THE ROLE OF SOCIAL CAPITAL IN ADAPTATION TO DROUGHT: A CASE STUDY OF OSHEEDHIYA VILLAGE OMUSATI REGION NAMIBIA

A MINI THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS OF THE DEGREE OF

MASTERS OF ARTS IN DEVELOPMENT STUDIES

OF

THE UNIVERSITY OF NAMIBIA

BY

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OCTOBER 2022

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ABSTRACT

Rainfall variability and drought events have become increasingly common for the past five years in Namibia, this has a more significant impact on subsistence farmers living in the communal areas who highly depend on rain-fed agriculture for their livelihoods. Communal farmers are already experiencing other challenges such as land degradation, unproductive soils. Scarce water resources and poor land tenure systems and drought are an additional pressure on their livelihood. This research analyses the role that social capital plays in the adaptation to drought amongst farmers living in the communal areas of Namibia using the case study of Osheedhiya village in the Omusati Region. Social capital is used herein to refer to the flow of knowledge, connections, and group membership. The objectives of the study were: to identify strategies used to adapt to drought among the communal farmers; to analyse the impact of social capital; to identify the types of social capital and its level of importance in adaptation to drought. The study used the qualitative research methodology through which the data was collected using key informant interviews and semi-structured interview guides. Thematic analysis was used to analyse the data. The results reveal that social capital, such as social ties with family, neighbours, friends, and community members, the spirit of working together to achieve a common goal, and government intervention has enhanced the chances of farmers living in communal areas to adapt to drought. Farmers, who are retired civil servants, Traditional Authority members linked to associations such as farmers' unions and producers' associations as well as those who own farm machinery, such as tractors and vehicles, adapted to drought conditions better than other farmers.

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ACKNOWLEDGEMENTS

I would like to thank my supervisor Dr. Romie Nghitevelekwa who assisted me from the start with constructing the proposal, applying for ethical clearance, and putting together this whole study. Her positive contributions have helped me throughout this entire process.

Particular appreciation goes to the Honourable Councillor of Onesi Constituency, Mr. Festus Petrus, and the Chief Regional Officer, Mr. Gervasius Kashindi of the Omusati Region for allowing me to conduct my study in their respective area. Special thanks goes to the farmers in Osheedhiya village; this study could not have been possible without their kindness and enthusiasm.

Thank you to my sister Jovita Protasius for being my chauffeur and camera girl throughout the fieldwork. To my husband, Walter Alweendo Jonas, for his patience during the long hours spent writing this thesis and his support throughout this journey; I could not have done it without him.

DEDICATION

This study is dedicated to the Father above who gave me the strength to move on, the farmers of the village of Osheedhiya, to my husband Walter Alweendo Jonas, baby Twasindana Jonas and my farther Nahum Indombo.

DECLARATION

I, Martha Ndilipune Jonas affirms that this study entitled: an analysis of the role of social capital in adaptation to drought: A case of Osheedhiya village, Omusati Region, is a reflection of my work. As a result, this study has not been submitted to any other institution besides the University of Namibia.

October 2022

Signature **Date**

CHAPTER 1: INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Rainfall variability and drought events have become persistent, especially in African countries, resulting in a significant impact on rain-fed agricultural production and water supply for domestic purposes (Masih, Maskey, Mussá, & Trambauer, 2014). According to the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report on the African continent, Africa continues to experience wide-spread drought impacts. This has seen most governments in Africa initiating governance systems for adaptation, such as better climate information services to respond to climate related threats (Robinson, 2020).

Some of the Southern African countries, including Namibia have recorded below-average rainfall with the year 2019 being the most critical year in terms of impact (Food and Agricultural Organisation [FAO], December, 2019). While drought is a challenge already, for Namibia drought recurrence has become increasingly common, for the past five years (Ministry of Agriculture, Water, and Forestry [MAWF], 2019). While the average rainfall in Namibia varies from place to place; rainfall recorded during the 2015/2016 and 2017/2019 rainy seasons was below the normal average rainfall across the country (Conroe, 2020). This study focuses on rainfall variation in Onesi Constituency over the past five years of 2015-2019. The normal average rainfall of Onesi Constituency is 387,4 mm and this has varied over the past five years (Ministry of Works and Transport, 2015; 2016; 2017 ;2018; 2019). Table 1.1 shows variation in rainfall received in Onesi

Constituency over the five-year period 2015-2019. The year 2015 and 2019 recorded the lowest rainfall over the five years.

Table 1.1: Rainfall recorded in Onesi Constituency over the five –year period 2015-2019

Year recorded	**Total rainfall in millimetres**
2014/2015	**191 mm**
2015/2016	**479.1 mm**
2016/2017	**522.0 mm**
2017/2018	**393.8 mm**
2018/2019	**92.8 mm**

Studies show that drought poses serious challenges for populations whose livelihoods depend on natural resources (Barbosa, Masante, Arias Muñoz, Cammalleri, De Jager, Magni & Vogt, 2021). Namibia, which has faced increased drought frequency is one of them, with the Omusati region being one of the drought prone regions in the county. The region is faced with increasing drought frequency and intensity. Due to the severe drought and the subsequent impact on the livelihoods of the people, the President of the Republic of Namibia declared the conditions of drought in 2015 and 2019 a State of Emergency (MAWF, 2019).

The 2019 drought, in particular was the worst in the last 90 years in Namibia. The drought resulted in at least one-third of the population being left without adequate food supplies and thousands of livestock perishing due to drought conditions such as intense heat, deficit

in precipitation and very dry soils (Shikangalah, 2020, p. 46). Furthermore, the country's agricultural output has decreased to below 50% in 2019 (FAO, 2019; Shikangalah, 2020).

Drought has a more significant impact on subsistence farmers living in the communal areas who highly depend on rain-fed agriculture for their livelihoods (MAWF, 2019). Given the changing climate and expected increased temperatures, coupled with land degradation, unproductive soils, scarce water resources and poor land tenure systems, farmers in communal areas are expected to experience frequent drought events (Mendelsohn, Shixwameni, & Nakamhela, 2012). Adaptation and coping strategies are therefore necessary to reduce vulnerability to drought as well as prepare for future extreme events. However, adaptation of people to different disasters varies from household to household and region to region, based on existing support systems to increase resilience of affected communities (Brooked *et al.*, 2003).

Most of the farmers in communal areas show low levels of adaptive capacity to the harsh conditions caused by drought (Spear, Zaroug, Daron, Ziervogel, Angula, Haimbili, & Davies, 2018). In Namibia, the government has been involved in piloting adaptation programmes and projects for farmers. The systems work to build adaptive capacities in communal areas (UNDP, 2015). Some of the strategies explored by the Namibian government to help farmers in the agricultural sector adapt to climate change are: encouraging diversification of crops and using crop varieties, which would hedge against unpredictable rainfall and shorter seasons (Crawford & Terton, 2016; Angula & Kaundjua, 2016). Other strategies include improving shared water resource systems, such as boreholes as well as encouraging the use of livestock management strategies such as mixing small and large stock herds of various breeds (Spear *et al.*, 2018).

Moreover, programmes like Collaborative Adaptation Research Initiative in Africa and Asia [CARIAA], which aimed to build the resilience of vulnerable populations and improve livelihood, have successfully enhanced the creation of awareness of the possible adaptation methods among local communities in Namibia (Crawford & Terton, 2016). Another project under the United Nations Development Programme [UNDP], Scaling up of Community Resilience to climate variability and climate change in Northern Namibia known as the [SCORE] project, which was implemented in seven regions in northern Namibia for a period of five years, 2014-2018, has helped strengthen the adaptive capacity for climate change and reduce vulnerability to drought amongst smallholder farmers living in communal areas (MET, 2019). The project facilitated training that promoted the use of conservation agriculture, farmers were specially trained on enhancing and maintaining permanent crop cover, minimising soil disturbance, and practicing crop rotation methods. Through the SCORE project, farmers have seen increased crop yields at the household level, which enhanced their ability to become resilient and adapt to climate change (Ministry of Environment and Tourism, [MET], 2019).

Additionally, the Adaptation at Scale in Semi-Arid Regions (ASSAR) research project that uses multi-scale interdisciplinary work to transform climate adaptation policy and practice between 2014 – 2018, as it enhances knowledge, capacities, and behaviours of organisations and individuals to enhance enablers for adaptation (Mesquita & Thaten, 2018). Due to research steered by ASSAR, one of the enablers identified to support adaptation in north-central Namibia is the enhancement of social networks (Spear *et +al.*, 2018). This study analyses the role of social capital in adaptation to drought in the Omusati Region, specifically Osheedhiya village.

1.2 STATEMENT OF THE PROBLEM

Literature has highlighted that Namibia is one of the countries with low adaptive capacity to climate change and specific attention has been given to the north-central regions (Spear *et al.,* 2018; Angula & Kaundjua, 2016). Adaptation research in Namibia has focused more on the impact and vulnerability than adaptation at the household level (Ziervogel, Few, Kunamwene, & Omari, 2016). Furthermore, literature on adaptation to drought emphasised strategies used to cope with the impact of drought. The devastating impact of drought has driven the majority of the Namibian population to poverty, resulting in food shortages, scarcity of water, poor grazing and land degradation. All this had a toll on farming activities and livelihoods of farmers living in communal areas (Shikangalah, 2020; Nakanyete, Shikangalah & Vatuva, 2020).

Most of those settled in rural areas could not cope with the problems associated with drought and therefore migrated to urban areas in search of better living conditions and livelihood diversification (Nakanyete, Shikangalah & Vatuva, 2020). Nonetheless, very little has been done on the mechanisms applied at the household level in terms of how farmers living in communal areas are prepared and what determines their choice of strategies.

Moreover, the concept of social capital can be applied in adaptation to drought. The concept refers to transferring information and knowledge, as well as building reciprocal relations that can lead to mutual understanding amongst farmers and can be applied at household level (Ingold, 2017). When social capital is used as a mechanism in adaptation to drought, farmers living in communal areas are able to come up with collective

community response leading to food security after a disaster such as drought (Alam, Alam & Mushtaq, 2016; Spear *et al.,* 2018). It is thus vital to include social capital in adaptation to climate change as this can have a positive impact on farmers' coping mechanisms (Adger 2001).

However, the government's role is very crucial in the effectiveness of social capital as a mechanism. The government should make available, institutions where farmers can access information on adaptation to drought as well as credit facilities available to all the farmers, (Saptutyningsih, Diswandi, Jaung, 2020). In relation to social capital, policy makers need to keep account of the potential differences in accessing social capital amongst different community members (Paul, Weinthal, Ballemare and Jeuland, 2016). This is because there are important differences across communities such as institutional power, the arrangement of a community and natural characteristics which have a great influence on information transfer and collaborations, leading to strong ties (Ingold, 2017.

When relationships between civil society and the state are mutual and supportive, social capital can promote adaptive capacity of societies to cope with climate change disasters such as drought (Adger, 2001). It is for this reason that this research focuses on analysing the role of social capital in adaptation to drought in the communal areas of Namibia, with a particular focus of Osheedhiya village in the Omusati Region of Namibia.

1.3 OBJECTIVES OF THE STUDY

The main objective of this study is to analyse the role that social capital plays in adaptation to drought in Osheedhiya village, Omusati Region. The specific objectives of this study are:

1. To identify the different strategies used to adapt to drought among communal farmers
2. To analyse the impact of social capital in adaptation to drought amongst communal farmers
3. To identify the type of social capital available and its level of importance in adaptation to drought
4. To examine the determinants of farmers' adaptation choices and social difference amongst farmers

1.4 SIGNIFICANCE OF THE STUDY

The study will contribute to existing debate and the body of knowledge on the role of social capital in adaptation to drought by identifying analytical frameworks that can be used to understand adaptation to drought among communal farmers and provide case study analysis to guide future adaptation plans. The study contributes to the theoretical approaches such as structural, cognitive, and relational social capital (Bhandari & Yasunobu, 2009) by providing types of networks found in the Omusati region, such as farmers' unions, for example Olushandja Horticulture Association as well as improving bonding relations between neighbours and bridging ties with councillors, traditional authorities and agricultural offices.

Structural social capital refers to the network of people and individuals which determines when one can receive help, which can be in the form of information and other assistance (Rostila, 2011). On the other hand, cognitive, social capital refers to the shared values or paradigms that allow a shared understanding of appropriate ways of acting. This includes

a set of norms of acceptable behaviour (Claridge, 2018). Relational social capital focuses on the nature of relationships such as trust amongst farmers, government and other supporting institutions. Furthermore, policymakers and development practitioners who deliberately work on drought and climate change could use the findings of this study to influence future adaptation responses. This study takes forward one's understanding of drought adaptation in Namibia, most specifically in communal areas in north central Namibia.

1.5 LIMITATION OF THE STUDY

The limitations of this study include, a limited understanding of farmers in Osheedhiya village on the concept of social capital that resulted in the researcher providing farmers with extended explanations of the concept of social capital. Furthermore, the researcher also explained the concept of social capital in the local language to maximise the chances of farmers understanding the concept better. Another limitation was the expectation by the farmers who thought that the researcher would address their drought impacts and therefore, the discussions largely focused on food relief. To overcome this expectation, the researcher emphasised that the study was conducted as a requirement for a master's degree and that there were no direct beneficiations. Also that the information collected was to be used for research purposes only.

1.6 DELIMITATION OF THE STUDY

While drought is a national challenge, the study only focused on Osheedhiya village in the Omusati Region. Farmers' adaptive capacity was analysed, focusing on the drought

experienced during the 2015/2016 and 2017/2019 seasons. Additionally, the study focused on both crops and livestock to conclude whether social capital can be used as a mechanism to enhance adaptation to drought.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

This chapter reviews the literature on drought, its impacts, and adaptation strategies used to cope with drought conditions. First, an overview of the drought situation in Africa is provided, highlighting the gap in the literature. Second, the impact of drought in Southern Africa is explored, focusing on farmers living in communal areas. Next, the chapter looks into policies and measures used to address drought impacts in countries in Southern Africa. Finally, the chapter discusses social capital as one of the mechanisms to be considered in drought adaptation strategy.

