher would start with either qualitative data analysed then based on the outcomes of the qualitative approach; a questionnaire is developed to target quantitative data collection.

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ANNEXES

Annex A: Information Leaflet

UNIVERSITY OF THE FREE STATE
UNIVERSITEIT VAN DIE VRYSTAAT
YUNIVESITHI YA FREISTATA
UFS UV

RESEARCH STUDY INFORMATION LEAFLET AND CONSENT FORM

DATE

Sepetember 2019

TITLE OF THE RESEARCH PROJECT

Role of NGOs in Climate Change Mitigation and Adaptation: A Case Study of Leribe Lesotho

PRINCIPLE INVESTIGATOR AND CONTACT NUMBER:

Mokhabelane Morahanye Contact: +266 63099023

FACULTY AND DEPARTMENT:

Faculty of Economic and Management Science
Department of Development Studies

STUDYLEADER NAME AND CONTACT NUMBER:

Dr Weldemichael Teshuhuney
Cell: +27 79077 14 71

THE AIM OF THE STUDY

The overall aim of the study is to ascertain knowledge and perceived roles of state-based Non-Governmental Organisations in Climate Change mitigation and adaptation in Leribe Lesotho.

PRINCIPAL INVESTIGATOR

My name is Mokhabelane Morahanye. I am a Masters student at University of the Freestate and I am doing this study under my own volition because I am more working. I worked as a District Administrator and oversaw the implementation of the projects by NGOs. That is why I am studying or doing this study. To find out if NGOs are really doing enough to assist rural communities respond to climate change.

STATUS OF ETHICAL APPROVAL

This study has not received approval from the Research Ethics Committee of UFS.

Approval number: *Not yet recieved*

205 Nelson Mandela Drive/Rylaan, Park West/Parkwes, Bloemfontein 9301, South Africa/Suid-Afrika
P.O. Box/Posbus 339, Bloemfontein 9300, South Africa/Suid-Afrika, T: +27(0)51 401 9111, www.ufs.ac.za

INVITATION TO TAKE PART IN THIS RESEARCH PROJECT

I chose you to take part in this study because I have established that you are one of the Leribe Farmers Forum leaders, that assist in organizing trainings on the issues of climate change, in particular mitigation and adaptation for farmers. The purpose is to acquire information on what you as a forum in assisting farmers to know about climate change. I got your contacts from District Agricultural Officer and you were selected because of your participation in climate change activities. There will be 10 people to participate in this study.

THE NATURE OF PARTICIPATION IN THIS STUDY

The part you are going to do in this study is answer the questions. I will expect you to fill the questionnaire. Example of questions:

1. *Does the rural community view climate change as a reality? Pls support your answer.*
2. *What kind of assistance is the NGO giving to the rural community when faced with negative effects of climate change?*
3. *To what extent do those adaption and mitigation strategies help the rural communities?*

You are expected to answer these questions in not more than 30 minutes.

THE PARTICIPANT RIGHT TO WITHDRAW FROM THE STUDY

The participant is free to withdraw in the study and there will not be any loss of benefit or damage in that case. Participating in this study is voluntary and there is nothing binding for a person to take part. When you take part you will be given a consent form which you will sign and keep safely. You can withdraw at any time but once you have filled information it is not easy to do so.

THE POTENTIAL BENEFITS OF TAKING PART IN THIS STUDY

If you don't take part in this study there will be persistent lack of knowledge on climate issues and taking part in this study will be treated with confidentiality and the researcher may give your name to the sponsor(if any).

THE ANTICIPATED INCONVENIENCE OF TAKING PART IN THIS STUDY

This study may have an inconvenience on your side. Sometimes your may jeopardize your work. However your names will not appear but the researcher will use fictitious codes to conceal your identity. If there is any danger or harm you will be assisted by the nearest health facility and the researcher will incur the expenses.