2.2 PERSPECTIVES ON DROUGHT IN AFRICA

According to the 4th report on climate change by the Inter-Governmental Panel on Climate Change (IPCC), drought is a period of abnormally dry weather that is long enough to cause a severe imbalance hydrologically (Robinson, 2020). In this study drought is regarded as prolonged periods of water deficit that are relative to standard conditions (Fava & Vrieling, 2021). These periods of scarce water have become so common and persistent, particularly on the African continent (Masih, Maskey, Mussá, & Trambauer, 2014). Many countries in Africa are said to experience extreme heatwaves, which have resulted in a drop of water in reservoirs, reduction in river flows, and damage to crops (Masante, McCormick, Vogt, Carmona-Moreno, Cordano, & Ameztoy, 2019; Ngcamu, & Chari, 2020). Although several research on drought in Africa has been undertaken over the years and proposed coping strategies, African countries continue to experience severe impacts

of drought affecting millions of the populations (Gerber & Mirzabaev, 2017). Drought on the continent has become a primary concern, having wide-reaching economic, social and environmental implications to individuals, families, and communities (Masih *et al.*, 2014; Gerber & Mirzabaev, 2017; Fava & Vrieling 2021). To propose coping mechanisms most governments considered historical review of past drought events.

The review of historical studies on drought risk management provides an opportunity for government and communities to understand drought situation and develop mitigation and better adaptation measures (Gerber & Mirzabaev, 2017). During the 20th-century, studies in Africa have concentrated on historical data and rain patterns by stressing the importance of forecasting rainfall as essential in reducing drought impacts, as well as monitoring and mitigating the hazard (Archer, Landman, Malherbe, Tadross & Pretorius, 2019; Chisadza, Tumbare, Nyabeza & Nhapi, 2015).

The rainy season of 1972/1973, 1983/1984, and 1991/1992 was highlighted as the worst hit by drought on the African continent (Masih, *et al.*, 2014; United Nations, 2007). Drought forecasting information has led to an improvement and recognition of programs and projects in drought management during the 20th century. However, the implementation and effectiveness of these programs remains a concern in the region (Tadesse, 2016). Moreover, the 21st century focused on coming up with in depth policies of managing the risks from drought.

During the 21st century, the rainy seasons that recorded the worst drought are 2011/2012, 2013/2014, 2015/2016, and 2016/2017 (Masante, McCormick, Vogt, Carmona-Moreno, Cordano, & Ameztoy, 2018 p. 22). Research and policies in Africa are now focusing on

drought risk management, especially amongst the most vulnerable communities (Jayanthi, Husak, Funk, Magadzire, Adoum, & Verdin, 2014). The emphasis is now on the impact of drought on the livelihood of communities, which entails the extent to which communities are exposed and the level of vulnerability and risk (Gerber & Mirzabaev, 2017).

Furthermore, the African continent continues to experience wide-spreading drought, which is linked to the slow progress in drought risk management, increase in the population, and demand for water on the continent (Robinson, 2020). Marumbwa, & Chirwa, 2021; Tadesse, 2016). In the IPCC report by Robinson, 2020 drought experiences differ from one country to another.

The capacity of countries to cope with drought depends on their geographic location. As a result, governments and communities respond differently to drought, because their drought management strategies are determined by the respective governments' financial situation and their political capacity to provide short-term solutions (Masih, *et al.*, 2014). The problem is that most of the states in the region have weak economies that make it difficult for governments to implement effective mechanisms for drought management (Belle, Sithabile, & Ogundeji, 2017). As a result, drought management initiatives and programs have focused on short-term solutions such as food relief directed to crises management. African countries are thus likely to continue focusing on relief because humanitarian assistance might discourage local initiatives and ownerships in long-term (Vogel, Koch & Van Zyl, 2018; Sam, Padmaja, Kachele, Kumar, & Müller 2020).

Research literature has therefore stressed the need for a shift from crisis management to risk management. At the moment governments and donors provide more resources for response activities rather than for long-term developmental activities that deal with planning, mitigation, and disaster preparedness (Tadesse, 2016). Most African governments continue to be more responsive to crises than being prepared due to their financial and institutional incapacity. Even though there have been substantial progress and understanding on risk management, there remains a gap in research and policy on effective strategies for drought preparedness (Gerber & Mirzabaev, 2017; Jayanthi, et, al. 2014).

2.3 DROUGHT IMPACTS IN SOUTHERN AFRICA

As a result, of the undesirable recurrent rainy seasons, countries like Botswana, Lesotho, Namibia, South Africa, and Zimbabwe have recorded unfavorable production prospects (FAO, 2019). In 2019 alone, aggregate cereal output of 30.2 million in the Southern African Democratic Countries (SADC) was estimated to have declined respectively by 2.1 million below the previous five years' average (FAO, 2019). This potential reduction in crop outlook was due to extreme weather events resulting in extensive crop losses and a reduction in yield produced in the region (SADC, 2016).

The agricultural sector contributes to more than 35% of the SADC regional economy. However, the drought in the region has put a toll on the gross domestic product of the countries in the region (Vogel, Koch, & Van Zyl, 2010). For example, in a typical non-drought year, South Africa exports excess maize, but during the 2016/2017 season, the impact of drought on agriculture was so massive that South Africa moved from being a

net exporter of maize to being a net importer of maize (Schreiner, Mungatana, & Baleta, 2018). Accordingly, these severe losses due to drought significantly impact rain-fed crops, stressing livelihood and coping mechanisms (Nhamo, Mabhaudi, & Modi, 2019).

Namibia, on the other hand, experienced drought in all parts of the country in the season of 2019; however, extreme heat was more pronounced in the communal areas crop production regions that include Zambezi, Kavango East, Kavango West, Omusati, Ohangwena, Oshana, and Oshikoto Region (MAWF,2019). The seven northern regions comprise farmers living on communal land administered by the traditional authorities. The drought has led to poor economic returns on communal land. These were exacerbated by the already existing conditions of poor soils and climatic conditions for agriculture (Nghitevelekwa, 2020; Mendelsohn, Shixwameni, & Nakamhela 2012).

In northern Namibia, farmers in communal areas practice subsistence agriculture, predominated with o*mahangu* (pearl millet), a rain-fed cereal crop that is the primary staple food for over 50% of the Namibian population (MAWF, 2019). Besides *omahangu,* other crops harvested by farmers that are also rain fed are sorghum, beans, pumpkin, watermelons, and groundnuts. In addition, some of the farmers in these areas have also started practicing horticulture to supplement rain-fed crops (Mendelsohn, Shixwameni, & Nakamhela 2012).

Direct impacts in the southern Africa region were also seen on livestock; for example, during the rainy season of 2015/2016, the region experienced 643,000 livestock deaths due to lack of pasture and water (Nhamo, Mabhaudi, & Modi, 2019). In Namibia, heat stress and the outbreak of diseases significantly led to high livestock mortality rates, which

affected farmers who lived in the communal areas (Spear *et al.,* 2018. In many societies, including those in north-central Namibia, livestock is an essential asset associated with wealth (Joshi, 2020, Nghitevelekwa, 2020; Ziervogel *et al.,* 2016). Livestock can be exchanged with cash and serve as collateral during the drought (Joshi, 2020; Spear, *et al.,* 2018). As a result of drought, the livestock sector is severely impacted, whereby grazing areas have become depleted, forcing farmers to slaughter their livestock (Schreiner, Mungatana, & Baleta 2018). Indirectly, this has led to farmers losing their essential assets (livestock), which subsequently affected their status and prestige, making it difficult for them to participate in cultural events such as weddings and funerals.

Drought also significantly impacted farmers who depend on other nature-based products such as emperor moths, also known as mopane worms, mainly in Botswana, Namibia, and Zimbabwe. These farmers are most vulnerable to drought because extreme heat causes the eggs of mopane worms to burst before they hatch, leading to short supply. This results in loss of income for farmers who take advantage of seasonal opportunities to harvest mopane worms for business (Ziervogel *et al.,* 2016).

There is a need for a broader understanding of the agricultural sector regarding drought preparedness in the region to reduce the impacts and people's vulnerability to drought (Schreiner, Mungatana, & Baleta, 2018). Although reduction in water affects both commercial and subsistence farmers, most literature on the agricultural sector, has focused more on commercial farming than subsistence farming. Furthermore, the literature suggests sufficient knowledge on future drought scenarios in the region but very little knowledge on adaptive capacity (Vogel, Koch, & Van 2010). Limited knowledge of adaptive methodologies means the region will remain poor in terms of preparedness with

low adaptive capacity. This calls for the need to integrate adaptation measures into socio-economic development strategies. To do so, Southern African governments need to push for a pro-poor adaptation agenda at local, national, and regional levels to reduce the impacts of drought on local communities (Chevalier 2010).

2.4 POLICIES, STRATEGIES AND PRACTICES TO ADDRESS DROUGHT

Drought has been documented as a challenge in southern Africa, and countries have been urged to establish new measures to adapt to drought impacts (IPCC, 2014). Successful adaptation requires countries to work together and secure public resources for early warning systems, research, information, and changes to decision-making procedures (Bauer & Scholz, 2015). Actions taken by governments on managing drought impacts are pursued through national and regional drought policies. These policies are guided by international bodies such as the United Nations Framework Convention on Climate Change [UNFCCC].

The UNFCCC, is a leading structure that drive efforts to combat climate change (Tadesse, 2016; IPCC, 2014) and provides a platform for nations to acknowledge the change in the earth's climate and adverse effects as a common concern for humankind. In some countries, the first step to complement the efforts of the UNFCCC is documented in their respective constitutions. For example, the Republic of Namibia's Constitution requires that the state actively promote and adapt policies that sustain ecosystems' ecological process and biological diversity to benefit the present and future population (Republic of Namibia, 2010). In Namibia, all climate change activities are coordinated by the Ministry

of Environment, Forestry, and Tourism, through the Namibia Climate Change Committee [NCCC] that advises the government on climate change policies and strategies (Republic of Namibia, 2010).

Apart from the UNFCCC National drought policies, strategies and practices of countries in southern Africa also draw from the experiences and proposals contained in the African Drought Adaptation Forums and United Nations International Strategy for Disaster Reduction [UNISDR]. The UNISDR framework encourages discussions on critical issues that link drought risk and development by providing a platform for the development of projects, programs, and policies for extreme events including drought (Tadesse, 2016). For example, through the UNISDR strategic framework, national drought policies are encouraged to include drought monitoring and early warnings systems, and vulnerability and risk impact assessments (Tadesse, 2016).

When it comes to good practices toward drought adaptation, country actions differ. For instance, the Botswana government comprises the National Early Warning Technical Committee, which links to the Office of the President, Cabinet, rural development councils, and district level drought committees (Tadesse, 2016). The government has allocated funds that is mainly focused on emergency response to drought. In Lesotho, the Disaster Management Authority undertakes annual vulnerability assessments to inform – decision-making and development programming (Tadesse, 2016).

Meanwhile, the South African government has a comprehensive Green Paper on Disaster Management that guides action across levels of government. They have also put in place disaster weather-triggered responses (Tadesse, 2016). The Namibian government, on the

other hand, has prioritized climate change action and has passed the National Climate Change Policy in 2011(Republic of Namibia Ministry of Environment and Tourism, 2011).

National policies are expected to substantially reduce drought impacts on human lives and the economic and environmental assets of communities in the SADC region (Tadesse, 2016). Moreover, national drought policies are now moving towards a policy framework that enhances preparedness and risk reduction (IPCC, 2014). A joint effort to integrate drought risk management and environmental protection parameters is that policies and programs are now assisting farmers financially, protecting natural resources, and promoting the best use of resources for individual farmers (Tadesse, 2016).

2.5 ADAPTATION STRATEGIES IN AGRICULTURE AND THE WATER SUPPLY SECTOR

2.5.1 Water management and conservation

The most significant impacts of climate change in southern Africa and the world are likely to be on water resources and management. (IPCC 2014; SADC, 2016). When it comes to adaptation regarding water resources, governments are coming up with strict management systems. Strict management systems include adopting integrated water management and reducing the mismatch between water supply and demand through strengthening institutional capacities and adopting more water-efficient technologies and water-saving strategies (IPCC 2014; United Nations, 2004).

Water saving strategies include mechanisms such as reducing evaporation and improving water use efficiency by refining water demand management, particularly at the local level and in the agricultural sector (Crawford & Terton, 2016). In countries like South Africa and Namibia, farmers are introduced to simple techniques for localized irrigation to help conserve water, especially during the dry seasons (Ncube & Shikwambana, 2016; UNDP, 2014). These may include rainwater harvesting and storage, used by local communities to improve water usage (Francis, Wasonga, Nyangito, Schilling, Munang 2015; Spear *et al.*, 2018; Ncube & Shikwambana, 2016). In rural areas, large containers and buckets were possible tanks to capture water (Akinnagbe & Irohibe, 2014).

In South Africa, another strategy explored to manage water resources is drilling as many boreholes as possible (Ncube &Shikwambana, 2016). Despite the existing research on drought and coping mechanisms applied by local communities to manage water scarcity during the drought, people continue to be affected by drought and remains a question why some households are not adapting to drought. There are still gaps within the literature in terms of understanding how communities adapt to drought and local challenges affecting water management.

2.5.2 Adaptation practices in the Agricultural sector

Literature has stressed that Africa's drought situation has been made worse due to a high dependence on rain-fed agriculture (Akinnagbe & Irohibe 2014). A range of adaptations practices are being observed through government's efforts on projects and programs that target the agricultural sector (Bauer & Scholz, 2015). Governments support to reduce the impacts of drought on food production and quality includes initiatives that encourage crop

diversification and improved farming techniques such as conservation agriculture and drip irrigation (Crawford & Terton, 2016). Besides government efforts, communities have developed traditional agricultural adaptation strategies to cope with climate variability and extreme events (Ziervogel et, 2016). Some of these techniques include crop replacement strategies, whereby farmers are now cultivating water-efficient crops such as sorghum and wheat instead of maize and rice; this adaptation strategy is common in most countries in southern Africa? (Ncube & Shikwambana, 2016).

In most cases, rural farmers would apply autonomous methods that increase climate resilience. For example, depending on the climatic conditions of that season, farmers would decide on which crop to grow on particular land during the dry seasons. Farmers would also grow their crops on low-lying grounds and use early warnings to forecast rainfall and decide when to start ploughing (Andrew, Newsham, David & Thomas, 2011).

Another methodology used is mixed cropping, whereby farmers plant different crops in the same field. For example, farmers would mix sorghum with beans; this helps with fertility and is considered one of the essential strategies in adaptation to drought (Akinnagbe, & Irohibe, 2014). In terms of livestock farming, farmers would move animals to areas with better grazing and where water is available (Ncube & Shikwambana, 2016). In some countries, such as Namibia, farmers are now moving away from farming with grazing animals like cattle and sheep to browsers such as goats to adapt to drought conditions (Joshi, 2020).

The ASSAR is a wide-ranging research project implemented for five years between 2014 and 2018 to guide adaptation policies in Botswana, Namibia, Kenya, Ethiopia, Ghana,

Mali, and India (Ziervogel, 2016). The project took a multi-sectoral approach to guide adaptation policies and practices to maximize marginalized groups (ASSAR, 2018). In southern Africa, the two countries that participated in the comprehensive research are Namibia and Botswana.

In Namibia, the government has prioritised climate change activities, which through several projects and research such as ASSAR have been attended to. However, most of the initiatives and activities around climate change are based on donor interest and funding. As a result, adaptation networks and community practices remain inadequate (Crawford & Terton, 2016).

For adaptation to take place effectively, adaptation policies need to consider factors such as gender, ethnicity, age, household composition, marital status, and social capital (Spear *et al.,* 2018). On the other hand, local communities had encouraged the idea of promoting food banks to reduce food security at a household level, whereby each household or family is encouraged to take at least 20 litres of *omahangu* (pearl millet) to the traditional authority for use during the dry seasons (Ziervogel, 2016). While this is happening on the ground, governments need to promote new adaptive technologies to farmers' groups through village-level outreach and community engagement activities (Spear *et al.,* 2018). This research thus tries to analyse the role of social capital in adaptation to drought and address that gap.

2.6 THE ROLE OF SOCIAL CAPITAL IN ADAPTATION TO DROUGHT

2.6.1 Conceptualising Social Capital

Pierre Bourdieu originally coined the concept of social capital in 1986, Bourdieu is a sociologist who indicated that in the development of humans, they acquire, communicate and reproduce cultural, symbolic, and social capital (Bourdieu, 1986, p. 259). Bourdieu defines social capital as "the aggregate of the actual or more or less institutionalized relationship of mutual acquaintance and recognition" (Bourdieu, 1986). Bourdieu considered social capital as one of the four forms of capital, along with economic, cultural, and symbolic capital, that are unequally distributed in society (Auer, Von Below, Nahuelhual, Mastrangelo, Gonzalez, Gluch & Puruelo, 2020).

The concept of social capital is now widely applied in research and has recently become popular in studies related to agricultural innovation and climate change (Adger, 2001; Cofré-Bravo *et al.*, 2019; Ingold, 2017). For Bourdieu, social capital can provide communities with benefits due to social ties and offset certain inequalities concerning other capitals, such as economic and symbolic capital (Auer, *et al.*, 2020). According to Coleman (1990) who also contributed to the concept of social capital, the concept cannot be looked at as a single entity but as different entities that can be a public or private good (Coleman, 1990 p. 302).

Public goods can be consumed simultaneously by everyone while a private good decreases available unit for others. Social capital consists of some form of social structure that

facilitates specific actions for individuals within a structure. Coleman also incorporated different dimensions such as obligations, expectations, informational potential, practical norms, sanctions, authority relations, and appropriate social organization. Auer *et al.*,. (2020) state that if all these dimensions are considered, social capital could help human capital develop and generate benefits such as organizational productivity because of the trust among individuals.

The most widely used framework for understanding social capital is structural, cognitive, and relational social capital (Bhandari & Yasunobu, 2009). Structural social capital refers to the network of people an individual knows and relies on when receiving help, such as information and assistance. Structural social capital considers the density, connectivity, hierarchy, and availability of a network of relationships that are found amongst a group, organization, or community (Rostila, 2011). What matters when it comes to social capital are the number of ties a person has, whom they have those ties with, and how strong they are. Moreover, studies that focus on structural social capital focus on the network approach (Adger 2001).

Cognitive, social capital refers to the shared values or paradigms that allow a shared understanding of appropriate ways of acting. They provide a set of norms of acceptable behavior. Cognitive social capital refers to Bourdieu's theory of habitus, a set of dispositions, reflexes, and forms of behavior people acquire through acting in society. Furthermore, relational social capital focuses on the extent to which individuals engage in social relationships that they have developed through a history of interactions (Claridge, 2018). The whole idea of social capital is centred on social relationships and their significant components, including social networks, civic engagement, norms of

reciprocity, and generalized trust (Bhandari & Yasunobu, 2009). The three dimensions of social capital are essential in understanding the concept and its role in different communities, as illustrated in Table 2.1.

Table 2.1: Summary of the three major approaches to social capital

Structural social capital	Cognitive Social Capital	Relational Social Capital
Social Structures	Shared understandings	Nature and quality of relationships
Networks and configurations Roles, rules, precedents, and procedures	Shared languages, codes, and narratives Shared values, attitudes, and beliefs	Trust and trustworthiness Norms and Sanctions Obligations & expectations Identity and identifications

2.7 SOCIAL CAPITAL AS A MECHANISM TOWARDS EFFECTIVE ADAPTATION TO DROUGHT

The concept of social capital matters in climate adaptation policies and has proven that transfer of information/knowledge and reciprocal relations can lead to mutual collaboration that can be used by local communities to adapt to climate change (Ingold, 2017; Saptutyningsih, Diswandi, and Jaung, 2020). Empirical evidence from literature identifies that, U.S rural communities with high levels of social capital have been able to develop a collective community response that leads to food security among community members after a disaster (Christy and Niles 2018).

The importance of social capital in climate adaptation is highlighted by Paul, Weinthal, Bellemare & Jeuland (2016) where trust, community engagement, and personal relations with people played an essential role in adaptation to climate change (Ingold, 2017). Therefore, in order to support and enhance local and vulnerable communities' choice of adaptation, it is significant to include social capital in climate change strategies. This is likely to have a positive impact on farmer's decisions when it comes to coping with climate change impacts (Alam, Alam & Mushtaq, 2016; Kaung *et al.*, 2019; Spear, *et al.*, 2018). Research by MacGillivray (2018) argues that the geographic extent, place, and nature of social networks play a critical role in climate hazards and are often neglected.

Spear *et al.*, (2018 p. 4) reports that the absence of social networks amongst local communities reduces their adaptive capacity. From the above literature it can been seen that, the significance of social capital in adaptation is not questionable. Moreover, the ability of farmers to adapt depends on their personal motivation, objectives and available resources that will allow them to configure different support networks.

The role of social capital in climate change has been explored to a certain extent; however, its role on farmers in communal areas who depend on the land and have low adaptive capacity remains a shortfall. This research thus fills the gap in the literature by identifying the different types of social capital that play a role in adaptation to drought and their level of importance. The study also examines the determinants of farmers in the communal areas' choices of adaptation and barriers that result in low adaptation capacity.

2.7.1 Social networks and collective action amongst agricultural communities as a means of promoting adaptive behaviour

According to Bhandari and Yasunobu, (2009 p. 13), the basic notion of the definition of social capital falls in the broad framework of Bourdieu, who said that "It is not what you know but whom you know that matters". Putman, (2000) explains that the basic idea of social capital is that a person's family, friends, and associates constitute an important asset, one that can be called on in a crisis, enjoyed for its own sake, and leveraged for material gain.

What is true for individuals, moreover, also holds for groups, for example, Ziervogel, *et al.,* (2016) stated that during disasters such as drought, farmers lose their prestige and status due to livestock deaths; this reduces farmers' participation in social networks, leading to low adaptive capacity (Ziervogel, *et al.*, 2016). Therefore, when farmers lose their livestock, their chances of participating in traditional ceremonies such as weddings and funerals are reduced, and this indirectly affects their level of social capital (networks that they can look for in times of need) (Ziervogel, 2016, *et al.*,2016). This aligns with the definition of Putman (2000), social capital provides benefits to actors by enabling them to participate in social networks and larger structures.

In rural communities' social networks are usually obtained through collective action, which refers to action taken together by a group of people whose goal is to achieve a common objective (Wang & Tan, 2020). When collective action is practiced through voluntary participation, cooperation is more effective (Gillenson, 2004; Paula, Weinthal, Bellemare & Jeuland, (2016). Empirical studies from literature identifies social networks

and collective action, which are types of social capital, as essential capital amongst communal farmers and can lead to the empowerment of farmers. Highlighting the importance of collective action, Hulk and Diez, (2020) defines the term community adaptive capacity as the ability of a group to address a common issue or provide members with common goods through collective action.

In managing common natural resources such as land or water, collective action grounds most decision-making processes at the local level. Resource-dependent livelihoods, especially in agriculture, must deal with the collective organization of scarce resources, various property rights, and sources of knowledge and information (Cofré, Bravoa, Klerkb & Engler 2019. Collective action encompasses various forms of cooperative interaction, ranging from self-organization in neighbourhood groups to official membership in cooperatives. A shift in regional development strategies from exogenous to an endogenous organization of collective action at the local level can serve as a promising approach in building adaptive and in the long run, transformative – capacity for livelihoods (Hulk & Diez, 2020; MacGillivray, 2018).

Networks and collective action are essential, especially when facing environmental changes and increasing impacts of economic globalization among rural farmers who depend on agriculture for livelihood (Hulk & Diez, 2020). According to Ncube and Shikwambana (2016), social networks are essential for households in desert regions to ensure access to water. Ncube and Shikwambana (2016) also stated that large families with influential social networks stand a better chance in negotiating to promote their interests. However, when it comes to this type of social networks, the main disadvantage is that poor households will continue to be marginalized and struggle to form potential

networks (Ncube & Shikwambana, 2016). The following section will focus on the support networks used by farmers in adaptation to climate change, specifically drought.

2.7.2 Support Networks used by Farmers: Bridging and Bonding Ties

Most social capital research that adopts a network approach concentrates on bonding and bridging ties (Ingold, 2017). Bonding ties entail the connections and interactions between homogenous community members such as neighbours and family members. It is rooted in individual forms of trust and reciprocity between, family, friends, and neighbours. In most cases, families and neighbours are the ones who first respond to disasters by rendering support to each other before other support systems come. The ties they form are generally crucial in sharing ideas and close relationships that result in strong social support and in-group attitude (MacGillivray, 2018).

However, bridging ties refer to relations between individuals or groups with different characteristics, such as different ethnicity, culture, age, and social or economic status (Nguyen-Trung, Forbes-Mewett, & Arunachalam, 2020). It has its roots in heterogeneous networks, social trust, and generalized reciprocity. This type of network provides access to a diversity of resources, skills, and knowledge, which is usually not accessible through bonding capital (MacGillivray, 2018, Cofré-Bravo, Klerkx, and Engler 2019).

Both bridging and bonding are beneficial to rural communities in building resilience and adaptation for effective community responses to climate change impacts (Christy & Niles, 2018). According to Cofré-Bravo, *et al.*, (2019), farmers' configurations of support networks differ. Different authors have recognized that farmers' innovation is not entirely based on individual competencies and actions, but it is also influenced by social networks

that farmers are embedded or have created to help them acquire knowledge and resources (Cofré –Bravo, Klerkx & Engler, 2019). Farm innovation requires different sources of knowledge, material and financial resources, and mental support (Cofré-Bravo, *et al.*, 2019).

Bonding capital is sometimes regarded as the dark side of social capital, because the trust, social ties and shared beliefs that may be beneficial to some people are detrimental to other (see for example Dirio Numerat, Simone, Belgian 2011) especially when cemented by ethnic hostility and patronage networks (MacGillivray, 2018). This means that social relations can be used to advance private interests at the expense of the public good. Christy and Niles (2018) in their study on the role of community social capital for food security following an extreme weather event, found that at the tropical storm, both bonding and bridging social capital influence rural community responses (Christy and Niles, 2018).

Bridging social capital on the other hand connects individuals and members of groups based on their ethnicity, race and identity Dressel *et al.*, 2020). This type of social capital attracts individuals from different locations that have a common goal (Kawamoto & Kim, 2019), this type of social capital connects people who don't know each other and have no similarity, (Otte, 2019). Therefore, this type of social capital will allow greater access to formal knowledge, innovation, experiences, training opportunities and financial resources for farmers. With this type of social capital farmers can have greater capacity to acquire and accumulate knowledge about knew technologies that they can apply to resolve different issues of their farms such as the management of crops during, (Cofré-Bravo, *et al.*,). It is through bridging relations that farmers can receive timely information to cope

with the drought, Dressel, *et al.,* 2020). This type of social capital becomes important in long term recoveries.

2.7.3 Inclusivity of Social Capital in Drought Adaptation Policies

Impacts posed by climate change-induced disasters such as drought can be reduced through the involvement of decision-makers in climate change adaptation policies (Ingold, 2017). In order to support local communities to cope with the impacts of drought, adaptation strategies need to incorporate issues related to access to social capital (Alam, Alam & Mushtaq, 2016). However, the government's role is very crucial in the effectiveness of social capital as a mechanism that facilitate adaptation to drought. The government should make available institutions where farmers can access information on adaptation to drought as well as credit facilities available to all the farmers, (Saptutyningsih, Diswandi, Jaung 2020; Spear *et al.,* 2018).

In the livelihoods of farmers, social capital plays a significant role and promotes farmers' adoption of climate change strategies, including drought strategies (Kaung *et al.,* 2019). In most cases, governments react to climate change disasters by creating adaptation strategies and introducing political instruments and measures (Ingold 2017). For example, governments would develop political programs and projects that entail new infrastructure, irrigation plans, early warning systems for extreme events, or land use maps. As highlighted before, social capital is important when it comes to making the right choices and which mechanism to use (Ingold, 2017). When relationships between civil societies and the state are mutual and supportive, social capital can promote the adaptive capacity of societies to cope with climate change (Adger, 2001). Interventions on drought, such as

drought relief, can create dependency, however, improving social capital among community members can enhance their chances of coping independently (Spear *et al.*, 2018). However, it is important to take note that social capital is not a one size fits all. Hence there are social differences amongst communities that have a great influence on information sharing and collaborations amongst community members which, can lead to weaker or stronger ties (Ingold, 2017).