CONFIDENTIALITY

Your name will not be recorded, anywhere and no one will be able to connect you to the answers you give. Your answers will be given a fictitious code number or a pseudonym and you will be referred to in this way in the data, any publications, or other research reporting methods such as conference

proceedings. Transcriber and external coder will maintain confidentiality by signing a confidentiality agreement. Your answers may be reviewed by people responsible for making sure that research is done properly, including the transcriber, external coder, and members of the Research Ethics Committee. Otherwise, records that identify you will be available only to people working on the study, unless you give permission for other people to see the records. Your anonymous data may be used for other purposes, e.g. research report, journal articles, conference presentation, etc. A report of the study may be submitted for publication, but individual participants will not be identifiable in such a report. Please keep in mind that it is sometimes impossible to make an absolute guarantee of confidentiality/anonymity, e.g. when focus groups are used as a data collection method. Focus groups are group interviews where participants discuss one topic and they give answers one after the other. While every effort will be made by the researcher to ensure that you will not be connected to the information that you share during the focus group, I cannot guarantee that other participants in the focus group will treat information confidentially. I shall, however, encourage all participants to do so. For this reason, I advise you not to disclose personally sensitive information in the focus group.

THE STORAGE AND DESTRUCTION OF INFORMATION AFTER THE STUDY

Hard copies of your answers will be stored by the researcher for a period of five years in a locked cupboard/filing cabinet in the university for future research or academic purposes; electronic information will be stored on a password protected computer. Future use of the stored data will be subject to further Research Ethics Review and approval if applicable. All the information will be deleted.

PAYMENT AND INCENTIVES FOR PARTICPATING IN THIS STUDY

There will not be any form of payment when you participate in this study. For the participants who have used their funds to travel they will be reimbursed. The researcher will use the formula of M8.00 per 10 kilometer as it is the standard amount charged.

INFORMATION ON THE FINDINGS OF THE STUDY

If you would like to be informed of the final research findings, please contact Mokhabelane Morahanye on +266 63099023 or email on morahanye55@gmail.com . The findings are accessible for two months after study. Should you require any further information or want to contact the researcher about any aspect of this study, please contact +266 63099023, or email, morahanye55@gmail.com . Should you have concerns about the way in which the research has been conducted, you may contact Dr Weldemichael Teshuhuney, email : TeshuhuneyW@ufs.ac.za. Office: 0514012656.

Thank you for taking time to read this information sheet and for participating in this study.

Annex B: Informed Consent

UNIVERSITY OF THE FREE STATE
UNIVERSITEIT VAN DIE VRYSTAAT
YUNIVESITHI YA FREISTATA
UFS UV

CONSENT TO PARTICIPATE IN THIS STUDY

I, _____ (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet. I have had sufficient opportunity to ask questions and am prepared to participate in the study. I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable). I am aware that the findings of this study will be anonymously processed into a research report, journal publications and/or conference proceedings.

I agree to the recording of the *insert specific data collection method.*

I have received a signed copy of the informed consent agreement.

Full Name of Participant: _____

Signature of Participant: _____ Date: _____

205 Nelson Mandela Drive/Rylaan, Park West/Parkwes, Bloemfontein 9301, South Africa/Suid-Afrika
P.O. Box/Posbus 339, Bloemfontein 9300, South Africa/Suid-Afrika, T: +27(0)51 401 9111, www.ufs.ac.za

[redacted]

Full Name(s) of Researcher(s): _____

Signature of Researcher: _____ Date: _____

Annex C: Permission to conduct study

Rural Self-Help Development Association
Mokhatlo oa Ba Ithusang Ho Itšebeletsa Metseng
Registered as an NGO in Lesotho since 1991

Tel: (+266) 2231 1279 • Fax: (+266) 2231 0458 • Email: rsda@rsda.org.ls • Website: www.rsda.org.ls/
PO Box 0523, Maseru West 105, Lesotho

28/06/2019

The Research Ethics Committee
University of the Free State (UoFS)
Bloemfontein

Dear Sir/Madam,

This is to confirm that Rural Self Help Development Association (RSDA) has authorized Mr Mokhabelane Morahanye studying Masters in Development Studies at UoFS to conduct research *on Role of NGOs in Climate Change Mitigation and Adaptation* at RSDA designated area in Leribe District.

RSDA is a Non-Governmental Organization registered in 1991 to eradicate extreme poverty in Lesotho therefore, it enhance livelihoods and build climate resilient Basotho Communities by helping people to help themselves, working collaboratively and in partnership with other stakeholders.

I highly appreciate your cooperation.

Yours Faithfully,

for 'Mampho Thulo (RSDA MANAGING DIRECTOR)