2.8 LIMITATIONS OF LITERATURE ON SOCIAL CAPITAL IN UNDERSTANDING AFRICAN FRAMEWORKS OF UBUNTU

The concept of Ubuntu which is not highlighted in the literatures and research of social capital can be very essential in the implementation of strategies amongst local communities, this thesis addresses some of these Ubuntu philosophies as regards to social capital. According to Lefa, (2015) the philosophy of Ubuntu is grounded in the principle of caring for one another's well-being and a spirit of mutual support. Ubuntu is embodied in African communities and lifestyle therefore the outcomes of any strategy amongst local communities in Africa can be influenced by the Ubuntu personality and values such as caring, sharing, equality, compassion, tolerance and harmony for others (Lutz, 2009).

Ubuntu is regarded as the sole force that drives almost every societal life in African societies and creates the relationship between the African communities (Lefa, 2018). In Africa a person living within a community whereby hunger, poverty and any emerging challenges are can survive because of communities brotherly and sisterly concerns (Lutz, 2009). The spirit of brotherly and sisterly that leads to collectivism amongst community members can cultivates a team spirit to towards work. It is important to take note that in

Africa the dominant spirits determine the organization outcomes, consciousness culture and energy levels which ultimately determine corporate performance Mkhabela, (2014). Therefore, ubuntu must be reinforced, rebuilt, re-established, and refurbished; this can only be done through the development of value-laden human rights educational programs promoted and delivered within the indigenous environment.

2.9 SUMMARY

The literature reviewed indicates that drought continues to put a toll on the African continent. The distressing impacts are felt more by the farmers living in communal areas and specifically in the agricultural sector. Furthermore, local community can be more adversely affected because most African governments are more responsive to crises than being prepared for the drought. In southern Africa, policies and measures pursued by governments are now focusing on strengthening adaptation strategies to improve drought preparedness at the local level. Social capital as one of the mechanisms plays a significant role in adaptation to climate change. In chapter three, the methodology used to collect data on social capital's role in adaptation to drought amongst farmers living in communal areas is analysed.

CHAPTER 3: METHODOLOGY

3.1 INTRODUCTION

This chapter presents the data collection methods and all issues relating to data collection on social capital's role in adaptation to drought. The chapter is divided into five sections. First, the qualitative research methodology is explained as well as the case study design. Second, the population of the study, sample, and sampling methods are presented. Thirdly, the data collection techniques are described and fourthly, methods of data analysis are presented. Lastly, the chapter looks at the ethical considerations and how they are dealt with in the research.

3.2 RESEARCH DESIGN

In this study, the qualitative research method was employed to analyse the role of social capital in adaptation to drought in Osheedhiya village, Omusati Region. This method was considered to be the most appropriate in exploring the concept of social capital in adaptation to drought because it allowed the researcher to get in-depth information about a specific phenomenon (Teegavarapu, Summers & Mocko, 2008). Furthermore, this study used the case study research design by focusing on Osheedhiya village in the Omusati Region. The strength of the case study research design is that it is grounded and applicable to real-life situations and provides in-depth data that helps create new theories and strengthens previous studies on the phenomenon being studied (Krusenvic, 2016).

3.3 POPULATION

In this study, the population was comprised of two groups, firstly the farmers from communal areas, specifically the village of Osheedhiya in the Omusati Region. These are farmers who live in Osheedhiya village and practice crop production or livestock farming, and who depend on rainfall and were impacted by the drought in the past five years. Secondly, key informants from the Omusati Region were considered; these are experts in sustainable and community development. The key informants included the Chief Regional Officer from the Omusati Regional Council, Councillor of Onesi Constituency, Traditional Council from Uukolonkadhi Traditional Authority, Community Liaison Officer, Division Rural Services, Omusati Regional Council, and the Agricultural officer from Ministry of Agriculture, Water and Land Reform at the constituency level.

3.3.1 Sampling and sampling procedures

This study comprises was based on a sample of 20 farmers who represent 20 households out of 63 households in the village of Osheedhiya. The village is divided into two parts A and B. For this study, part A was selected which comprised of 63 households. Part A of the village was selected because most of the households belonged to the residents who were born and bred in Uukolonkadhi. Additionally, the sample comprised of five key informants representing the institutions of Onesi Constituency Office, Omusati Regional Council, Ministry of Agriculture, Water and Land Reform at the Constituency level and Uukolonkadhi Traditional Authority.

This study employed a non-probability sampling method, which is applicable for qualitative research methodology. In particular, a purposive sampling procedure was used to select the sample. Purposive sampling, also known as judgmental sampling is used when participants are selected based on their knowledge and experience (Stebbins, 2001). In this study, farmers were selected purposely based on their experience of the drought in the past five years. The participants were full-time farmers who were in the village during the past five years and could share their experiences. For example, farmers who own households and a field in the village but do not stay full-time were not selected. In addition, farmers who did not stay in the village in the past five years were not selected. Key informants were selected based on their experience in the field of sustainable development and community engagement.

3.4 DATA COLLECTION INSTRUMENTS

In this study, semi-structured interview guides were used to collect data from participants. The semi structured interview guide comprised of non-structured questions that incorporated themes such as drought impact, accessibility of social capital, types of social networks, including bonding and bridging ties and types of adaptation strategies. Semi structured interview guides were suitable in this study because they allow the researcher to ask probing non-structured questions (Stebbinces 2001). In this case, the researcher could probe more, especially on the concept of social capital, which participants were not familiar with. Interview guides for the key informants were different from each other, each depending on the expertise of the key informant as an expert in their field.

3.5 PROCEDURES FOR DATA COLLECTION

All the participants received a letter informing them of the research with clear explanations of the study's aims, and phone calls were made to set up interview dates through the village headman and the Onesi constituency councillor. Interviews with farmers took place at their households at a time agreed on by the researcher and participants. At the same time, interviews with the key informants took place during office hours at their respective offices. Interviews with the farmers were all conducted in the local language, Oshiwambo. Since the researcher is conversant with the language spoken in the Omusati Region, an interpreter was not necessary. Interviews lasted over 45 minutes and audio recordings were also used during interviews to supplement handwritten notes.

3.6 DATA ANALYSIS

Thematic data analysis was used, whereby patterns of themes from interview transcripts were selected. The 25 audio recordings were analysed, coded, and put in themes to present a coherent narrative of the role of social capital in adaptation to drought. The qualitative software ATLAS.ti was used to analyse the themes. In data analysis, the following codes were used:

Table:3.1 Codes used to represent quotes from farmers and Key informants who participated in the research

Communal Farmers interviewed	**Key informant interviewed**
CF01	EAO
CFO2	ETO
CF03	ECR
CF04	EOC
CF05	ELO
CF06	
CF07	
CFO8	
CF09	
CF10	
CF11	
CF12	
CF13	
CF14	
CF15	
CF16	
CF17	
CF18	
CF19	
CF20	

3.7 RESEARCH ETHICS

The University of Namibia issued an ethical clearance before the study was undertaken, and therefore, the study is in line with the approved ethical guidelines. During the interviews, the topic was introduced to participants as an analysis of the role of social capital in adaptation to drought. Emphasis was made on the fact that the study is a requirement of a master's degree. Furthermore, participants were informed that participation was entirely voluntary, and they were free to withdraw at any time, without any negative consequences. Participants were also assured of confidentiality and anonymity. Therefore, during data analysis, a list of codes was developed and used to refer to participants and they were handled with great care. The list of codes developed was not shared with any other person, and only the researcher could interpret the meanings of the codes. Therefore, the names of the participants are not divulged in this thesis. All the research data is kept in a locked safe for five years, and it will be destroyed by shredding and burning when no longer required.

3.9 SUMMARY

Chapter 3 highlights the methodology used in analysing the role of social capital amongst farmers in communal areas. The qualitative research methodology and case study research design were used. The population, sample and sampling frame were also described as well as the data analysis and ethical considerations. The next chapter will focus on the findings of adaptation to drought in the village of Osheedhiya.

CHAPTER 4: RESULTS AND DISCUSSIONS

4.1 INTRODUCTION

This chapter presents the findings of the role of social capital in adaptation to drought from the perspectives of farmers in communal areas and that of the key informants in the field of agriculture, community development, and governance in the Omusati Region. The chapter starts by providing an overview and ethnographic setup of Osheedhiya village. Furthermore, the chapter presents farmers' experiences of rainfall variability and drought between 2015 and 2019. Additionally, key features that play a role in farmers' preparedness for drought and how the drought affected the farmers are presented. Social capital as a strategy in adaptation to drought is discussed by exploring the different types of social capital in Osheedhiya. Lastly, the chapter presents the social difference and the variance amongst farmers in adaptation to drought.

4.2 INTRODUCING OSHEEDHIYA VILLAGE

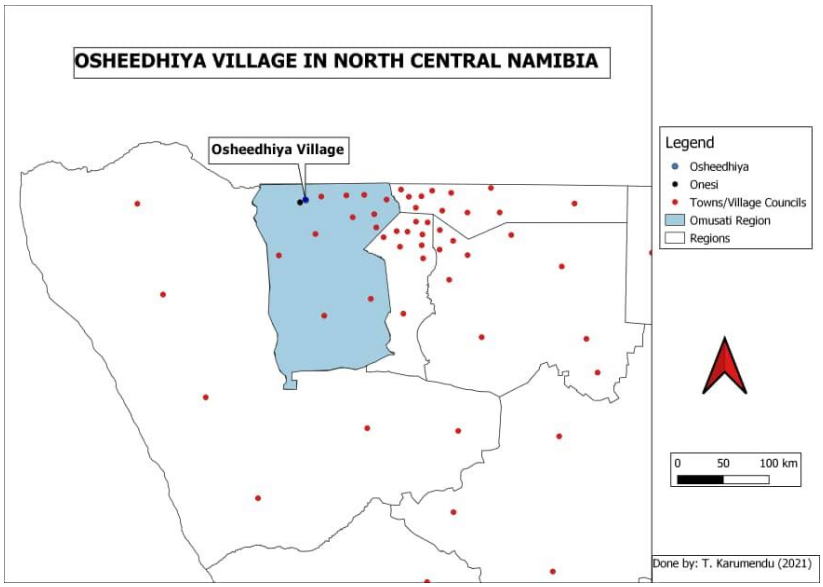

Figure 4.1: Location of Osheedhiya village in the Onesi Constituency, Omusati Region, North – Central Namibia, Source: © Karumendu, 2021

Osheedhiya is a village located in the Onesi Constituency, Omusati Region in north-central Namibia. The village is 30 kilometres west of Outapi Town, which is the capital of Omusati Region. The village is divided into two parts, namely, Osheedhiya A & B, and this study focused on Osheedhiya A, which comprises 63 households. Like all other villages on communal land, Osheedhiya is predominantly an agricultural area, where the production of o*mahangu* (pearl millet) and the rearing of livestock is the predominant use of the land and the basis of livelihoods for many households.

The land is communal land vested in the state and administered by the traditional authority (headman level under the Uukolonkadhi Traditional Authority) as provided for by the Communal Land Reform Act, 05 of 2002. The tenure system is customary, where different types of land rights are allocated by the traditional authority and given legal effect by the Communal Land Board (which is at the regional level). Like in many communal areas, the land rights found in Osheedhiya village are customary, rights of leaseholds, and occupational land rights. The village is constrained by poor soils and, therefore, poor crops yields, a situation that is exacerbated by the variability in climatic conditions (Mendelsohn, Shixwameni & Nakamhela, 2012).

Due to the area's land tenure system, the village land has minimal economic value and inadequate access to financial and other necessary services, as commercial banking institutions do not avail financial facilities to people residing on communal land without collateral. The individualised landholdings range from five to fifteen hectares, mainly for cropping and residential. Households are surrounded by common land areas filled with mopane trees primarily used for everyday use to harvest firewood and grazing (Nghitevelekwa, 2020; NSA, 2011).

The village of Osheedhiya is approximately three kilometres away from the Olushandja Dam, also known as "*Etaka Dam*" by the local communities. The Dam has a maximum capacity of 42 million cubic meters and stores water from the Calueque Dam nearby Angola (Kapalanga, Hoko, Gumindoga & Chikwiramakomo, 2020). The Dam serves as a balancing and storage dam for water supplied from the Calueque Dam on the Cunene River. Olushandja Dam forms an important component of the bulk water supply network (Esmé, G. 1995). Similarly, the dam provides an opportunity for some farmers living in proximity to the Dam to engage in horticultural production that includes onions, cabbage, tomatoes, beetroot, butternuts, sweet potatoes, and gem squash which they sell to the community of Omusati Region, mainly to Otsandi, Opuwo, Outapi and Oshakati town.

Figure: 4.2 Illustrates a horticultural Project in Osheedhiya village owned by a teacher in the Onesi constituency, © Jovita Protacios

According to the NSA report of 2011, the Onesi Constituency in the Omusati Region reported a high percentage of dependence on farming compared to other constituencies in the Omusati Region, and this could be due to the proximity of the Olushandja Dam.

Figure 4.3: Olushandja Dam is a vital source of water that brings subsistence to livestock and crop production on Osheedhiya village © Martha Jonas

Livestock farming in the village has reduced, but livestock farmers are now moving away from farming with livestock that are grazers to livestock that are browsers or a combination of both browsers and grazers (NSA, 2018). Besides farming activities, the livelihoods of farmers include other sources of income, such as the old-age pension grant of N$ 1200 per month given to adults above 60 years old, which is the primary source of income in most households, followed by orphan and vulnerable children grants, paid to children's homes were a child under the age of 18 have lost one parent or in cases of children with disability. Some households have indicated that they also depend on cash remittances from family members, mostly from their biological children living in other regions and towns; very few households depend on the disability grants and retirement

fund (NSA, 2018). In households with people categorized as veterans, the veteran grant is one source of income for these households. Very few individuals in the village have formal jobs. According to the NSA report of Omusati Region (2011) only 36. 1 percent of the rural population in Omusati region is employed.

4.3 DEMOGRAPHIC DETAILS OF RESEARCH PARTICIPANTS

Research participants' demographic details are analysed in terms of the age of the farmers, gender, number of years the farmers have been living in Osheedhiya village, type of farming practice, and the primary source of income. These details are presented in Table 3 below, illustrating the demographic data of farmers who participated in the study.

Table 4.1: Demographic data of farmers who participated in the study

Participants	Age	Gender	Years of Living in Osheedhiya	Type of Farming	Main Source of Income
CF01	70	Male	More than 30 years	Crops and livestock	Pension fund and disability grant
CF02	58	Female	Six years	Crops	Civil servant
CF03	80	Female	More than 30 years	Crops and livestock	Pension and cash remittances
CF04	55	Female	15 years	Crops	Selling of marula seeds and basket weaving
CF05	88	Female	More than 30 years	Crops and livestock	Pension and cash remittances, veteran grant
CF06	50	Male	More than 30 years	Crops and Livestock	Veteran grant
CF07	67	Male	20 years	Crops and livestock	Civil servant
CF08	78	Female	More than 30 years	Crops	Pension grant

CF09	62	Female	25 years	Crops	Pension grant, basket weaving, and cash remittance
CF10	45	Female	13 years	Crops and livestock	Cash remittance
CF11	75	Male	More than 30 years	Crops and livestock	Pension and disability grant
CF12	67	Female	More than 30 years	Crops and livestock	Pension and cash remittance
CF13	42	Male	Seven years	Livestock	Livestock farming
CF14	58	Male	20 years	Crops	Veteran grant and retirement
CF15	45	Male	5 years	Crops	Horticulture produces
CF16	55	Male	15 years	Livestock	Veteran grant
CF17	67	Male	13 years	Crops and livestock	Livestock farming, retirement, Veteran grant
CFC18	40	Female	13 years	Crops and livestock	Owns chicken poetry, retirement
CF19	63	Male	25 years	Crops and livestock	Livestock farming, businessman
CF20	52	Female	21 years	Crops	Civil Servant

The demographic information presented in table 3 shows that participants interviewed were in the age group 40 – 88, and all had lived in the village for more than five years. The table also shows that ten females and ten males participated in the study. This indicates that information constructed represents both male and female gender. The table further shows that male participants practice farming with livestock, especially cattle, but most female participants were more into crop production. This is translated in terms of gender roles and social status: men's interest in livestock is associated with prestige and wealth while the women are interested in food production to feed their household.

Consequently, drought impacts might differ from male and female, depending on whether crops or livestock were more affected. Table 4 below describes the key informant who participated in the study.

Table 4.2: Key informants who participated in the study

Participant	Institution
EOC	Constituency Office
ECR	Omusati Regional Council
ETO	Uukolonkadhi Traditional Council
ECL	Omusati Regional Council
EAO	Ministry of Agriculture Water and Land Reform, Constituency-Level

4.4 PERCEPTIONS ON DROUGHT AND RAINFALL VARIABILITY

The research participants were asked to describe the rainy seasons in the years between 2015 and 2019. The most popular response from participants was that over these years, drought have become common. One of the participants describing the changes in rainfall with reference to the region had this to say: *"Rainfall has varied in the Region, there have been years before where we have received good rain, but rainfall has become unpredictable, especially in 2015 -2019"* (Key informant ECR).

Another participant shared that: *Between 2015 and 2019, we have been faced with prolonged dry seasons with very little or no rainfall at all.* Farmer (CF16)

Most research participants in the village highlighted the 2015, 2017, and 2019 rainy seasons as very dry with very little rainfall compared to other rainy seasons. Most farmers

referred to the rainy season of 2019, as the driest year they have ever experienced in their years of farming. This argument is supported by Shikangala (2020), who reported that the 2019 rainy season was the worst rainy season Namibia has ever experienced in the last 90 years. Describing this, one research participants stated that:

2019 is very much similar to that of 1981; the sky was clear; you could not even see one cloud in the sky. Farmer (CF12)

Another research participant stated that:

The rain over the past years was unreliable, but 2019 left a significant mark in our farming history Farmer (CFO6)

Moreover, the statistics from the Ministry of Works and Transport, Metrological services of April 2015, April 2016, April 2017, April 2018, and April 2019 support participants' sentiments regarding 2019 and 2015 to have been one of the driest seasons experienced in the Onesi Constituency. Participants believe that there is a variation in climatic conditions over the years 2015-2019 and that there has been change in conditions of their environment. An expert research participant iterated that:

Our environment is becoming drier and drier with intense heat. Key informant (EAO)

This interpretation by the key informant above is in line with Ziervogel *et al.*, (2016), who found that heat stress in Namibia contributes to the outbreak of diseases affecting livestock. Even though the region has received good rainfall in the year 2020, drought have become an issue of concern over the years. Moreover, this information suggests that people are aware of the changes that are happening in their environment.

4.5 THE IMPACT OF DROUGHT ON CROPS AND HARVESTS

Farmers in Osheedhiya village, just like other farmers in other communal areas in Namibia, survive on rain-fed agriculture to feed their families. In normal times, these families are self-supporting and produce enough food for their families. However, when drought strikes and harvest is poor, they do not have enough to feed their families. The Crops Prospects, Food Security and Drought Situation Report of 2019 revealed that crop-producing regions in Namibia drastically reduced their crop output due to the high dependence on rain-fed agriculture (MAWF, 2019).

"Ka pwali omwali tatumbu omukwawo"

The subheading of this section talks about the impacts of drought as experienced in Osheedhiya village. The caption was extracted from the interview with farmer CF07, who described the drought experienced to have been very tough. The farmer used a proverb in the vernacular language Oshiwambo that states: "*Ka pwali omwali ta tumbu omukwawo*". Using this proverb, the farmers meant that the drought was so severe, and the impacts were intense for everyone, making it difficult for farmers to assist each other.

The drought impacts were so severe, everyone is affected and could not help each other. From this statement it seems that despite the fact that the impacts of drought was severe, everyone was affected equally probably because of their social structures and low adaptive capacity (they do similar activities that is rain fed farming and livestock keeping), and that could not help each other because they have similar networks that are inactive during severe drought and this may suggest that most bonds do not necessary provide access to important resources when disaster strike, and thus the need for bridging social capital is

critical to provide access to external resources and assistance, This is supported by Otte, 2019. With regards to experience of the drought and its impacts on crop yields and food security, other research participants stated that:

The drought in the past five years was so severe that we could not harvest enough from our field to carry us to the following year. Farmer (CF02)

We did not even get etanga lyamukunkulwa (wild melon) or olata (25-liter bucket) of omahangu from the harvest. Farmer (CF08)

Our omahangu storage was empty, especially during 2015 and 2019. Farmer (CF12)

The accounts given by participants above suggest that there are times when drought severely affects crop harvest and food security in their families. This is in line with the findings by Milgrom and Giller (2013), who found that sorghum and millet can disappear entirely during drought. Farmers further reported that the drought was so devastating and widely spread that its effects were difficult to manage. They stressed that what made things worse for them was that they could not store their harvest for the next year due to drought. Below is a statement from one farmer stressing the extent to which drought impacts on crop harvest is very critical compared to other challenges facing crop production, such as the outbreak of locust:

Locusts usually attack our crops, but we still have some harvest, but we could not harvest anything during the dry seasons. Farmer (CF 05)

Participants further argue that, during the 2018/2019 season drought, in order for households to survive, they had to buy maize from the shops since omahangu was difficult to acquire, even from informal trading. In some cases, when *omahangu* was limited or the yields were not enough for specific years, farmers could buy '*omahangu'* from farmers in the neighbouring country Angola that had a better harvest due to the availability of water in the Calueque Dam, located on the Cunene River in southern Angola. Below is a statement from one farmer:

Our sisters from the neighbouring country Angola took advantage of the opportunity to sell omahangu during the 2019 drought *because they had a better harvest, prices were so high that 10 kilograms of omahangu were sold at N$ 200*. Farmer (CFO7)

4.5.1 Impacts of drought on the livestock economy

When participants were asked to reflect on the impacts of the drought, participants emphasized that the pressure was mostly on livestock, which depend on grazing. Humans had the option of buying maize and other food supplements. Farmers further emphasized that the impact on livestock was so severe, especially in 2019 and 2017, whereby many households were left with a few goats and cattle skulls scattered in the field. Two of the research participants shared their experiences, including how the impacts of the drought further affected their finances:

Cattle were hardly-hit; even if you feed them, they remained as if they were not fed at all and demanded more food. Farmer (CF20)

Our pockets ran dry trying to resuscitate our livestock that still died in the end. Farmer (CFO6)

During the interviews, it was observed that the discussion on livestock brought many emotions to male research participants. Most of the male participants reported that the drought of 2019 discouraged them from engaging in cattle farming. Participants pointed out that as men in Aawambo culture had to experience their cattle perishing due to the drought, their status in society was also affected. This is in line with findings by Joshi (2020), who found that livestock is significant to the Aawambo culture and that there is a cultural stigma attached to male members of society who do not own livestock. One of the key informant participants stated that:

I bought ten cattle with my resignation Cheque in 2016 just for my cattle to all die during the drought. My investment was in vain Farmer (CF16)

As a man, when you see your cattle dying one by one, it takes away your pride, you become ashamed to face the society and participate in traditional ceremonies; men are respected due to their participation in traditional ceremonies through their participation of slaughtering cattle. Key informant (ECR)

This is in line with the study done by Ziervogel *et al.,* (2016) who found that the loss of livestock significantly impacts the loss of income, status, prestige, and participation in social networks of farmers who depend on livestock. Farmers stressed that most of their livestock died while hoping to get water in the Olushandja Dam that also went dry, especially during the 2019 drought. A study done by Nakanyete, Shikangala, and Vatuva

(2020) reported that at least 9000 livestock were reported to have died of thirst. Hence, the impact of drought on livestock affects farmer's participation in social networks resulting to an increase in the farmer's vulnerability and reducing their adaptive capacity due to weaker ties as well as reducing their status in society. Farmers are therefore not able to hold onto livestock as a means of insurance, usually selling their livestock during emergencies, or sponsoring of livestock during traditional ceremonies such as weddings and funerals.

4.5.2 Other impacts of drought on farmers in Osheedhiya Village

Another impact highlighted by farmers but not linked to rain-fed agriculture and livestock in Osheedhiya village was the loss of income from horticultural activities. Due to the village's proximity to the Olushandja Dam, many farmers in the vicinity of Onesi Constituency pump water from the Dam, which they use to produce cash crops such as beetroots, carrots, cabbage, sweet potatoes, tomatoes, onions, and gem squash. As a result, when the Dam did not receive enough water from the Cunene River, farmers could not continue pumping water from the dam, which had a significant impact on the income generated from cash crops and the community members who work in the nearby horticulture farms. Thus, the impact of drought goes beyond feeding households to affecting farmers' financial incomes as well. In the study by Hegga *et al.*,. (2016) he supports that income generation projects surround the village Olushandja. One of the research participants whose family members are engaged in the income-generating projects shared that:

Our children are employed in the small vegetable gardens around the village, and when the Etaka dried up, we had to share our pensions and small earnings with our children Farmer (CF09).

The impacts of drought in Osheedhiya village were also experienced in terms of materials used for building purposes. For example, the farmers shared that many households' huts were left unmaintained because there was a shortage of grass to make huts. The available grass was used sparingly as livestock feeds. One of the farmers CF12 said that:

My household huts have not recovered from the damage of the drought*; up to today, most of the huts are still not maintained after I used the grass to feed my livestock.* Farmer (CF12).

The above findings indicate that in Osheedhiya village, the seasonal harvest was highly affected, whereby food production reduced drastically, leaving most of the *omahangu* storage empty. Furthermore, livestock deaths, especially cattle, took a toll on farmers whose prestige lies in owning livestock. Due to the village's proximity to the Olushandja dam, the active youth and farmers could not work in the horticultural project since the dam had dried up. Moreover, the immense impact of drought coupled with lack of drought preparedness will continue to threaten farmers' livelihood and food security in the future. According to Crawford & Terton, (2016) The above findings call for an enhancement of risk management strategies to strengthen capacities for disaster risk preparedness amongst communities who are affected by drought.

4.6 DROUGHT PREPAREDNESS AMONGST FARMERS

In this section, we will focus on how farmers narrate their experiences of drought by identifying key features that determined their ability to cope with the drought.

4.6.1 Selling of livestock

One of the common strategies applied to reduce the impacts of drought is selling of livestock to reduce pressure on limited feed available for animals. One of the farmers stated that:

We sold our livestock to reduce the pressure on the limited feed that was available and generate income to buy food for our families and supplements for the remaining livestock. Farmer (CF06)

The above quotation was extracted from a discussion with farmer CF06, who highlighted that the first thought that came to most farmers' minds was to sell their livestock to reduce the pressure of feeding a large number of livestock and generate money to buy food for their household members. Joshi (2020), who studied barriers to selling livestock in the face of drought in the Omusati Region, these barriers are such as information, markets culture and financial security. Additionally, selling livestock was based on previous experiences where most farmers lost large numbers of cattle, hoping they would survive on the limited grazing available at that time. This adaptation technique is in line with a study done in the UK by Salmoral, Ababio, and Holman (2020) that found that strategies

used by farmers during the drought were short-term to address feed shortages. Another farmer shared different sentiments that:

Selling livestock was not easy; but we had to do it to reduce the livestock amount drastically. The selling price was so low that cattle could go for as little as N$ 3000. Farmer (CF20)

The above narrative also illustrates that low prices on livestock can also be categorized as one of the barriers to selling livestock. Participants further stressed that farmers who could sell their livestock faster during the dry season only managed due to relationships and mutual trust that they had with other farmers in other regions and areas; This could be linked to the bridging networks that farmers had outside their locality where they could access new information as well as technology that will allow them to better cope with the drought impacts. Relationships and mutual trust are an essential form of social capital. This is supported by Ingold (2017), who described that mutual trust and established relationships could help communities respond immediately to climate change disasters.

4.6.2 Trading for livestock feed

Farmers also indicated that another strategy used was trading boxes of horse mackerel fish to acquire animal feed. One of the farmers who has engaged in this strategy shared that:

I would buy fish boxes and drive to Etunda, an irrigation farm 40 km from Onesi and exchange 10 kg - 16 plus of masbakel fish (Horse Mackerel) for animal feed. At Etunda, I would gather maize stalk and cabbage leaves in a 50 kg drum. Farmer (CF14)

This citation by the above farmer represents bonding ties a type of social capital that refers to trust relationships between members of a network with strong ties and typically informal collaboration. Cofré-Bravo, Klerkx & Engler (2019) found that bonding ties facilitate connection and cooperation between Chilean fruit farmers from Chile.

4.6.3 Feeding livestock with indigenous fruits and seeds

Knowledge of alternative animal feeds is important for drought preparedness. One of the options identified by farmers include cutting of Mopane branches into smaller pieces to accommodate the old animals that could not feed by themselves. Despite the fact that this short-term response mechanism saves lives of livestock participants anticipated that some of these strategies were used out of desperation. One of the key informant research participants stated that:

Farmers were going against the Uukolonkadhi Community Forest principles, and they went to the extent of cutting mopane branches into smaller pieces to feed their livestock.

Most of the farmers who [practiced] this methodology [have learnt this from] farmers in other regions Key informant (ETO)

One key informant who explored alternative animal feeds a and fed his cattle with Makalani fruits known as Oondunga stated that:

I did not know that cattle could chew on makalani fruit; when I found out, I linked up with people in other regions that have palm trees because we have very few palm trees

here, I took advantage of this opportunity because only a few farmers were aware of feeding their cattle with Oondunga Key informant (ECR)

The statement by participants is also evident that farmers in Osheedhiya village applied their bridging networks to access feed for their livestock. This connection can be linked to ethnicity and form of identity. Kawamoto and Kim's (2020) study after a disaster in Japan, illustrates that social capital-built relations outside the community, these relations provide assistance during emergencies which is based on existing relationships and networks. They further state that residents always have a responsibility to close connections.

Another observation made from this discussion suggests that farmers are hesitant to pursue strategies that did not guarantee actual benefits; they preferred the short-term strategies, such as selling their livestock to lessen the burden and trading to acquire food that has direct benefits. Moreover, some of the participants indicated that if any opportunity arose in agro-ecological practices that include conservation agriculture they are willing to participate, however the outside connections and networks that can allow them to access new innovations is very scares in amongst the community of Osheedhiya.

4.7 SOCIAL CAPITAL IN ADAPTATION TO DROUGHT

The previous section demonstrated some of the strategies that farmers have used to adapt to drought. This section will explore more in-depth social capital as a mechanism that facilitate adaptation to drought amongst farmers living in communal areas. This will be done by exploring the different types of social capital found in communities living in

communal areas and how farmers draw on these to adapt to drought. Social capital was a new concept to participants; therefore, the researcher had to explain the concept by illustrating the connections and links one has, the ties with other people, and group membership. The subsection below demonstrates the type of social capital identified by participants. Figure 4 below depicts the types of social capital identified by farmers in Osheedhiya village by farmers and key informants.

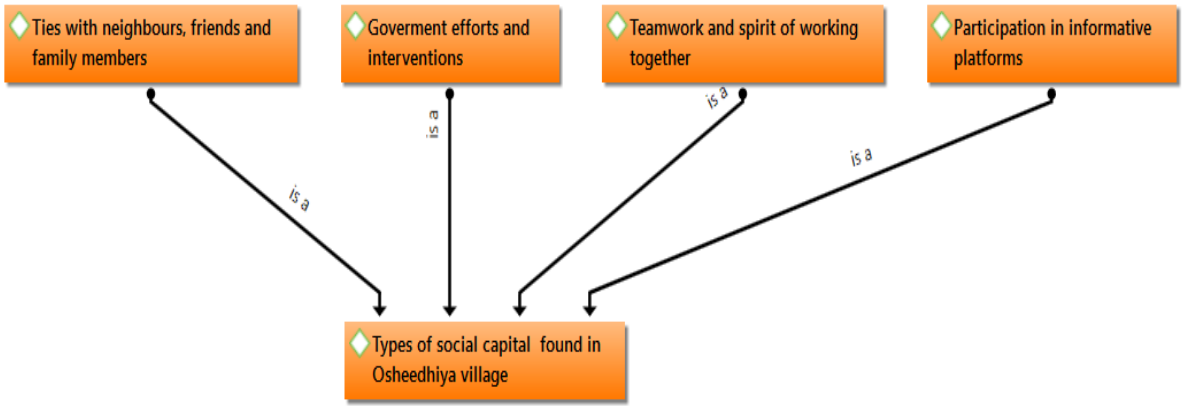

Figure 4.4: Types of social capital in Osheedhiya village, © Martha Jonas

4.7.1 Ties with neighbours, friends, family, and community members

When farmers were asked to identify the type of social capital that plays a role in drought adaptation in their community, they highlighted that their community comprises ties that are conceptualized as bonding ties. These are defined by the connections and interactions with family members, friends, community groups, and neighbours. Rostila (2011)

highlighted that the number of ties one has with their friends, family, and neighbours and how robust their bonds are matters in dealing with a crisis. In relation to this, some of the farmers had this to share:

We could access the correct medication to give our livestock because of our relationship with our friends and neighbours. Farmer (CF20)

Whenever I required transport to get animal feed my neighbours always helped me use their vehicle. Farmer (CF17)

I was able to have something to feed my household every single day, which I got from my friends who are my neighbours; they were always the first to come through with a basket of omahangu. Farmer (CF03)

Furthermore, participants emphasized that as long as farmers have good relationships with their community members and neighbours, their ability to adapt to drought conditions is enhanced. To this, one of the research participants indicated that:

The food relief I got was not enough to feed my household, but my neighbours, who were the first to witness my struggle, gave me moral support. We always organized each other to work in the small gardening project, I was able to take home some tomatoes, spinach, and butternut as my payment. Farmer (CF07)

The above quote does not only indicate the possibility of receiving help from others during drought, but also it is an indication of the important role of strong bonds in facilitating collective adaptation activities (such as gardening project).

Figure 4.5: Farmers from Osheedhiya village participating in the food for work program in small horticulture project in the vicinity of Osheedhiya, © Martha Jonas

Farmers further discussed that there are currently three active horticultural projects in the vicinity of Osheedhiya and further emphasized that the projects have a food for work program that encourages community members to organize themselves to work in the projects. Community members that participate in the food for work program normally get the vegetables that cannot be sold. Moreover, during the drought opportunities to work in the projects was limited, however participants articulated that farmers who had good relations and were trusted by others were always the first to be informed about the opportunities available in the group by the organizing committee of the team.

Moreover, working in the vegetable gardens and getting a few vegetables at the end of the day resulted in some community members having extra food to supplement the scarce

food. These experiences support Saptutyningsih, Diswandi & Jaun, (2020), who concluded that farmers who trust others are likely to accept new adaptation methods that will influence their choice of adaptation. Participants further argued that farmers' trust and ties with their fellow community members made it easier to adapt to the drought because farmers could share the limited resources they had. One of the research participants had this to say:

I went to look for a few old friends in Oshana Region to get advice and see if I could get animal feed. I have not communicated with them in a long time, but the connection was so strong when we met because we were all affected by the same problem. Farmer (CF06).

Participants also shared that the bonding ties became stronger during the drought because everyone was affected. They further indicated that some of the adaptation strategies that they have used are due to the ties with different ethnic groups and other cultures. These types of ties are called bridging ties which they claim to be limited to a few farmers only who have relations with people living beyond the Omusati Region. For example, one of the key informant research participants stated that:

In our community, most farmers who have ties with individuals in other areas were able to explore adaptation strategies that their fellow farmers did not have access to. Key informant (EOC).

Moreover, farmers further highlighted that their ties with friends, neighbours, and community members were more vital during the drought than with family members. This is because the neighbours and friends were available to share supplies and emotional

support. The above findings align with McGillivray (2018), who confirms that neighbours usually respond to disasters by rendering support to each other before any other support comes. As a result of stronger bonding ties, farmers could coordinate and take their needs to responsible people such as the Constituency and traditional councillors. Therefore, farmers who form strong relationships with others are likely to survive the drought situation.

4.7.2 It is teamwork that worked, "omunwe gumwe iha gu itongola ona"

Omunwe gumwe iha gu itongola ona means one finger cannot clear itself of a lace bug. This proverb in Oshiwambo language means that if a person works alone, they are likely not to achieve anything. In this case, one can interpret it further to say that when in a crisis, one needs the help of others. Many research participants during the fieldwork referred to this proverb. One of them notably stated that:

If we did not work together at cattle post, we could not have reduced the pressure on our finance. Farmer (CF06*).*

Another research participant echoed this statement that:

Farmers at cattle posts have always struggled to open up a joint account, but during the drought *of 2019, some of them succeeded because they realized that if they do not work together, they would not be able to cope with the devastating impacts alone when it comes to purchasing medication for their livestock and maintaining boreholes.* Key informant (EAO)

In Omusati region farmers usually keep their livestock at cattle posts, primarily for better grazing and pasture. Cattle posts are areas that are very far from the villages and are considered forests that are more fertile compared to the inland where many activities are happening. There are very few households at the cattle posts, mainly for the cattle herders. Participants further made emphasis that most of their livestock are at the cattle posts, and this is where they worked together to try and save their livestock by working together as a team. Another key informant had this to say:

Farmers in Omusati Region were involved in exchanging grass and water; if they spot an area with grass, farmers organize themselves, and they would contribute petrol money to fill up one vehicle, collect ten litter's containers with water and exchange the containers for grass. Key informant (ECR)

The above statement from participant illustrates that there was also informal exchange among members of the community. Farmers further emphasized that the severe impacts of the drought made them realize that the spirit of working together was critical if they were to cope with the drought conditions. This can be contextualized as collective action, another type of social capital contributing to their ability to adapt to the drought. One of the studies on social capital points out that collective action enhances farmers' chance to access information, share knowledge, and resource mobilization, which increases their chances of responding to climate change impacts (Christy & Niles, 2018). As a support to this, one of the research participants shared the experiences that:

Some farmers in the region organized themselves by identifying households who had omahangu in their storage to come together; these households brought to the table about

5 - 10 lata (20-liter buckets) of omahangu, and sold at a reduced price to farmers who did not have any omahangu in their storage from the previous years. Key informant (EOC).

This initiative by the community is similar to the findings by Crawford & Terton (2016), who reported that one of the adaptation strategies proposed in the Omusati Region was the promotion of a food bank, whereby each household is required to take up to 1 lata (20 litres bucket) of *omahangu* to the traditional authority. When it comes to group activities and teamwork, farmers had many stories to tell:

I remember that during the 2019 rainy season, we did not receive enough rain, but my three neighbours and I managed to plough very early before anyone else in the village. We took our donkeys and first worked on one field together before moving to the next. We slaughtered a goat and brewed traditional beer. Farmer (CF11).

Moreover, in the Aawambo culture, group activities where every individual is expected to participate, also known as *Ondjambi* is popular. It was also observed that this type of initiative is common in villages far from towns and is likely to work when members from the same clan or households are close. Another group initiative that was initiated in drought times was a savings club. Farmers highlighted that this club comprised mostly of female pensioners and unemployed farmers. The practice of the saving club is farmers collect money during the year that households can use in a crisis. Members of the savings club contribute as little as 20 dollars per month. The club initially comprised 25 households but now only has eight members this is because most members could not see the benefit of the saving club and felt that a certain group had more power over the finance

than others. Some of the research participants shared their experiences of the savings club that:

Even though the idea of our savings club was to use the money during a crisis or during the harvest, there are exceptions when a member is in dire need and the club can help. Farmer (CF13).

Some individuals in the village consider the savings club as a waste of time, but I remember buying 10 kg of maize three times with my savings from the club, so it is a good thing Farmer (CF 09)

The findings demonstrate that working together to pool resources and efforts to solve a common problem has been critical for farmers to adapt to drought. Farmers also stressed that they could not have been able to survive the drought if they did not work together.

4.7.3 Participation in information –sharing platforms

Access to information sharing platforms is another type of social capital that has helped farmers adapt to drought in Osheedhiya village. In the sections below, platforms that participants pointed out to be important in accessing information and knowledge that helped them better cope with the drought are presented.

a) Village commercial centre

Like most villages in north-central Namibia, the Osheedhiya village has a commercial centre that is made up of several *Cuka shops (small trading shops)* owned by individuals

from the village; this is where trading takes place. Talking about the commercial centers, some of the research participants stated that:

Farmers are always at the commercial centre, and this is where they spend most of their time; some go there early in the morning and only go home late in the evening. Farmer (CF14.).

During the crises such as the drought, any information is communicated at the commercial centre, because whoever comes into the village is likely to stop at the centre first before proceeding. Key informant (ETO).

If you want the information to spread fast just take it to the commercial centre, it will reach a large number of people in a short time, and some farmers will confuse you, one will think they live at the Cuka shops, any information you want to get to them can only be disseminated through this centre because that is where they spend most of their time. Farmer (CF19)

Some participants further argued that sometimes it is difficult to get some farmers to attend meetings where information is shared because they spend too much time at the commercial centre. Participants highlighted that agricultural officers usually arrange meetings to inform farmers of the rainfall patterns, including the possibility of the drought in particular years. At times, these meetings will be held at the commercial centre where most farmers are found to ensure that the information reaches most of the farmers in the village. It is also at the commercial centres where farmers can buy *omahangu* from others that are selling, as one of the research participants shared:

Sometimes you do not have anything to eat at home because you did not harvest enough, but because you are always at the Cuka shops you will get someone who will offer you small omahangu for sale or even free. If you stay at home all the time, you will not network with your fellow farmers and neighbours Farmer (CF04.

Therefore, village commercial centers are essential in disseminating information during the drought. Most of the conversation farmers indulge in while at the commercial centre is around the drought situation. In most cases, farmers will share their stories of surviving, support each other emotionally, and share available supplies.

b) Radio stations

Almost every second household in the Osheedhiya village has a radio and, the popular radio stations that community members listen to in the village are Kati FM, Ship FM, and Eagle FM. These three stations' network is well received in Omusati Region. Findings reveal that radio is an essential medium of information dissemination that many farmers depend on, as one of the research participants stated:

The radio has allowed us to understand the drought situation better. On the radio, we get to understand that the drought did not only impact our region but the whole of Namibia; we can also follow discussions on what government plans are in to assist farmers. Farmer (CF13)

Most of the information I used to save my livestock came from the radio; I got contacts of fellow farmers who are selling animal fodder. Farmer (CF06)

Participants further highlighted that the radio typically encourages them to start new projects. For example, after the drought of 2019, farmers were encouraged to reserve a small area from their fields for horticultural production of cash crops that are not rain-fed. Additionally, farmers suggested that during drought, they are mostly glued to the radio to find out information on food relief and how they should coordinate themselves to benefit from food relief or receive any other assistant. Additionally, participants reported that the radio is an essential platform in information sharing, especially that the Constituency councillor announced all information on food relief on the radio. In a study on the influence of institutional access and social capital on adaptation decisions based on empirical evidence in Bangladesh by Alam, Alam & Mushtaq (2016) found that lack of information on appropriate adaptation strategies is among the important barriers to adaptation. The results suggests that the use of radio stimulate a sense of sharing of information and resources among farmers.

c) Traditional and religious gatherings

Traditional and religious events are another form of communication channel and can be used to share information on drought experiences.

Drought *were the talk at traditional and religious ceremonies, during happy days such as weddings and baptisms, and sad days such as funerals, relatives, and friends usually come together, instead of the usual family gossip and catch up the drought situation overtook most of the conversations.* Key informant (ECL).

Participants further alluded that traditional ceremonies bring together a large number of people with different experiences and knowledge. As one of the participants stated:

During the drought of 2019 that was so severe, I attended my sister's great grandchild's daughter's baptism party, and the topic was around drought, Farmer (CF16).

Farmers further noted that during crises such as drought, they looked forward to attending formal events because they were likely to meet people from different regions or towns that would share how they were coping with the crises. Another key informant had this to say:

Most of the farmers in our area are retired; they go from one funeral and wedding to another. In most cases, they find that this is the way for them to network, meet their peers, and obtain knowledge on how to cope with crises Key informant (ETO)

Drought can be devastating and overwhelming for farmers, resulting in only wanting to speak about coping mechanisms with their peers. In a study by Bhandari and Yasunobu (2017), they found that the whole notion of social capital is centred on social networks. When farmers in Osheedhiya village attend traditional ceremonies, they can build social networks and develop new links that might lead to more information and solutions to drought adaptation.

d) Pension points

Another platform used by farmers to share their stories and access new information on the drought that leads to farmers coping better with drought impacts is the pension points; these are large gatherings where the local community meet every month on a particular date that is announced on the radio to receive their pension grants. At these pension points,

business people also sell products, including *omahangu* and even livestock feed. Farmers stated that everyone was looking for what to buy at the pension points to sustain their household during the drought. One of the farmers shared the following

Even though we did not harvest, we always look forward to the pension points to see what we can buy to supplement the little that we already have. Farmer (CF05)

Farmers further argue that the pension points support each other emotionally during crises such as drought. They stressed that even though everyone in the Region and Onesi Constituency is affected by the drought, some farmers have more knowledge of coping than others, and the pension point is thus used as a hub to receive what one lacks.

e) Other platforms

Farmers have emphasized that drought has become a hot topic, that wherever they find themselves, someone would always bring up the topic because of its intensity. Some shared that:

When I attended my children's parent meeting, we would ponder on the drought impacts and comfort each other. Farmer (CF10)

Furthermore, during the parent meetings, farmers are likely to get information on adaptation strategies from other parents, as one of them shared that:

We would always talk about our livestock and how we are surviving the drought during parent meetings Farmer (CF11)

Additionally, since most communal farmers do not have transport, they usually use public transport, which participants also identified as another platform where new information and knowledge can be accessed from strangers who are likely to share new information from their villages, towns, and regions. Moreover, it was observed that when information is disseminated through elevated platforms such as the Onesi Constituency Office, farmer's union, ministry responsible for agriculture (regional office), very few farmers have access to this information, as shared by the key informant participant who stated that:

You have farmer's associations who get better advice due to how they have organized themselves concerning their crops and livestock; however, farmers do not use these formal platforms and would rather get second-hand information from the Cuka shops or other informal platforms. Key informant (EOC).

The above statement suggests limited as well as weak relations between local farmers and government at the local level, which can limit both individual as well as collective adaptation. Nevertheless, farmers in Onesi Constituency are surrounded by the Onesi Constituency Office, Uukolonkadhi Traditional Authority Office, and the ministry responsible for agriculture that work hand in hand to assist the community members as regards adaptation to drought. Whatever information that comes to the village is coordinated through these institutions. As Hegga *et al.,*. (2016) stated, seasonal climate information can be accessed through platforms for climate information exchange to reduce vulnerability to a particular hazard. Platforms discussed above are the primary source of information and knowledge sharing used by farmers in Osheedhiya village to cope with the drought. These platforms are part of social capital because they hold the potential for

the diffusion of knowledge and innovation, leading to farmers elicited knowledge and views on adaptation measures.

4.7. GOVERNMENT INTERVENTIONS IN DROUGHT RESPONSE ACTIVITIES

Another type of social capital that farmers identified to play a significant role in the Osheedhiya village on adaptation to drought is access to interventions by the government. These are actions that the government undertakes to assist communities in coping with drought impacts. One of the farmers, for example, shared that:

During the drought, we depended 100% on the government; we were always close to our radios to listen to what our government would do for us. Farmer (CF18).

The Onesi Constituency Office, together with the office of the ministry responsible for agriculture, is responsible for communicating all the interventions that the government will take. One of the key informant participants spoke to this by saying that

The community in the Onesi Constituency rely on the information we give them regarding the rainy season; if we inform them through the radio that the season will be short, you will see them coming one by one to the Constituency office to enquire more information. Key informant (EOC).

A farmer also related to this by stating that:

We always purchase seeds at a subsidized price from the agriculture office, they announce on the radio for farmers to go and buy drought-resistant seeds Farmers (CF12)

Participants also further indicated that some interventions such as drought adaptation programs are coordinated directly by the Regional Council's office. They emphasized that they do not normally hear of these programs in their village, and when the programs are organized, the time is too short for farmers to grasp anything. Participants emphasized that the government makes minimal efforts in equipping farmers with the appropriate knowledge and skills. This statement is in line with the findings by Spear, *et al.,* (2018) who reported that farmers are slow to shift to climate-smart ways of farming, and this is because of poor technical support by government institutions, and efforts are mostly seen through food relief and financial support such as social protection grants. One of the research participants highlighted that:

Our government gives us pensions and grants for our orphans and vulnerable children; we could not survive the extreme dry seasons without government grants Farmer (CF09).

During the drought of 2019, an article in the New Era, a government-run national daily newspaper, reported a family of 21 people on the verge of death in Osheedhiya village due to lack of food. When asked about this article, they complimented the government for taking a drastic step after the family appeared in the newspaper. One of the farmers shared that:

The family that came in the newspaper consists of many young girls with their little ones, they were unemployed and did not work in the field, and they have become a particular case and received food relief and government support even after the drought Farmer (CF10).

Findings further highlight that government efforts and support are key in the ability of farmers to adapt to drought conditions. However, the conditions in which the government works with the farmers in drought response may determine the extent to which government interventions support and enables adaptation to drought. During the interviews, it was observed that farmers are very devoted to the government and see government efforts as the best solution to any crisis. Government support through food relief has been mentioned almost by every farmer; however other efforts highlighted by other literature, such as the provision of tractors for harvesting, were not pointed out by farmers (Spear, *et al.,* 2018). Research conducted in Botswana illustrated that communities advocate moving away from dependency on government (Ziervogel, *et al.,* 2016). However, in this study, farmers seem to be comfortable with the support they get from the government. It is therefore imperative to enhance government support, especially in the area of drought adaptation. However, most of the Programs and projects put in place by the government as well as development agencies seem to depend highly on donor interest and funding from international agencies (Crawford & Terton, 2016). As a result, adaptation projects and initiatives implemented are likely to pursue the donor ideas, resulting in the local communities' ideas being overlooked.

4.8. SOCIAL DIFFERENCES IN ADAPTATION TO DROUGHT

Participants acknowledged the importance of social capital in adaptation to drought but further discussed that farmers' ability and power to access social capital in their community differs. Highlighting these differences, one of the key informants stated that:

Farmers who are civil servants are ahead in terms of knowledge and always build new relationships, therefore they can cope better. Key informant (ETO).

Participants described that farmers who are civil servants and retired participate in formal platforms such as farmer's unions and therefore have an advantage of establishing social networks. In the Osheedhiya village, members of the Uukolonkadhi Traditional Authority Committee are likely to have the advantage of participating in social activities that enhance their chance of forming new relationships and connections. Farmers further argue that individuals who serve on traditional councils are usually those who have retired from government and are highly respected because they have the required resources such as transport, which farmers require to travel to meetings and transport other farmers to cattle posts and to collect animal feed.

In most cases, farmers are discouraged from participating in informative meetings due to a lack of transport and resources. Indirectly' this limits farmers' ability to adapt to drought impacts. Participants also emphasized that very few farmers in their village have acquired the necessary skills and knowledge due to a lack of education. In most cases, farmers learn from each other, therefore, if most of them are not educated, the variance will not be much because their abilities are limited. A key informant participant state that:

Acquiring resources that can help a farmer in times of crisis requires a farmer to have a reason behind why they are doing what they are doing; farmers will only accept new ideas or be curios if they recognize what is in for them Key informant (EOC).

In relation to this, a farmer shared that:

Training was offered on how to manoeuvre donkeys when ploughing, but out of all the households, only one household that belongs to a traditional council agreed to participate in the program. Farmer (CFO1).

The statement made by the expert in the field is confirmed by Christy and Niles (2018), who found that farmers have different personal motivations, innovation, objectives, and resource endowment, which result in them accessing different social networks and benefiting from these resources. Additionally, farmers in communal areas can be put in different categories, farmers who accept new opportunities are likely to be capacitated through training programs, while those that are not open to new opportunities are likely to remain behind from new innovations.

Another key informant shared that:

Farmers who do not attend meetings at the agriculture office are likely to use the wrong seedling and not plough at the right time. Key informant (ECL)

Therefore, farmers who attend meetings and training will receive adequate information because there is information sharing. Moreover, participants alluded that differences seem to be there due to alcohol use; those who spend most of their time at the commercial centre normally have limited information and knowledge that can enhance their chances of accessing social capital because information at informal platforms is not sufficient.

In Omusati Region, there are farmer's associations who get better advice due to the way they organize themselves concerning their crops and livestock; there are also farmers who

are wealthy and own tractors, vehicles, and machinery; these farmers always encourage hard work and assist other farmers who do not have the knowledge and resources. Key informant (ECR)

As a result, farmers who cannot access to formal information platforms can capitalize on wealthy farmers and are likely to adapt in the process. However, even though the social difference in accessing social capital is there, Farmers are now aware of different strategies to reduce the impacts of drought on their livelihoods and have started exploring other alternatives to food security, such as allocating a smaller piece of land to grow vegetables in their fields.

4.8.1 Gender differences in coping with drought

Another variance observation made was that female participant were more involved in helping

each other with food suppliers than male participants, especially in sharing omahangu and food supplies with neighbours and family members. One of the female farmers shared that:

We are good at trading for food suppliers; I could exchange my only pair of the shoes just to get something to feed my children. Farmer (CF02)

Moreover, when it came to the male participants, they were involved in selling their livestock to get money to buy food supplies. Research in other countries has shown similar

findings, for example, farmers in Ethiopia have been found to have employed the strategy of selling livestock to adapt to drought (Ncube & Shikwambana, 2016).

4.9 SUMMARY

Chapter 4 presented the results on the role of social capital amongst farmers living in communal areas. The study found that the application of social capital to adaptation to drought, mostly affected social networks. Access to information and knowledge are not appreciated as potential resources that can assist in adaptation. However, farmers living in communal areas were able to survive the harsh conditions caused by drought through, strong ties and relationship with neighbours and family members which can be linked to bonding and bridging ties and the spirit of Ubuntu which speaks of togetherness.

Farmers were also able to work together collectively through gardening projects and at cattle posts where they brought their resources together to solve a common problem. Furthermore, bridging ties such as government interventions was found to also play a significant role in providing access to new information and knowledge potential for adaptation to drought. Hence strengthening government interventions can assist local communities build trust and cope better with drought.

Farmers were also able to access new information through engaging in meetings and other platforms such as radio, commercial centres, and traditional ceremonies. This shows that if social capital is strengthened amongst communal farmers, it can help farmers to better cope with drought. Moreover, formal associations have potential, despite the fact that some farmers are left out, thus there is a need to find better ways to include those who do

not have access to these networks, for example having more representations from the local farmers.

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSION

The main aim of this research was to analyse the role of social capital in adaptation to drought. This study concludes that ties with friends, neighbours, and families make it possible for farmers to share food supplies and render emotional support during the drought. Even though farmers were not fully aware that they could manage their resources because of the relationships and ability to work together, the findings demonstrate that if stronger bonds are created between farmers and the Traditional councillors, Constituency councillor and agricultural officers in the region, it can lead to collective drought response. As farmers engage with the government officials it should increase trust on government which would in turn stimulate more farmer engagement in collective drought management activities. The study by Adger (2001) also supports that the relationships, networks, and norms shape the livelihood of farmers who collectively manage their resources during a crisis. During the drought, farmers could get information on which medication to use for their livestock and build relationships with farmers who have transport to assist collect food relief from the constituency office. Additionally, most of the information in the Osheedhiya village is shared through informal platforms such as commercial centres, that can be used as platforms to communicate issues relating to drought.

Moreover, it is evident that once social capital is incorporated in drought policies and programs, it can lead to drought preparedness, hence, social capital is crucial in adaptation policies (Alam, Alam & Mushtaq, 2016). Moreover, opportunities for accessing social capital can be extended by encouraging civil servants to engage with the traditional

authority and participate in governance committees when they retire to extend and share their knowledge from the public service.

The study also found that if social capital is integrated as one of the mechanisms to facilitate adaptation to drought. Access to social networks, knowledge, information and resources would result in farmers that are able to cope with drought. However, most farmers living in communal areas find it difficult to access the required social networks and information, due to extensive use of alcohol which takes away their ability to participate or receive information. Finally, the government and development agents should make efforts in facilitating access to social networks, knowledge, information and resources. Hence if efforts are not made, farmers living in communal areas would not appreciate the benefit of social capital but would continue to depend on drought relief programs.

5.2 RECOMMENDATIONS FROM THE RESEARCH FINDINGS

5.2.1 Social capital as a mechanism in adaptation to drought

Including social capital in drought adaptation policies and programs can enhance farmers' chances of acquiring the knowledge leading to drought preparedness.

5.2.2 Improving Access to formal information sharing platforms influences farmers' decisions to adapt to drought

1. Create a new scope to maintain partnership with the farmers in communal areas to attend meetings and formal information platforms that can assist farmers gain knowledge of surviving drought, shaping their perceptions and decisions to prepare for future drought.
2. Embed drought response awareness activities into trusted sources of information such as radios, could make the flow of information and resources for drought response between the government and communal farmers more easily accessible.
3. Embed drought response activities into existing local government networks such as Traditional authority, the constituency office, and MAWLR could change the way communal farmers work with the government during drought.

5.2.3 Political action and government support

1. Collaborative engagement between the Government and the farmers who are familiar with drought can be used as a means to gain knowledge for surviving different drought events and farmers' trust to facilitate effective drought response at the local level.
2. Strengthening constituency development structures where farmers can engage and build networks to improve their coping mechanisms.
3. The government should include a small budget to assist community members who volunteer to coordinate food relief or participate in drought adaptation initiatives.

This will address the lack of resources being a barrier to active and willing farmers to build networks.

4. Increase farmer's access to available bridging ties and rights institutions and people intellectuals such as agricultural officers to facilitate flow of information and resources for drought response.

5.2.4 Strengthening Social Capital as an adaptation strategy

1. Encourage drought dissemination of information at the village level and equip councillors and agricultural officers with drought adaptation information.
2. Introduce regional disaster risk management at the district level with information and pamphlets printed in Oshiwambo that farmers can access.
3. The government needs to organize a task force by inviting and encouraging innovative people and intellectuals to assist farmers in accessing social capital.
4. Create partnership between the Farmers in Osheedhiya and the Olushandja Horticultural Producers Association to assist farmers acquiring networks and information that can help them diversify.

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ANNEXURES

ANNEXURE A: ETHICAL CLEARANCE CERTIFICATE

UNAM
UNIVERSITY OF NAMIBIA

ETHICAL CLEARANCE CERTIFICATE

Ethical Clearance Reference Number: HREC-NH/01/10/2020 **Date:** 07-10-2020

This Ethical Clearance Certificate is issued by the University of Namibia Research Ethics Committee (UREC) in accordance with the University of Namibia's Research Ethics Policy and Guidelines. Ethical approval is given in respect of undertakings contained in the Research Project outlined below. This Certificate is issued on the recommendations of the ethical evaluation done by the Faculty/Centre/Campus Research & Publications Committee sitting with the Postgraduate Studies Committee.

Title of Project: AN ANALYSIS OF THE ROLE OF SOCIAL CAPITAL IN ADAPTATION TO DROUGHT: A CASE STUDY OF OSHEEDHIYA VILLAGE, OMUSATI REGION

Nature/Level of Project: M.A. (NON-HEALTH) (NQF9)

Researcher: MARTHA NDILIPUNE JONAS

Student Number: 200515519

Faculty: HUMANITIES AND SOCIAL SCIENCES

Supervisor(s): DR A. NHEMACHENA & DR. R. NGHITEVELEKWA

Take note of the following:

(a) Any significant changes in the conditions or undertakings outlined in the approved Proposal must be communicated to the UREC. An application to make amendments may be necessary.
(b) Any breaches of ethical undertakings or practices that have an impact on ethical conduct of the research must be reported to the UREC.
(c) The Principal Researcher must report issues of ethical compliance to the UREC (through the Chairperson of the Faculty/Centre/Campus Research & Publications Committee) at the end of the Project or as may be requested by UREC.
(d) The UREC retains the right to:
(i) Withdraw or amend this Ethical Clearance if any unethical practices (as outlined in the Research Ethics Policy) have been detected or suspected,
(ii) Request for an ethical compliance report at any point during the course of the research.

REC wishes you the best in your research.

Prof. H.L. Beyer, Deputy Chair: HREC-NH
pp Chair: HREC-NH

ANNEXURE B: SEMI-STRUCTURED INTERVIWEW GUIDE FOR COMMUNAL FARMERS

My name is Martha Jonas, registered under the program Masters of Arts in Development Studies at the University of Namibia, student number 200515519. This research is a requirement for my Master's Degree thesis titled: **An analysis of the role of social capital in adaptation to drought: A case study of Osheedhiya village, Omusati Region.** Thank you for agreeing to take part in this study that will take approximately **45 minutes**. In this interview, there is no wrong or correct answer; what is required is your opinion on the role that social capital plays in adaptation to drought among communal farmer's households. Your contributions to this study will add to the existing body of knowledge on adaptation to drought. The interview will be recorded and you may decline to answer any questions or stop the interview at any time, your participation is strictly voluntary and you are encouraged to ask for clarification for any question that you do not understand.

Opening questions

1. How long have you been a communal farmer in Osheedhiya village?
2. Are you involved in community activities or any project in the village/region?
3. Are you a full-time farmer or you are also employed?
4. Have you ever attended any type of training on adaptation to drought?

Questions on Social capital

5. How would you describe the rainy season for the past five years in Osheedhiya village?
6. What role does social capital play in adaptation to drought?

7. When did you start farming with Omahangu and livestock, and how did your fellow community members and relationships help with information sharing?
8. How did the drought of 2015- 2019 impact your household, and what lessons did you learn?
9. What type of platforms are there in your community for information sharing?
10. Do you think collective action is a good thing, and can it help in times of drought?
11. What are the barriers for community members to participate in activities and collective action?
12. What is the determining factor in accessing these platforms and participating in collective action?
13. What can the government do to make accessible the platforms to access social capital?

Please take note that this guide only represents the main themes to be discussed with the communal farmers and does not include the various prompts that may also be used

ANNEXURE C: INTERVIEW GUIDE FOR ONESI CONSTITUENCY COUNCILLOR

My name is Martha Jonas, registered under the program Masters of Arts in Development Studies at the University of Namibia, student number 200515519. This research is a requirement for my Master's Degree thesis titled: **An analysis of the role of social capital in adaptation to drought: A case study of Osheedhiya village, Omusati Region.** Thank you for agreeing to take part in this study that will take approximately one hour. In this interview, there is no wrong or correct answer. What is required is your opinion on the role that social capital plays in adaptation to drought among communal farmers' households. Your contributions to this study will add to the existing body of knowledge on adaptation to drought. The interview will be recorded, and you may decline to answer any questions or stop the interview at any time. You are encouraged to ask for clarification for any question that you do not understand.

Introduction questions

1. How long have you worked for the constituency office of Onesi?
2. How would you describe the community in the Onesi constituency?

Questions on social capital

3. What is the role of the constituency office in adaptation to drought?
4. How would you describe the impact that drought have on communal farmer's especially Osheedhiya village?
5. What are developmental programs found in Onesi constituency?

6. Would you say groups and connections could be a form of adaptation to drought?
7. How would you describe communal farmer's ability to work together?
8. When resources are distributed to the community, are they distributed equally?
9. During the drought of the past five years, are there any particular communal farmers who can access information?
10. Do you think that villages that are far away from constituency offices and other offices differ?
11. Do you think community farmers who participate in community activities are likely to adopt?
12. What mechanisms do you think can be put in place for communal farmers to access social capital?

ANNEXURE D: INTERVIEW GUIDE FOR CHIEF REGIONAL OFFICER

My name is Martha Jonas, registered under the program Masters of Arts in Development Studies at the University of Namibia, student number 200515519. This research is a requirement for my Master's Degree thesis titled: **An analysis of the role of social capital in adaptation to drought: A case study of Osheedhiya village, Omusati Region.** Thank you for agreeing to take part in this study that will take approximately one hour. In this interview, there is no wrong or right answer. What is required is your opinion on the role that social capital plays in adaptation to drought among communal farmer's households. Your contributions to this study will add to the existing body of knowledge on adaptation to drought. The interview will be recorded, and you may decline to answer any questions or stop the interview at any time. You are encouraged to ask for clarification for any question that you do not understand.

Opening questions

13. How will you describe the impact that the drought of the past five years have on the Omusati region?
14. How would you describe the level of adaptation in the Omusati region?

Questions on Social Capital and adaptation

15. When it comes to communal farmers in Omusati, are farmers able to adapt to drought, and what type of methodologies do they employ?

16. What role does social capital can play in adaptation to drought in the Omusati region?

17. How will you describe the level of importance of social capital in adaptation to drought?

18. Would you say that the level of variance amongst communal farmers might be due to drought?

19. Do you think the region has made availability for communal farmers to access social capital?

20. What can the government do to create opportunities for social capital?

Please note that this guide only represents the main themes to be discussed with the Chief Regional Officer and does not include the various prompts that may also be used (examples given for each question).

ANNEXURE E: INTERVIEW GUIDE FOR THE COMMUNIITY LIAISON OFFICER

My name is Martha Jonas, registered under the program Masters of Arts in Development Studies at the University of Namibia, student number 200515519. This research is a requirement for my Master's Degree thesis titled: **An analysis of the role of social capital in adaptation to drought: A case study of Osheedhiya village, Omusati Region.** Thank you for agreeing to take part in this study that will take approximately one hour. There is no wrong or correct answer; what is required is your opinion on the role that social capital plays in adaptation to drought among communal farmers' households. Your contributions to this study will add to the existing body of knowledge on adaptation to drought. The interview will be recorded, and you may decline to answer any questions or stop the interview at any time. You are encouraged to ask for clarification for any question that you do not understand.

Opening questions

1. What are your roles/responsibility in working with farmers' households in the Omusati region?
2. How would you describe working with communal farmers?

Questions on social capital and adaptation

3. What type of platforms are there for information sharing and acquiring knowledge for communal farmers regarding drought?

4. What do you regard as a determining factor for communal farmers participating in information sharing platforms and collective action? Can it also be a barrier?

5. When working with communal farmers, would you say that their adaptation to drought conditions is because of variance in information and ability to collaborate?

6. What factor would you regard to play a significant role in communal farmers' adaptation to drought?

7. When working with communal farmers, do you think there is a difference in adaptation to drought between farmers who have access to information and the ones who do not have access to information

8. When looking back at drought of the past five years, what do you think decisions can make to improve access to information, communications, and networks in improving communal farmers' ability to adapt to drought?

9.

Please note that this guide only represents the main themes to be discussed with the community liaison officer and does not include the various prompts that may also be used (examples given for each question). Non-leading and general prompts will also be used, such as "Can you please tell me a little more about that?" and "What does that look like for you."

ANNEXURE F: INTERVIEW GUIDE FOR AGRICULTURAL EXTENSION OFFICERS

My name is Martha Jonas, registered under the program Masters of Arts in Development Studies at the University of Namibia, student number 200515519. This research is a requirement for my master's degree thesis titled: An analysis of the role of social capital in adaptation to drought: A case study of Osheedhiya village, Omusati Region. Thank you for agreeing to take part in this study that will take approximately 45 minutes. In this interview, there is no wrong or correct answer. What is required is your opinion on the role that social capital plays in adaptation to drought among communal farmer's households. Your contributions to this study will add to the existing body of knowledge on adaptation to drought. The interview will be recorded, and you may decline to answer any questions or stop the interview at any time. You are encouraged to ask for clarification for any question that you do not understand.

Opening questions

1. How long have you been working in Omusati region?
2. How would you describe the rainy season in the past five years in the Omusati region?
3. How would you describe communal farmer's adaptive capacity especially in Osheedhiya village?

Questions on social capital and adaptation to drought

4. What type of platforms are there for information sharing and acquiring knowledge for communal farmers regarding the drought?

5. What do you regard as a determining factor for communal farmers to participate in information sharing platforms?
6. When working with communal farmers would you say that their level of adaptation to drought conditions is because of variance in information, and ability to act collectively?
7. Do you think collective action is a good thing and it can help in times of drought?
8. What are the barriers to accessing social capital for communal farmers?
9. What needs to be done for farmers to access social capital?

Please take note that this guide only represents the main themes to be discussed with agricultural extension officers and does not include the various prompts that may also be used (examples given for each question). Non-leading and general prompts will also be used, such as "Can you please tell me a little bit more about that?" and "What does that look like for you".

ANNEXURE G: INTERVIEW GUIDE FOR TRADITIONAL AUTHORITY OFFICER

My name is Martha Jonas, registered under the program Masters of Arts in Development Studies at the University of Namibia, student number 200515519. This research is a requirement for my Master's Degree thesis titled: **An analysis of the role of social capital in adaptation to drought: A case study of Osheedhiya village, Omusati Region.** Thank you for agreeing to take part in this study that will take approximately one hour. In this interview, there is no wrong or right answer. What is required is your opinion on the role that social capital plays in adaptation to drought among communal farmer's households. Your contributions to this study will add to the existing body of knowledge on adaptation to drought. The interview will be recorded, and you may decline to answer any questions or stop the interview at any time. You are encouraged to ask for clarification for any question that you do not understand.

Introduction questions

1. What are the duties of the traditional authority towards communal farmers?
2. Is land capacity a determining factor during drought.?

Questions on social capital

3. How did the drought of 2015- 2020 impact the household, and what lessons did they learn?
4. What type of platforms are there for communal farmers?
5. Do you think collective action is a good thing, and can it help in times of drought?
6. What are the barriers for community members to participate in activities and collective action?

7. What is the determining factor in accessing these platforms and participating in collective action?
8. What can the government do to make these platforms accessible and participate in collective action?

ANNEXURE H: LANGUAGE EDITING CERTIFICATE

Dr.GM

The Rev. Dr. Greenfield Mwakipesile

ThD, MBA, HBS | mwakipg@outlook.com

CONTACT

PO Box 99539,
UNAM,
Namibia

LANGUAGE & COPY-EDITING CERTIFICATE

25th May 2022

RE: LANGUAGE, COPYEDITING AND PROOFREADING OF MARTHA NDILIPUNE JONAS' THESIS FOR THE MASTERS IN DEVELOPMENT STUDIES DEGREE OF THE UNIVERSITY OF NAMIBIA

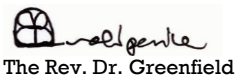
This certificate serves to confirm that I copyedited and proofread **MARTHA NDILIPUNE JONAS'** Thesis for the **MASTERS IN DEVELOPMENT STUDIES DEGREE** entitled: **THE ROLE OF SOCIAL CAPITAL IN ADAPTATION TO DROUGHT: A CASE STUDY OF OSHEEDHIYA VILLAGE OMUSATI REGION NAMIBIA**

I declare that I professionally copyedited and proofread the thesis and removed mistakes and errors in spelling, grammar, and punctuation. In some cases, I improved sentence construction without changing the content provided by the student. I also removed some typographical errors from the thesis and formatted the thesis so that it complies with the University of Namibia's guidelines.

I am a trained language and copy editor and have edited many Postgraduate Diploma, Masters' Thesis, Dissertations and Doctoral Dissertations for students studying with universities in Namibia, Zimbabwe, Eswatini, South Africa and abroad. I have also copy-edited company documents for companies in the region and abroad.

Please feel free to contact me should the need arise.

Yours Sincerely,



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